Devineni Venkata Ramana & Dr.Hima Sekhar
MIC College of Technology
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B.Tech (CSE|ECE|ME)
Accredited by
NAAC A
With Grade

FORMAT FOR INSTITUTE FUNDED SEED GRANT PROPOSAL

Name of the Principal Investigator: Mr.N. V. Subba Rao

Designation: Associate Professor

Name of the Co-Investigator (if any): No

Designation: No

Department: Civil Engineering

Title of the Project: 'ANALYSIS OF STEEL FIBER STRENGTH IN CONCRETE ALONG WITH PARTIAL REPLACEMENT OF CEMENT BY FLY ASH''

1. Background

Cement, one of the most important building materials, is a binding agent that sets and hardens to adhere to building units such as stones, bricks, tiles, etc. The raw ingredients are processed in cement manufacturing plants and heated to form a rock-hard substance, which is then ground into a fine powder to be sold.

Cement mixed with water causes a chemical reaction and forms a paste that sets and hardens to bind individual structures of building materials.Fly ash is a fine gray powder consisting mostly of spherical, glassy particles that are produced as a byproduct in coal-fired power stations. Fly ash has pozzolanic properties, meaning that it reacts with lime to form cementitious compounds. It is commonly known as a supplementary cementitious material.

The fly ash is one of the waste materials produced from thermal power stations. Fly ash is also known as flue-ash or simply ash. Steel fiber is a metal reinforcement. Steel fiber for reinforcing concrete is defined as short, discrete lengths of steel fibers with an aspect ratio (ratio of length to diameter) from about 20 to 100.

Steel Fiber in plain concrete would act as crack arrester and would substantially improve its compressive strength properties. Increase the Tensile strength and Toughness. Improves Abrasion and Impact load resistance.

This project is focused at the effects on the addition of fly ash as a partial replacement of cement in concrete and steel fibers acts as a fiber in the concrete. This experiment is carried out by finding the compressive strength. The fly ash is added in the proportion of 10%, 20% and 30% by weight in the cement respectively to the presents good pozzolanic properties and steel fibers provide good strength to the concrete as the results are compared with the control mix of design mix M30.the specimens are tested after nominal,7,28,56 days of curing. It is

observed that while keeping fly ash at 5% and 7.5% and 10% and 12.5% with steel fibers can be carried out in concrete without decreasing the strength.

Fine aggregates are basically natural sand particles from the land through the mining process. The fine aggregates consist of natural sand or any crushed stone particles that are ¼" or smaller. This product is often referred to as 1/4'" minus as it refers to the size, or grading, of this particular aggregate. Aggregates less than 4.75 mm in size are called fine aggregates; sand falls under the fine aggregate and crushed stone or metal under the coarse aggregates.

Coarse aggregate is stone which are broken into small sizes and irregular in shape. In construction work the aggregate are used such as limestone and granite or river aggregate.

The aggregates manufactured by machine-crushed consist of stones of various sizes whereas hand-broken aggregates consist of only single size stones. Materials that are larger to be retained on 4.75 mm sieve size are called coarse aggregate, and their maximum size can be up to 63 mm

The aggregates are generally acquired by blasting in stone quarries or breaking them by hand or by crusher machines. Aggregate which has a size bigger than 4.75 mm or which retrained on 4.75 mm IS Sieve are known as Coarse aggregate. Size of aggregate Chips,10mm,12mm,20mm,40mm.

Mix Design is done on bases of IS 10262-2019 Code book.

Fineness modulus of aggregate's has done, resulted as ZONE II.

Slump cone test has done , resulted as 40MM Drop.

MIX PROPORTION FOR M30 --1:1.66:2.816.

Concrete is mixed according to mix proportion and casted in cubes properly
For 3 cubes quantity of materials are
Cement - 4.1kg
F.A - 7.5kg
C.A - 12.406kg
Water - 1.845kg
Curing of cubes will be done at respective days [7,14,28].

Testing :

- Specific Gravity of Cement And Fly ash
- Specific Gravity of Aggregate's
- Normal Consistency of Cement
- Fineness Modulus of Aggregate's

- Slump Cone Test

1.2 Objectives of the project

- By using fly ash as partial replacement with cement in concrete it give more sustainability in environmental
- Using steel fibre it gives addition strength to concrete .
- By addition reinforcement with steel fiber it will able gain more tensile strength

1.3 Methodology

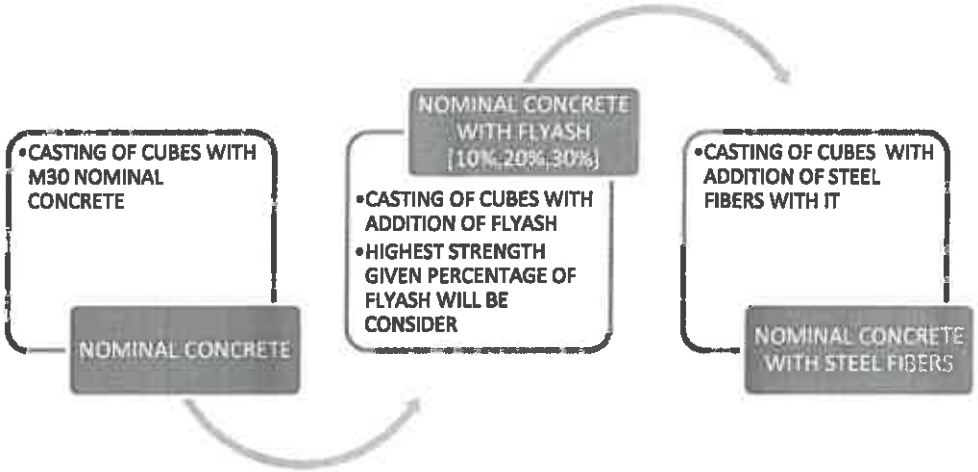

Fig.1 Nominal Concrete with Steel Fibre And Fly Ash Preparation

2. Total (in Rs): 30000

Date: 06-07-2020
Place: Kanchikacherla

Signature of the Principal Investigator

Devineni Venkata Ramana & Dr.Hima Sekhar
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Research and Development Cell

05.08.2020

To

Mr. N.V. Subba Rao,
Associate Professor,
Department of Civil Engineering
Devineni Venkata Ramana & Dr. Hima Sekhar MIC College of Technology,
Kanchikacherla.

Sub: Letter of sanction

Dear **N.V. Subba Rao,**

The Management of Devineni Venkata Ramana & Dr. Hima Sekhar MIC College of Technology appreciate your efforts in submitting your proposal titled: **"Analysis of Steel Fiber Strength in Concrete along with Partial Replacement of Cement by Fly Ash"** seeking a seed grant. After thorough scrutiny, the Research Advisory Committee of the Institution has selected and recommended your proposal for the sanction of **Rs 30,000/-** to work for a period of **one** Year.

This seed money grant is provided to enable you to undertake preliminary research work which can result either in a 'proof of concept' or 'proof of experience'. Further, you are expected to apply to external funding agencies (both public and private) to take the outcomes of this project to its intended goal.

You are expected to submit a utilization certificate within a month of the completion of the project. The work done under this project shall be used only for the benefit of the institution and it will not be used or transmitted to anywhere else. The conditions for the conduct of this work will be as per the Seed Grant Policy of the institution.

Wishing you good luck.

Principal

PRINCIPAL
Devineni Venkata Ramana & Dr Himasekha
MIC College of Technology
Kanchikacherla, Krishna Distric

Copy to:

- HOD, Department of Civil Engineering, MIC
- Account Section, MIC

Devineni Venkata Ramana & Dr. Hima Sekhar
MIC College of Technology
(Autonomous)
Approved by AICTE and permanently Affiliated to JNTU Kakinada
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PROJECT COMPLETION REPORT FOR INSTITUTE FUNDED SEED GRANT

Title of the project:: **"Analysis of Steel Fiber Strength in Concrete Along With Partial Replacement of Cement By Fly Ash"**

1) Name of the Principal Investigator(s) and Co-Investigator(s): **Mr. N V Subba Rao**
2) Date of commencement: 05-08-2020
3) Proposed date of completion: 30.06.2021
4) Actual date of completion: 20.8.2021
5) Objectives as stated in the project proposal:

This project is focused at the effects on the addition of fly ash as a partial replacement of cement in concrete and steel fibers acts as a fiber in the concrete. This experiment is for finding the compressive strength. The fly ash is added in the proportion of 10%, 20% and 30% by weight in the cement respectively to the presents good pozzolanic properties and steel fibers provide good strength to the concrete as the results are compared with the control mix of design mix M30.the specimens are tested after nominal,7,28,56 days of curing. it is observed that while keeping fly ash at 5% and 7.5% and 10% and 12.5% with steel fibers can be carried out in concrete without decreasing the strength.

Chemical Composition of Flyash :

Component	Percentage: %
Silicon dioxide	62·12
Aluminum oxide	21·30
Iron (III) oxide (Fe_2O_3)	5·55
Titanium dioxide (TiO_2)	1·38
Magnesium oxide (MgO)	1·58
Calcium oxide (CaO)	0·53
Potassium oxide (K_2O)	4·24
LOI	3·30

Experimental set up	**Compression Testing Machine**
Methodology	1. Testing of Materials 2. Mix Design 3. Casting of Cubes 4. Curing of Cubes 5. Testing of Cubes
Results	• Specific Gravity of Cement : 3.15 • Specific gravity of fine aggregate : 2.66 • Specific gravity of coarse aggregate : 2.75 • Specific gravity of fly ash : 2.3 • Normal Consistency of Cement is at 34% • Slump cone test has done, resulted as 40 mmDrop **Testing of Samples is Done using Compression Testing Machine**  **NOMINAL CONCRETE WITH FLYASH 10%,20%,30% - 7DAYS**

S.NO	% OF FLYASH	WEIGHT (kg)	PEAK LOAD (kN)	PEAK STRESS (MPa)
1	10%	8.54	554.3	24.63
		8.50	483.2	21.47
		8.54	672.9	29.90
		AVG	= 570.13	25.33
2	20%	8.28	614.2	27.29
		8.51	645.6	28.69
		8.38	388.9	17.29
		AVG	= 549.5	24.42
3	30%	8.01	476.8	21.19
		8.36	518.4	23.01
		8.32	531.3	23.60
		AVG	= 508.8	22.6

12. Budget utilization:

Sr.	Budget Head	Funds Sanctioned	Expenditure(In Rs.)	% of Total cost
1.	Recurring (in Rs) :	20,000	Labour Cost – 8000/- Cost of 1.Steel Fiber 2. Cement 3. Fly Ash3. CA 4. FA---6000/- Food & Refreshments – 4000/- Travel Expenditure – 2000/-	57.14
2.	Non-Recurring (Equipment/Instrument) (in Rs)	15,000	Testing --10000/-	42.86
3.	Others,Ifany	Nil	Nil	Nil

13) Plan for utilizing the equipment facilities in the future, if any – **Not applicable**

Signature of the Principal Investigator

Date:20.8.2021

Place: Kanchikacherla

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UTILIZATION CERTIFICATE

Certified that out of **Rs 30,000** of institute funded seed grant for the "**ANALYSIS OF STEEL FIBER STRENGTH IN CONCRETE ALONG WITH PARTIAL REPLACEMENT OF CEMENT BY FLY AS**" sanctioned during the Academic Year **2020-21** in favour of **Mr. N.V.Subba Rao** from **Department of Civil Engineering** dated **05.8.2020** and a sum of **Rs. 30,000 (Rupees Thirty Thousand only)** has been utilized for the purpose for which it was sanctioned. The balance amount if any is refunded to the institution.

Signature of PI

Signature of Accounts Officer

MIC College of Technology
Kanchikacherla, Krishna District

Signature of Head of the Institution

PRINCIPAL
Devineni Venkata Ramana & Dr Himasekha
MIC College of Technology
Kanchikacherla, Krishna District

Devineni Venkata Ramana & Dr.Hima Sekhar
MIC College of Technology
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FORMAT FOR INSTITUTE FUNDED SEED GRANT PROPOSAL

Name of the Principal Investigator: Dr. P.Pradeep

Designation: Associate professor

Name of the Co-Investigator (if any): NIL

Designation: -Nil

Department: Electrical & Electronics Engineering

Title of the Project: Battery management system for electric bikes

1. Background

1.1 Description of Proposal:

A battery electric vehicle (BEV), pure electric vehicle, only-electric vehicle, fully electric vehicle or all-electric vehicle is a type of electric vehicle (EV) that exclusively uses chemical energy stored in rechargeable battery packs, with no secondary source of propulsion (e.g. hydrogen fuel cell, internal combustion engine, etc.). BEVs use electric motors and motor controllers instead of internal combustion engines (ICEs) for propulsion. They derive all power from battery packs and thus have no internal combustion engine, fuel cell, or fuel tank. BEVs include – but are not limited to motorcycles, bicycles, scooters, skateboards, railcars, watercraft, forklifts, buses, trucks, and cars.

Modern Electric Bikes face two major problems on single battery, GSM. The solutions for these complications are yet to be discovered. Our Project tends to solve the above mentioned complication by introducing dual battery and IOT Technology. Our idea employs multiple batteries instead of single battery system and provides efficient way of monitoring and management them. It aids the help of IoT technology and Cloud support for efficient execution of the idea. In the time ahead Electric Bikes are going to make revolution in the automobile Industry. our project hopes to assist for the same. The purpose of this paper is to describe the design and management of a battery for a electric bikes with the help of IoT technology.

1.2 Objectives of the project

The main objective of this project employs multiple batteries instead of single battery system and provides efficient way of monitoring and management them. It aids the help of IoT

technology and Cloud support for efficient execution of the idea. In the time ahead Electric Bikes are going to make revolution in the automobile Industry. Our project hopes to assist for the same. The purpose of this paper is to describe the design and management of a battery for anelectric bikes with the help of IoT technology.

1.3 Methodology:

- ✓ When user selects a mode, it communicates the vehicle via base cloud
- ✓ □Node MCU identifies the request and gives the signals to Arduino to implement
- ✓ Switching is done with the help of 12v relays
- ✓ Selection between the charging and discharging batteries should be done by mobile application
- ✓ The values are calculated and conveyed through cloud

2. Total (in Rs): 20,000/-

Date: 8-7-2020
Place:Kanchikacherla

Signature of the Principal Investigator

Devineni Venkata Ramana & Dr.Hima Sekhar
MIC College of Technology
(Approved by AICTE & Permanently Affiliated to JNTUK, Kakinada)
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Research and Development Cell

05.08.2020

To

Dr. P. Pradeep,
Associate Professor,
Department of Electrical and Electronics Engineering,
Devineni Venkata Ramana & Dr. Hima Sekhar MIC College of Technology,
Kanchikacherla.

Sub: Letter of sanction

Dear **P. Pradeep,**

The Management of Devineni Venkata Ramana & Dr. Hima Sekhar MIC College of Technology appreciate your efforts in submitting your proposal titled: **"Battery Management System for Electric Bikes"** seeking a seed grant. After thorough scrutiny, the Research Advisory Committee of the Institution has selected and recommended your proposal for the sanction of Rs 20,000/- to work for a period of one Year.

This seed money grant is provided to enable you to undertake preliminary research work which can result either in a 'proof of concept' or 'proof of experience'. Further, you are expected to apply to external funding agencies (both public and private) to take the outcomes of this project to its intended goal.

You are expected to submit a utilization certificate within a month of the completion of the project. The work done under this project shall be used only for the benefit of the institution and it will not be used or transmitted to anywhere else. The conditions for the conduct of this work will be as per the Seed Grant Policy of the institution.

Wishing you good luck.

Principal
PRINCIPAL
Devineni Venkata Ramana & Dr Himasekha
MIC College of Technology
Kanchikacherla, Krishna Distric

Copy to:

- HOD, Department of EEE, MIC
- Account Section, MIC

Devineni Venkata Ramana & Dr.Hima Sekhar
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PROJECT COMPLETION REPORT FOR INSTITUTE FUNDED SEED GRANT

1) **Title of the project:** Battery management system for electric bikes
2) **Name of the Principal Investigator(s) and Co-Investigator(s):** Dr. P. Pradeep
3) **Date of commencement:** 05.08.2020
4) **Proposed date of completion:** 21.05.2021
5) **Actual date of completion:** 28.04.2021
6) **Objectives as stated in the project proposal:**

The main objective of this project employs multiple batteries instead of single battery system and provides efficient way of monitoring and management them. It aids the help of IoT technology and Cloud support for efficient execution of the idea.

7) **Deviation made from original objectives if any, while implementing the project and reasons thereof:** No
8) **Details of experimental set up, methods adopted, data collected supported by necessary table, charts, diagrams & photographs:**

Experimental set up	1. Solar panel 15 watt 2. Solar charge controller 3. 12V lead acid batteries 2No 4. Current sensor 5. Voltage sensor 6. Arduino microcontroller 7. LCD display
Methodology	✓ When user selects a mode, it communicates the vehicle via base cloud ✓ □Node MCU identifies the request and gives the signals to Arduino to implement ✓ Switching is done with the help of 12v relays ✓ Selection between the charging and discharging batteries should be done by mobile application ✓ The values are calculated and conveyed through cloud.
Results	Charging of battery on the go, Frequent charging of battery is eliminated, Shortage of power is eliminated, User friendly. Based on the priorities, anyone can control wirelessly battery charging of the

	vehicle, simultaneously they can monitor the battery voltage from anywhere as the power is consumed.

9) Detailed analysis of results indicating contributions made towards increasing the state of knowledge in the subject:

A consumer generates enough energy for Bike battery charging and uses it accordingly with an environment friendly system. Hence in the work, Eco-friendly efficient battery management system is proposed to control the various combination of modes that are used in the battery monitoring.

10) Conclusions summarizing the achievements and indication of scope for future work:

This prototype gives us a deep insight into working of a self sufficient and reliable system for monitoring and controlling the battery. The green energy system requires only initial stage investment in solar panel and the system is developed at low cost. But the main requirement for this application is a proper internet connection with required band width and frequency. The above architecture can be integrated with mobile phones and hence an Android application can be built to view this data. With the help of mobile phones, the data can be collected and viewed even from remote locations, where Internet connection is weak. This prototype can also be extended for the auto control of the battery switching based on state of charge of the battery.

11.Budget utilization:

S.NO	Budget Head	Funds Sanctioned	Expenditure	% of Total cost
1	Recurring (in Rs) :	5000	Stationaries – 2500 Food & Refreshments – 500 Connectivity - 1000 Travel Expenditure – 1000	25
2.	Non-Recurring (Equipment / Instrument) (in Rs)	15000	1. Solar panel 15 watt 2. Solar charge controller 3. 12V Lead Acid Batteries 2No 4. Current sensor 5. Voltage sensor 6. Arduino microcontroller 7. LCD display	75
3	Others, if any	Nil	Nil	Nil

12. Plan for utilizing the equipment facilities in the future, if any – Not applicable

Signature of the Principal Investigator
Date: 28.04.2021
Place: Kanchikacherla

Devineni Venkata Ramana & Dr.Hima Sekhar
MIC College of Technology
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UTILIZATION CERTIFICATE

Certified that out of **Rs 20,000** of institute funded seed grant for the **"Battery management system for electric bikes"** sanctioned during the Academic Year **2020-21** in favour of **Dr. P. Pradeep** from **Department of Electrical & Electronics Engineering** dated **05.8.2020** and a sum of **Rs. 20,000 (Rupees Twenty Thousand only)** has been utilized for the purpose for which it was sanctioned. The balance amount if any is refunded to the institution.

Signature of PI

Signature of Accounts Officer

Devineni Venkata Ramana & Dr. Hima Sekhar
MIC College of Technology
KANCHIKACHERLA - 521 180

Signature of Head of the Institution

PRINCIPAL
Devineni Venkata Ramana & Dr Himasekhar
MIC College of Technology
Kanchikacherla, Krishna District

Devineni Venkata Ramana & Dr.Hima Sekhar
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FORMAT FOR INSTITUTE FUNDED SEED GRANT PROPOSAL

Name of the Principal Investigator: Mr. M.Sunil Kumar

Designation: Assistant Professor

Name of the Co-Investigator (if any): NIL

Designation: NIL

Department: Electrical & Electronics Engineering

Title of the Project: Eye Controlled Wheel Chair For Physically Handicapped Using RASPBERRY PI

1. Background

1.1 Description of Proposal:

This Project presents an eye-controlled wheel chair using raspberry pi for people suffering from quadriplegia & paralysis. In this model, we use the optical-type eye tracking system to control powered wheel chair. User's eye movements are captured and sent to raspberry pi in which it identifies the position of the eye and send signals to the motor driver. The motor driver then sends commands to the motors so that the motors can move in a particular direction according to user needs. If the eye is moved left then the wheel chair also moves left, if the eye is moved right the wheel chair also moves right, single blink is to move forward and double blink is to stop the wheel chair. An ultrasonic sensor is placed to detect obstacles and send a voice message to the user. An emergency button is placed so that the user can send their GPS location via SMS to their relatives when pressed.

1.2 Objectives of the project :

The main objective of this project employs if the eye is moved left then the wheel chair also moves left, if the eye is moved right the wheel chair also moves right, single blink is to move forward and double blink is to stop the wheel chair. An ultrasonic sensor is placed to detect obstacles and send a voice message to the user. An emergency button is placed so that the user can send their GPS location via SMS to their relatives when pressed.

1.3.Methodology:

- ✓ The wheel chair is moved by using the DC motors on both the wheels.
- ✓ When user selects a mode, the PI camera is used to track the eye movements and sends the instructions to the Raspberry PI.

- ✓ The open CV is used to converts the image signal to the system understand language.
- ✓ In the Raspberry PI numpy algorithm is used.
- ✓ According to user facility the DC motor will move either forward, back word or it can stop when there is an obstacle and give voice signal.

2. Total (in Rs): 25,000/-

Date: 19-07-2020
Place:

Signature of the Principal Investigator

Devineni Venkata Ramana & Dr.Hima Sekhar
MIC College of Technology
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Research and Development Cell

05.08.2020

To

Mr. M. Sunil Kumar,
Associate Professor,
Department of Electrical and Electronics Engineering,
Devineni Venkata Ramana & Dr. Hima Sekhar MIC College of Technology,
Kanchikacherla.

Sub: Letter of sanction

Dear **M. Sunil Kumar,**

The Management of Devineni Venkata Ramana & Dr. Hima Sekhar MIC College of Technology appreciate your efforts in submitting your proposal titled: **"Eye Controlled Wheel Chair for Physically Handicapped Using RASPBERRY PI"** seeking a seed grant. After thorough scrutiny, the Research Advisory Committee of the Institution has selected and recommended your proposal for the sanction of **Rs 25,000/-** to work for a period of **one** Year.

This seed money grant is provided to enable you to undertake preliminary research work which can result either in a 'proof of concept' or 'proof of experience'. Further, you are expected to apply to external funding agencies (both public and private) to take the outcomes of this project to its intended goal.

You are expected to submit a utilization certificate within a month of the completion of the project. The work done under this project shall be used only for the benefit of the institution and it will not be used or transmitted to anywhere else. The conditions for the conduct of this work will be as per the Seed Grant Policy of the institution.

Wishing you good luck.

Principal
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Devineni Venkata Ramana & Dr Himasekha
MIC College of Technolog
Kanchikacherla, Krishna Distr

Copy to:

- HOD, Department of EEE, MIC
- Account Section, MIC

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PROJECT COMPLETION REPORT FOR INSTITUTE FUNDED SEED GRANT

Title of the project: Eye Controlled Wheel Chair for Physically Handicapped Using RASPBERRY PI

1) **Name of the Principal Investigator(s) and Co-Investigator(s):** Mr. M.Sunil Kumar
2) **Date of commencement:** 05.08.2020
3) **Proposed date of completion:** 15.05.2021
4) **Actual date of completion:** 25.05.2021
5) **Objectives as stated in the project proposal:**

The main objective of this project is to control the movement of wheel chair with eye movement thus eliminating the need for support for people with disabilities. An ultrasonic sensor is placed to detect obstacles and send a voice message to the user. An emergency button is placed so that the user can send their GPS location via SMS to their relatives when pressed.

6) **Deviation made from original objectives if any, while implementing the project and reasons thereof:** No

7) **Details of experimental set up, methods adopted, data collected supported by necessary table, charts, diagrams & photographs:**

Experimental set up	1. Raspberry PI board 2. PI camera 3. Ultrasonic sensor 4. DC motor 5. Wheel chair
Methodology	✓ The wheel chair is moved by using the DC motors on both the wheels. ✓ When user selects a mode, the PI camera is used to track the eye movements and sends the instructions to the Raspberry PI. ✓ The open CV is used to converts the image signal to the system understand language.

	✓ In the Raspberry PI numpy algorithm is used. ✓ According to user facility the DC motor will move either forward, back word or it can stop when there is an obstacle and give voice signal.
Results	The wheelchair system accepts video processing results that are generated based on the location of the eye pupil. Thus, sending orders to the motor driving circuit for the wheelchair movement.

8) Detailed analysis of results indicating contributions made towards increasing the state of knowledge in the subject:

While the movement of wheel chair is controlled with video results based on eye pupil. The ultrasonic sensors detect obstacles and it measures the distance between a wheelchair and an obstacle. If the obstacle is extremely near to the wheelchair, the motor stops the wheelchair.

9) Conclusions summarizing the achievements and indication of scope for future work:

In this system, we have developed a wheelchair system that allows disabled and physically handicapped people to move their wheelchairs in the desired direction. Places in the dark light interfere with the operation of the wheelchair. This system works perfectly with ambient light and indoors.

10) Budget utilization:

S.NO	Budget Head	Funds Sanctioned	Expenditure	% of Total cost
1	Recurring (in Rs) :	5000	Stationaries – 2500 Food & Refreshments – 500 Connectivity - 1000 Travel Expenditure – 1000	20
2.	Non-Recurring (Equipment / Instrument) (in Rs)	20000	1. Raspberry PI board 2. PI camera 3. Ultrasonic sensor 4. DC motor 5. Wheel chair	80
3	Others, if any	Nil	Nil	Nil

Devineni Venkata Ramana & Dr.Hima Sekhar
MIC College of Technology
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NAAC A
With Grade

11) Plan for utilizing the equipment facilities in the future, if any – Not applicable

Signature of the Principal Investigator
Date: 25.05.2021
Place: Kanchikacherla

Devineni Venkata Ramana & Dr.Hima Sekhar
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UTILIZATION CERTIFICATE

Certified that out of **Rs 25,000** of institute funded seed grant for the **"Eye Controlled Wheel Chair For Physically Handicapped Using RASPBERRY PI"** sanctioned during the Academic Year **2020-21** in favour of **Mr. M. Sunil Kumar** from **Department of Electrical & Electronics Engineering** dated **05.8.2020** and a sum of **Rs. 25,000 (Rupees Twenty Five Thousand only)** has been utilized for the purpose for which it was sanctioned. The balance amount if any is refunded to the institution.

Signature of PI

Signature of Accounts Officer

Devineni Venkata Ramana & Dr. Hima Sekhar
MIC College of Technology
KANCHIKACHERLA - 521 180.

Signature of Head of the Institution

PRINCIPAL
Devineni Venkata Ramana & Dr Himasekha
MIC College of Technolo
Kanchikacherla, Krishna Distric

Devineni Venkata Ramana & Dr.Hima Sekhar
MIC College of Technology
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NAAC A
With Grade

FORMAT FOR INSTITUTE FUNDED SEED GRANT PROPOSAL

Name of the Principal Investigator: Dr. G. Rajesh

Designation: Professor

Department: Mechanical Engineering

Title of the Project: Fabrication of Low-Cost Bio-degradable Plastic MaterialsUsing Potato Starch

1. Background

1.1 Description of the problem

Plastic pollution is the most widespread problem affecting the marine environment. It also threatens ocean health, food safety and quality, human health, coastal tourism, and contributes to climate change.

- They are not eco-friendly
- They are made from non-renewable resources
- They do not break down
- They are toxic

1.2 Rational for taking up the project:

Biodegradable Plastics are plastics that can be biologically broken down in a reasonable amount of time into their base compounds. It is an environment-friendly plastic. It can be decomposed, unlike typical and standard plastics. It would not harm human health when this plastic decomposesinto the soil. It can decompose in soil and water

- Take less time to break down
- Environmentally friendly
- Easier to recycle
- Biodegradable plastics are not toxic

1.3 Description of Proposal

1.3.1 Objectives of the Project

The objective of this project to supply biodegradable plastic by using potato starch and perform grain size measurement tests and Vickers microhardnesstests and using biodegradable plastics for molding workpiece and study the comparison with conventional petroleum-based

plastics.

1.4 Innovative component of the project

Environmental challenges facing the world, including the development of bio-derived, biodegradable and recyclable polymers – also known as bioplastics.

The report points to particular technological advances in optimizing bioplastic production and improving its properties to provide the performance and longevity expected by consumers. Meanwhile, chemical recycling technologies are offering potential options to reduce waste plastic going to landfill.

Finding an inexpensive alternative to existing plastics with similar performance which impacts the environment less is a challenge. Before the world shifts to using biodegradable or at least bio-derived plastics, the functionality of these materials will likely need to approach that of existing plastics by using potato starch-based biodegradable plastics.

1.5 Methodology detailing stepwise activities and sub-activities

Firstly, measure the weight of the potato starch powder with the help of a weighing machine

- Now take 20 grams separately using the weighting machine
- Take a beaker and add 100 ml of distilled water
- Add 3 drops of hydrochloric acid in distilled water which was in the beaker
- Now add 2 drops of glycerol to the distilled water and mix it properly
- Now while mixing the potato starch powder into the liquid and mix it properly with the help of a stirrer
- Now, pour the liquid into the metal plate and heat it till an opaque gel was formed
- After heating the liquid will convert into gel
- If the solution turned red showing it contained acid
- If the solution turned green showing that the solution was neutral

2. Work Plan

Phase-wise plan of action up to post-project activities detailing time schedule.

Time	1-3 Months	4-6 Months	7-9 Months	10-12 Months
Activity	Literature survey	Problem identification &	Project Implementation	Preparing project reports& Paper

		Framing research design	& Finding	Communication

3. Expected Outcome and Deliverables of the Project

In this work, Considering many nations around the arena are struggling with meal shortages, generating bioplastics from waste in place of meals is the high-quality way to head. This look concluded that meals wastes can be used for bioplastic production. in this look at, it became determined that the bioplastics created from potato peels absolutely biodegraded within 28 days, and it become suggested that those bioplastics may be utilized in the packaging industry. The development of mechanical properties has to be investigated for its usage of it in distinctive business regions. alternatively, it become determined that the industrial bioplastic did now not biodegrade in 28 days. Bioplastics utilization has extended in recent years both within the global and in Turkey. consequently, for the sustainability of the ones called as 'biodegradable', the standards must be developed. In the end, a brand new guide for bioplastics needs to be evolved for manufacturing, usage and waste management in Turkey as quickly as possible.

4. **Likely Impact**(Please attempt to quantify) : Yes

5. Suggested Post-Project Activities:

The production of biodegradable plastic using potato as well as vegetable waste.

6. Budget estimate

A. Recurring (in Rs):28000

1.Potato starch powder. 2. Distilled water. 3. Cooking oil. 4. Hydrochloric acid.

5. Sodium hydroxide pellets. 6. Glycerol.

B. Non-Recurring (Equipment/Instrument)**(in Rs): Nil**

C. Total (in Rs):28,000

Date: 22.07.2020
Place: Kanchikacherla

Signature of the Principal Investigator

Devineni Venkata Ramana & Dr.Hima Sekhar
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Research and Development Cell

05.08.2020

To

Dr. G. Rajesh,
Professor,
Department of Mechanical Engineering
Devineni Venkata Ramana & Dr. Hima Sekhar MIC College of Technology,
Kanchikacherla.

Sub: Letter of sanction

Dear **G. Rajesh,**

The Management of Devineni Venkata Ramana & Dr. Hima Sekhar MIC College of Technology appreciate your efforts in submitting your proposal titled: **"Fabrication of Low-Cost Bio-degradable Plastic Materials Using Potato Starch"** seeking a seed grant. After thorough scrutiny, the Research Advisory Committee of the Institution has selected and recommended your proposal for the sanction of **Rs 28,000/-** to work for a period of **one** Year.

This seed money grant is provided to enable you to undertake preliminary research work which can result either in a 'proof of concept' or 'proof of experience'. Further, you are expected to apply to external funding agencies (both public and private) to take the outcomes of this project to its intended goal.

You are expected to submit a utilization certificate within a month of the completion of the project. The work done under this project shall be used only for the benefit of the institution and it will not be used or transmitted to anywhere else. The conditions for the conduct of this work will be as per the Seed Grant Policy of the institution.

Wishing y· · good luck.

Principal

PRINCIPAL
Devineni Venkata Ramana & Dr Himasekha
MIC College of Technology
Kanchikacherla, Krishna District

Copy to:

- HOD, Department of Mechanical Engineering, MIC
- Account Section, MIC

Devineni Venkata Ramana & Dr.Hima Sekhar
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With Grade

PROJECT COMPLETION REPORT FOR INSTITUTE-FUNDED SEED GRANT

1) **Title of the project:** Fabrication of Low-Cost Biodegradable Plastic Material using Potato Starch
2) **Name of the Principal Investigator(s):** Dr. G. Rajesh
3) **Date of commencement:** 05.08.2020
4) **Proposed date of completion:** 04.08.2021
5) **Actual date of completion:** 05.05.2021
6) **Objectives as stated in the project proposal:**

   The objective of this project to supply biodegradable plastic by using potato starch and perform grain size measurement tests and Vickers micro hardness test and using biodegradable plastics for molding work piece and study the comparison with conventional petroleum-based plastics.
7) **Deviation made from original objectives if any, while implementing the project and reasons thereof:** No

8) **Details of experimental set up, methods adopted, data collected supported by necessary table, charts, diagrams & photographs:**

Experimental set up	1. Electronic balance 2. Electric Furnace
Methodology	In this work, Firstly, measure the weight of the potato starch powder with the help of weighing machine • Now take 20 grams separately using weighting machine • Take a beaker and add 100 ml of distilled water • Add 3 drops of hydrochloric acid in distilled water which was in the beaker • Now add 2 drops of glycerol in the distilled water and mix it properly • Now while mixing and the potato starch powder into the liquid and mix it properly with the help of stirrer • Now, pour the liquid into the metal plate and heat it till and opaque gel was formed • After heating the liquid will convert into gel

	• If the solution was turned red showing it contained acid • If the solution turned green showing that the solution was neutral
Results	The specimen are often wont to make thin films and solid objects. This plastic could replace the traditional plastic cutlery that pollutes the environment. Corn starch plastic when produced with high acid-base conc. Produces almost glass like plastic which may be used as a glass substitute and should just be a solution to glass landfills polluting the environment. The biodegradable plastic specimen with chemical alteration are often used and seamlessly replace plastic products that are mass.

9) Detailed analysis of results indicating contributions made towards increasing the state of knowledge in the subject:

To compare potato starch biodegradable plastics with other materials we've taken sample No. 1(131.7 HV) and sample No. 2 (200.9 HV) as they need the foremost hardness (Table 5.2). Fig 6.2 Potato Starch Biodegradable Plastic Hardness Comparison 0 50 100 150 200 250 300 Sample 1Sample 2 low-carbon steel PVC Limestone Fe Hardness (HV)38 Here Fig 6.2 represents the hardness comparison graph of potato starch biodegradable plastics with other material where Xaxis represents the materials and Y-axis represents HV values.

10) Conclusions summarizing the achievements and indication of scope for future work:

In this work, The project are often further researched upon and explored to seek out the elastic property of said plastic and the way the elastic property changes with the addition or removal of certain products. More in-depth research on the casting process of this plastic are often explored with silicone-based mounds or plaster of Paris being a number of the immediate choices.

11) Budget utilization:

Sr. No.	Budget Head	Funds Sanctioned	Expenditure	% of Total cost
1.	Recurring (in Rs):	20000	1. Potato starch powder. 2. Distilled water. 3. Cooking oil. 4. Hydrochloric acid. 5. Sodium hydroxide pellets. 6. Glycerol	71.42

2.	Non-Recurring (Equipment Instrument) (in Rs)	8,000	1. Electric furnace. 2. Glass beakers. 3. Stir rods. 4. Measuring tube. 5. Blender. 6. Molding tray. 7. Dropper.	28.58
3.	Others, if any	Nil	Nil	Nil

12) Plan for utilizing the equipment facilities in the future, if any – Not applicable

Signature of the Principal Investigator
Date: 05.05.2021
Place: Kanchikacherla

Devineni Venkata Ramana & Dr.Hima Sekhar
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With Grade

UTILIZATION CERTIFICATE

Certified that out of **Rs 28,000** of institute funded seed grant for the **"Fabrication of Low-Cost Bio-degradable Plastic Materials Using Potato Starch"** sanctioned during the Academic Year **2020-21** in favour of **Dr. G. Rajesh** from **Department of Mechanical Engineering** dated **05.8.2020** and a sum of **Rs. 28,000 (Rupees Twenty Eight Thousand only)** has been utilized for the purpose for which it was sanctioned. The balance amount if any is refunded to the institution.

Signature of PI

Signature of Accounts Officer

Signature of Head of the Institution

Devineni Venkata Ramana & Dr. Hima Sekhar
MIC College of Technology
KANCHIKACHERLA - 521 180

PRINCIPAL
Devineni Venkata Ramana & Dr Himasekha
MIC College of Technolo
Kanchikacherla, Krishna Dist

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FORMAT FOR INSTITUTE FUNDED SEED GRANT PROPOSAL

Name of the Principal Investigator: Dr. K. Srinivas

Designation: Professor

Department: Mechanical Engineering

Title of the Project: Experimental investigation on microstructural characterization and mechanical properties of plasma arc welded Inconel 617 plates

1. Background

1.1 Description of the problem

Welding of Inconel is a difficult task due to its tendency to crack and posing intricacies to the welder. However, it is extensively used in applications where resistance to oxidation at elevated temperatures is required. Therefore, it is important to note that the welding of Inconel alloys is demanding. Under such circumstances, one has to automate the welding of Inconel 617 alloy to eliminate some of the process uncertainties. Plasma arc welding (PAW) is a highly non-linear process that can be automated easily, and it can provide a more focused arc to weld the high strength and creep-resistant alloys. In the present research, PAW process is employed on 2 mm thick Inconel 617 plates by varying the key process parameters, such as welding current and welding speed. Initially, bead-on-plate (BoP) experiments were conducted to determine the suitable range of welding parameters to weld the superalloy. Subsequently, butt welding of the plates was performed based on the results of BoP welding. Furthermore, a study was conducted to determine the influence of the welding process parameters on the microstructural and mechanical properties of the butt joints.

1.2 Rational for taking up the project:

From the literature, it has been observed that many of the researchers had attempted to characterize the weld zone and its effect on the mechanical properties of Ni-basedsuperalloys. Particularly, they focussed on gas tungsten arc welding, electron beam welding, laser beam welding, CO2 gas welding and modified deep arc welding methods. To the best of the authors' knowledge, no work is reported on melt-in-mode plasma arc welding. From the literature, it has been observed that many of the researchers had attempted to characterize the weld zone and its

effect on the mechanical properties of Ni-basedsuperalloys. Particularly, they focussed on gas tungsten arc welding, electron beam welding, laser beam welding, CO2 gas welding and modified deep arc welding methods. To the best of the authors' knowledge, no work is reported on melt-in-mode plasma arc welding.

1.3 Description of Proposal

1.3.1 Objectives of the Project

The objective of the paper is to experimental Investigation on microstructural characterization and mechanical properties of plasma Arc Welding of Inconel 617 Plates.

1.4 Innovative component of the project

Inconel 617, a solid solution nickel-based alloy, has been extensively used in elevated temperature applications due to its tremendous oxidation resistance, better mechanical properties and phase stability at higher temperatures. This alloy is mainly used in aircraft and land-based gas turbine engines for the combustor, transition ducting and exhaust system components. Super alloy 617 is also used for the manufacture of machinery to operate the Next Generation Nuclear Plant service temperatures from 650 to 1,000^{oC}. Inconel 617 maintains its tensile properties with slight changes, at a wide range of temperatures (77–1,093 K) in various environments like salt/vacuum exposures for long periods. Nickel-based superalloys are considered to be very difficult to weld and repair because of their vulnerability to heat-affected zone (HAZ) and weld metal cracking during fabrication, post-weld heat treatment (PWHT) and subsequent operation. Janaki Ram et al.conducted experiments on 2 mm thick Inconel 718 using electron beam welding. They reported microstructures of bead on plate (BoP) welding, high-temperature tensile properties and stress rupture properties. Shah Hosseini et al. had welded the Inconel 617 and SS 310 materials by using gas tungsten arc welding. Furthermore, they investigated the zonular mechanical properties of weldment by performing shear punch test. Henderson et al.described the characteristic defects observed in the welding of Ni-based superalloys.They also analyzed the weldability of nickel-based superalloys using gas tungsten arc, electron beam, laser welding and friction or inertia bonding. Richards and Chaturvedi presented the effect of minor elements like C, B, S, P and others on the weldability of nickel-based superalloys. Moreover, Fontana et al.described the high-power CO2 and Nd:YAG laser welding of superalloys for the manufacturing of aero engines and power plant components. They observed solidified microstructures in the fusion zone and the micro-

fissures in the HAZ of Inconel 718. Furthermore, they also suggested laser beam welding for the welding of superalloys rather than tungsten inert gas welding and electron beam welding.

1.5Methodology detailing stepwise activities and sub-activities

Super alloy Inconel 617 plates of dimensions 150 mm × 100 mm × 2 mm were used to perform welding by using melt-in-mode PAW. Before performing BoP trials, the plates of Inconel 617 were cleaned with the help of a wire brush and acetone solution to remove the layers of oxidation. The PAW experiments were conducted using a Fronius Magic Wave 4000 power source, consisting of two modules: the main module and the plasma module. The main module was used to set the welding current and voltage. The flow rate of shielding gas was kept fixed at a suitable level. The plasma module was used to set the plasma gas flow rate and current for the pilot arc generation. From the extensive literature study, it has been observed that the welding current and welding speed were found to have a significant contribution on the quality of the welds produced using PAW. Furthermore, the torch standoff distance was maintained constant and its value was kept at 8 mm. The movement of the torch and the welding speed were controlled with the help of a CNC X–Y slide. The suitable range of welding current andwelding speed was determined by conducting a pilot study. The trial experiments were conducted by performing BoP trials. During the pilot study, the welding current and welding speed were varied in the range of 70–110 amps and 250–300 mm·min−1, respectively. Several BoPs were made with different combinations of welding current and welding speed.

2. Work Plan

Phase-wiseplanofactionup topost-projectactivitiesdetailingtimeschedule.

Time	1-3 Months	4-6 Months	7-9 Months	10-12 Months
Activity	Literature survey	Problem identification & Framing research design	Project Implementation & Finding	Preparing project reports& Paper Communication

3. Expected Outcome and Deliverables of the Project

Once the butt welds were prepared with the selected PAW input process parameters, specimens of the required size and dimension were cut to test various mechanical properties, such as tensile strength and root bend test. Moreover, the micro-hardness of the weldments at

base metal, HAZ and fusion zone is measured. In addition to the micro-hardness, the microstructure of the welded joint at the above-specified locations was also examined with the help of an optical microscope. Furthermore, the weldments were examined for their grain size in the fusion zone.

4. **Likely Impact** (Please attempt to quantify) : Yes

5. **Suggested Post-Project Activities:**

As a future work, the as-casted samples were used for further mechanical testing such as fatigue and creep study.

6. **Budget estimate**

A. Recurring (in Rs):25000

B. Non-Recurring (Equipment/Instrument)**(in Rs): Nil**

C. Total (in Rs):28,000

Date: 24.07.2020
Place: Kanchikacherla

Signature of the Principal Investigator

Devineni Venkata Ramana & Dr.Hima Sekhar
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Research and Development Cell

05.08.2020

To

Mr. K. Srinivas,
Professor,
Department of Mechanical Engineering
Devineni Venkata Ramana & Dr. Hima Sekhar MIC College of Technology,
Kanchikacherla.

Sub: Letter of sanction

Dear **K. Srinivas,**

The Management of Devineni Venkata Ramana & Dr. Hima Sekhar MIC College of Technology appreciate your efforts in submitting your proposal titled: **"Experimental Investigation on Microstructural Characterization and Mechanical Properties of Plasma Arc Welded Inconel 617 Plates"** seeking a seed grant. After thorough scrutiny, the Research Advisory Committee of the Institution has selected and recommended your proposal for the sanction of **Rs 25,000/-** to work for a period of **one** Year.

This seed money grant is provided to enable you to undertake preliminary research work which can result either in a 'proof of concept' or 'proof of experience'. Further, you are expected to apply to external funding agencies (both public and private) to take the outcomes of this project to its intended goal.

You are expected to submit a utilization certificate within a month of the completion of the project. The work done under this project shall be used only for the benefit of the institution and it will not be used or transmitted to anywhere else. The conditions for the conduct of this work will be as per the Seed Grant Policy of the institution.

Wishing you good luck.

Principal
PRINCIPAL
Devineni Venkata Ramana & Dr Himasekha
MIC College of Technology
Kanchikacherla, Krishna District

Copy to:

- HOD, Department of Mechanical Engineering, MIC
- Account Section, MIC

Devineni Venkata Ramana & Dr.Hima Sekhar
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PROJECT COMPLETION REPORT FOR INSTITUTE-FUNDED SEED GRANT

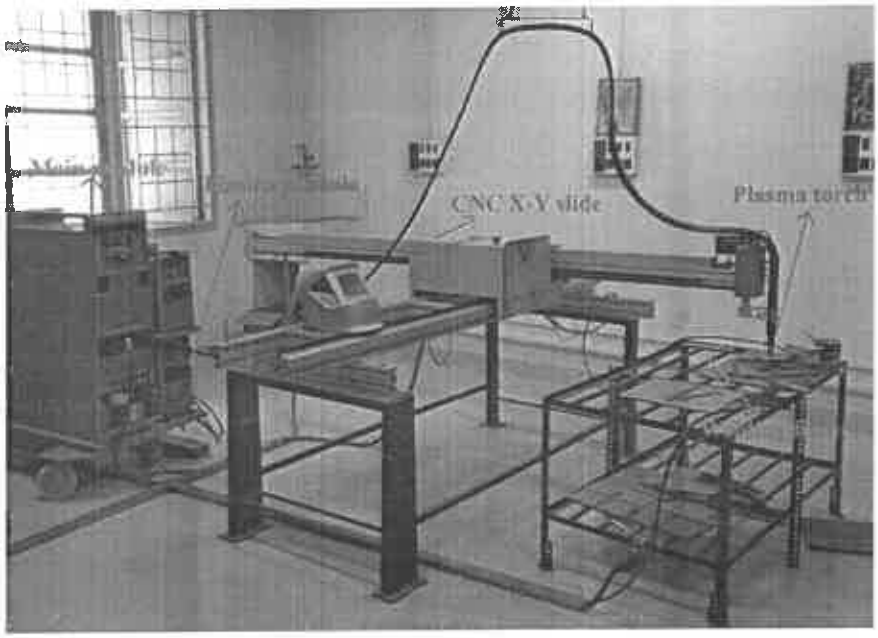
Title of the project: Experimental Investigation on Microstructural Characterization and Mechanical Properties of Plasma Arc Welded Inconel 617 Plates

1) **Name of the Principal Investigator(s):** Dr. K. Srinivas
2) **Date of commencement:** 05.08.2020
3) **Proposed date of completion:** 04.08.2021
4) **Actual date of completion:** 31.05.2021
5) **Objectives as stated in the project proposal:**

In the present research, PAW process is employed on 2 mm thick Inconel 617 plates by varying the key process parameters, such as welding current and welding speed. Initially, bead-on-plate (BoP) experiments were conducted to determine the suitable range of welding parameters to weld the super alloy. Subsequently, butt welding of the plates was performed based on the results of BoP welding. Furthermore, a study was conducted to determine the influence of the welding process parameters on the microstructural and mechanical properties of the butt joints.

6) **Deviation made from original objectives if any, while implementing the project and reasons thereof:** No
7) **Details of experimental set up, methods adopted, data collected supported by necessary table, charts, diagrams & photographs:**

Experimental setup	1. Plasma Arc Welding Setup
Methodology	The PAW experiments were conducted by using Fronius Magic wave 4000 power source, which consists of two modules namely main module and plasma module. The main module was used to set the welding current and voltage. The flow rate of shielding gas was kept fixed at the suitable level. The plasma module was used to set the plasma gas flow rate and current for the pilot arc generation. From the extensive literature study, it has been observed that the welding current and welding speed were found to have significant contribution on the quality of the welds produced using PAW. Furthermore, the torch standoff distance was maintained constant and its value was kept at 8 mm. The movement of the torch and the welding speed were controlled with the help of a CNC *X–Y* slide. The suitable range of welding current and welding speed was determined by conducting a pilot study. The trial experiments were conducted by performing BoP trails as shown in Table 1.

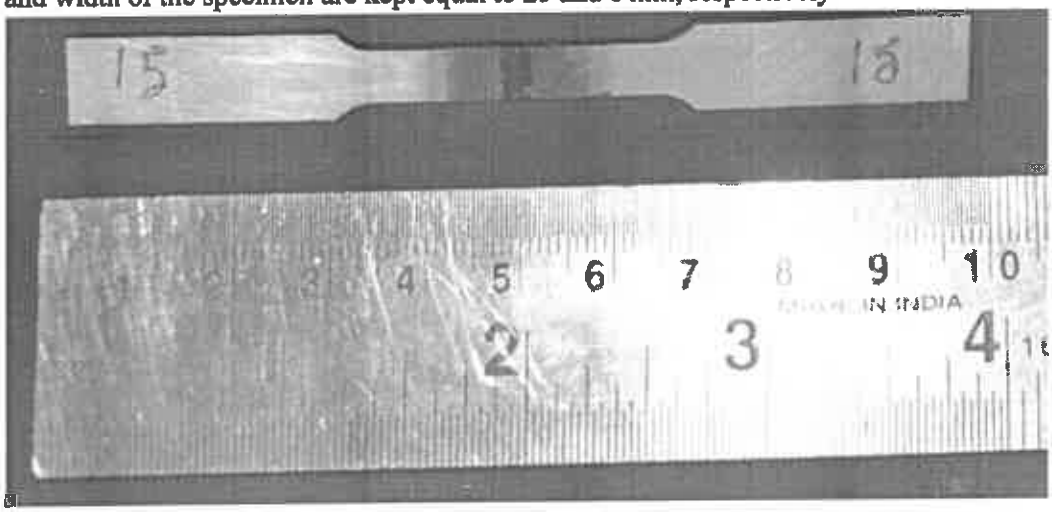
	During pilot study, the welding current and welding speed were varied in the range of 70–110 amps and 250–300 mm·min−1, respectively. 
Results	Once the butt welds were prepared with the selected PAW input process parameters, specimens of required size and dimension were cut to test various mechanical properties, such as tensile strength and root bend test. Moreover, the micro-hardness of the weldments at base metal, HAZ and fusion zone is measured. In addition to the micro-hardness, microstructure of the welded joint at the above specified locations was also examined with the help of optical microscope. Furthermore, the weldments were examined for their grain size in the fusion zone.

8) Detailed analysis of results indicating contributions made towards increasing the state of knowledge in the subject:

During the welding process, when the molten metal pool is moved across the centreline of the weld, the temperature gradient and grain growth rate vary significantly. Particularly in autogenous welding, the solidification of the weld pool occurs suddenly by the epitaxial growth on the partially melted grains. This solidification process depends on the speed of welding and the grain growth rate. During growth of the solid in the weld pool, the shape of the solid–liquid interface controls the development of microstructural features. The nature and the stability of the solid–liquid interface depend on the thermal and

constitutional supercooling. Based on these conditions, the interface growth may occur as planar, cellular or dendritic. It is also referred in the literature that these changes in solidification morphology are directly related to welding conditions. In the present study, it was observed that the microstructure in the fusion zone shows the formation of dendritic structure after solidification.

The strength of the welded joints is greatly influenced by the reformation of the grains that occurred due to the phase transformation in various zones, such as fusion zone, HAZ and base metal of the welding area. The tensile test specimens were prepared as per ASTM E8/E8M standard with 100 mm length and 10 mm width at the gripping. The gauge length and width of the specimen are kept equal to 25 and 6 mm, respectively.



9) Conclusions summarizing the achievements and indication of scope for future work:

In the present study, an attempt was made to perform the microstructural and mechanical properties of melt-in-mode PAW of Inconel 617 superalloy. The following conclusions were drawn from the said experimental investigations:

- The BoP trails indicated that the depth of penetration decreased with the decrease in the value of current and increase in the value of speed.
- Furthermore, the butt welding of plates suggested that the bead width increased with the increase in the value of weld current.

- The microstructural study revealed a coarse grain structure in the fusion zone due to the formation of γ^1 phase with directional solidification. It was also observed that the grain coarsening increased from the parent metal to the fusion zone of the weld.

10) Budget utilization:

Sr. No.	Budget Head	Funds Sanctioned	Expenditure	% of Total cost
1.	Recurring (in Rs):	25000	1. Potato starch powder. 2. Distilled water. 3. Cooking oil. 4. Hydrochloric acid. 5. Sodium hydroxide pellets. 6. Glycerol	100
2.	Non-Recurring (Equipment Instrument) (in Rs)	Nil	Nil	Nil
3.	Others, if any	Nil	Nil	Nil

11) Plan for utilizing the equipment facilities in the future, if any – Not applicable

Signature of the Principal Investigator
Date: 31.05.2021
Place: Kanchikacherla

Devineni Venkata Ramana & Dr.Hima Sekhar
MIC College of Technology
(Approved by AICTE & Permanently Affiliated to JNTUK, Kakinada)
Kanchikacherla - 521180, Krishna Dist, A.P. India.
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B.Tech (CSE|ECE|ME)
Accredited by
NAAC A
With Grade

UTILIZATION CERTIFICATE

Certified that out of **Rs 25,000** of institute funded seed grant for the **"Experimental investigation on microstructural characterization and mechanical properties of plasma arc welded Inconel 617 plates"** sanctioned during the Academic Year **2020-21** in favour of **Dr. K. Srinivas** from **Department of Mechanical Engineering** dated **05.8.2020** and a sum of **Rs. 25,000 (Rupees Twenty Five Thousand only)** has been utilized for the purpose for which it was sanctioned. The balance amount if any is refunded to the institution.

Signature of PI

Signature of Accounts Officer

Signature of Head of the Institution

Devineni Venkata Ramana & Dr. Hima Sekhar
MIC College of Technology
KANCHIKACHERLA - 521 180.

PRINCIPAL
Devineni Venkata Ramana & Dr Himasekha
MIC College of Technolog
Kanchikacherla, Krishna Distric

Devineni Venkata Ramana & Dr.Hima Sekhar
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FORMAT FOR INSTITUTE FUNDED SEED GRANT PROPOSAL

Name of the Principal Investigator: Mr. CH. PULLA RAO

Designation: ASSOCIATE PROFESSOR

Name of the Co-Investigator (if any): Nil

Designation: NIL

Department: Electronics and Communication Engineering (ECE)

Title of the Project: VIDEO DENOISING USING NLM ALGORITHM

1. Background

1.1 **Description of Proposal:** Processing digital images using a digital computer is known as digital image processing. A video is a time-based sequence of images. A two-dimensional function of spatial coordinates is defined as an image. A two-dimensional function of spatial coordinates is defined as an image. Image is composed of a fixed number of elements, each which have an exacting value at a particular position. Those elements are referred as a picture element, image elements and pixels. Spatial domain methods and frequency domain methods are the two types of image enhancing techniques. The image plane is referred to as the spatial domain, and techniques in this area are based on direct manipulation of image pixels. The Fourier transform of a picture is changed in frequency domain processing. Aiming at the problem that blurred digital video is easy to lose inter-frame information and ignore spatiotemporal during restoration, a video image deblurring algorithm based on denoising engine is proposed. A variety of image restoration methods have been developed such as TV regularization, regularization method based on wavelet. In a plug and play algorithm is proposed, which decompose the inverse problem of image restoration into a series of image denoising tasks and iterates through the successive application of image denoising. Adaptive Laplacian regularization function using the denoising function and construct a new regularization term by constraining the inner product between the input image and its denoising residuals. Due to the flexibility and efficiency of the regularization term in the selection of the denoising function, the NLM regularization, obtains a mor rigorous video image restoration. The algorithm has advantages in both PSNR index and visual comparison.

1.2 Objectives of the project:

Video is a chronological set of frames. Sequential play of frames is a Video. Noise is a random variant of intensity or color information in images, and is generally an feature of electronic noise. It can be shaped by the image sensor and circuitry of a scanner or digital camera. Noise can also originate in film grain and in the unavoidable shot noise of an ideal photon detector. The goal is to remove the noise in the video which creates a disturbance while watching the video. Denoising is the technique of reducing noise from video, which improves the quality of the video by providing higher contrast and a more detailed image than a non-enhanced image. To improve the quality of an image and to remove the noise in the video, image enhancement techniques are used. One of the techniques is using an algorithm to denoise the video. The algorithm using here is Non-Local Means (NLM) algorithm. Non-Local Means (NLM) algorithm is using to extract the redundant information from video images. NLM regularization provides a novel restoration model that combines several regularizes, particularly the NLM regularize and the denoising regularize. After denoising, the PSNR values for the noisy and denoisy videos are calculated, to measure the quality of the videos.

1.3 Methodology:

The main aim of the project is to de noise the video by using Non-Local Means (NLM) algorithm. The steps involved in the de noising video are reading the input video, converting the video into frames, and then converting each frame of the RGB video into Lab color code, and applying the NLM (Non-Local Means) algorithm to each frame the video. After NLM algorithm is applied on the noisy video, convert all the frames again into RGB color code from Lab color code for the better representation and display of the video calculating the PSNR values for both the noisy and de noisy videos for the better-quality estimation of the noisy and de noisy videos.

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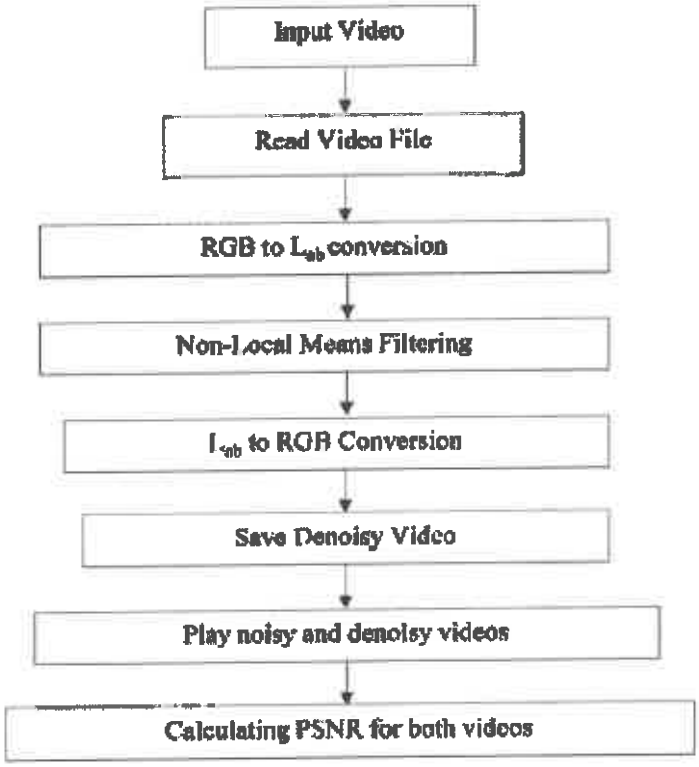

2. Total (in Rs):22000

Date: 13-7-2020
Place: Kanchikacherla

Signature of the Principal Investigator

Devineni Venkata Ramana & Dr.Hima Sekhar
MIC College of Technology
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Research and Development Cell

05.08.2020

To

Mr. Ch. Pulla Rao,
Associate Professor,
Department of Electronics and Communication Engineering,
Devineni Venkata Ramana & Dr. Hima Sekhar MIC College of Technology,
Kanchikacherla.

Sub: Letter of sanction

Dear **Ch. Pulla Rao,**

The Management of Devineni Venkata Ramana & Dr. Hima Sekhar MIC College of Technology appreciate your efforts in submitting your proposal titled: **"Video Denoising Using NLM Algorithm"** seeking a seed grant. After thorough scrutiny, the Research Advisory Committee of the Institution has selected and recommended your proposal for the sanction of **Rs 22,000/-** to work for a period of **one** Year.

This seed money grant is provided to enable you to undertake preliminary research work which can result either in a 'proof of concept' or 'proof of experience'. Further, you are expected to apply to external funding agencies (both public and private) to take the outcomes of this project to its intended goal.

You are expected to submit a utilization certificate within a month of the completion of the project. The work done under this project shall be used only for the benefit of the institution and it will not be used or transmitted to anywhere else. The conditions for the conduct of this work will be as per the Seed Grant Policy of the institution.

Wishing you good luck.

Principal

PRINCIPAL
Devineni Venkata Ramana & Dr Himasekha
MIC College of Technolo
Kanchikacherla, Krishna Distri

Copy to:

- HOD, Department of ECE, MIC
- Account Section, MIC

Devineni Venkata Ramana & Dr.Hima Sekhar
MIC College of Technology
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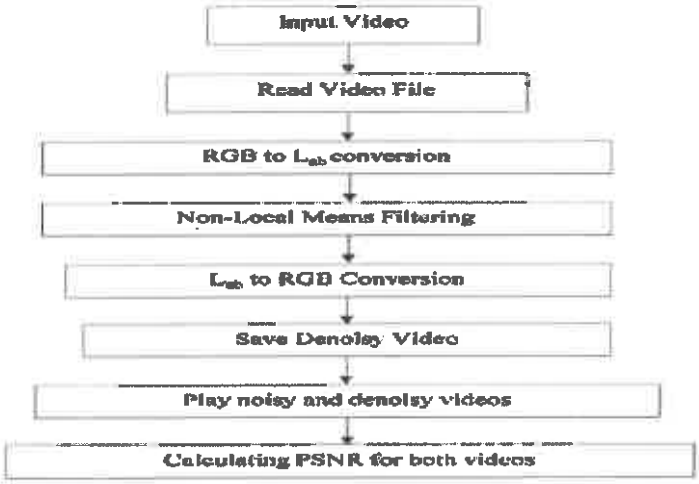
PROJECT COMPLETION REPORT FOR INSTITUTE FUNDED SEED GRANT

1) **Title of the project:** VIDEO DENOISING USING NLM ALGORITHM
2) **Name of the Principal Investigator(s) and Co-Investigator(s):** Mr. CH. Pulla Rao
3) **Date of commencement:** 05.08.2020
4) **Proposed date of completion:** 27.06.2021
5) **Actual date of completion:** 15.07.2021
6) **Objectives as stated in the project proposal:**

Video is a chronological set of frames. Sequential play of frames is a Video. Noise is a random variant of intensity or color information in images, and is generally an feature of electronic noise. It can be shaped by the image sensor and circuitry of a scanner or digital camera. Noise can also originate in film grain and in the unavoidable shot noise of an ideal photon detector. The goal is to remove the noise in the video which creates a disturbance while watching the video. Denoising is the technique of reducing noise from video, which improves the quality of the video by providing higher contrast and a more detailed image than a non-enhanced image. To improve the quality of an image and to remove the noise in the video, image enhancement techniques are used. One of the techniques is using an algorithm to denoise the video. The algorithm using here is Non-Local Means (NLM) algorithm. Non-Local Means (NLM) algorithm is using to extract the redundant information from video images. NLM regularization provides a novel restoration model that combines several regularizes, particularly the NLM regularize and the denoising regularize. After denoising, the PSNR values for the noisy and denoisy videos are calculated, to measure the quality of the videos.

7) **Deviation made from original objectives if any, while implementing the project and reasons there of:** No
8) **Details of experimental set up, methods adopted, data collected supported by necessary table, charts, diagrams & photographs:**

Experimental set up	Power supply Adapter USB Connectors Computer FPGA Spartan Board

Methodology	The main aim of the project is to de noise the video by using Non-Local Means (NLM) algorithm. The steps involved in the de noising video are reading the input video, converting the video into frames, and then converting each frame of the RGB video into Lab color code, and applying the NLM (Non-Local Means) algorithm to each frame the video. After NLM algorithm is applied on the noisy video, convert all the frames again into RGB color code from Lab color code for the better representation and display of the video calculating the PSNR values for both the noisy and de noisy videos for the better-quality estimation of the noisy and de noisy videos. 
Results	The LMS algorithm modifies the tap weights to minimize the mean-square error. The NLMS can be observed like the LMS, but with a normalized step-size β. The RLS algorithm develops the set of filter tap weights that decreases the weighted least square error. A 12th order adaptive filter is selected to simulate the three filters. The parameter values of the algorithms were determined based on the optimal performance of the algorithm in noise canceling. The step-size $\mu = 0.02$ for LMS, the normalized step-size $\beta = 0.25$ for NLMS, and the exponential weighting factor $\lambda\lambda = 1$ for RLS. The best-estimated results for LMS, NLMS and RLS algorithms are displayed in figure 7. Examining the simulation plot, one can see that the performance of both the LMS and RLS algorithms in noise removal

	is not as good as that of NLMS. With LMS, the amplitude of the estimated signal is very poor for the first 100 iterations compared to that of the desired signal. However, after 100 iterations, the shape of the sinusoid is reproduced gradually, allowing a more precise estimate of the desired signal. Initially, the signal estimated by the RLS shows a very high amplitude in contrast to the desired signal. However, after 50 iterations, the algorithm converges and develops a more accurate estimate of the desired signal. The efficiency of the RLS in noise canceling is better than that of the LMS. The NLMS clearly shows the more exact estimate of the desired signal d(l)b after the first 50 iterations. The NLMS adaptive algorithm results in more efficiency in noise canceling.

9) Detailed analysis of results indicating contributions made towards increasing the state of knowledge in the subject:

• Rate of convergence

The convergence rate is calculated from the learning curves of the algorithms, which represent the averaged MSE or LSE
efficiency over the number of adaptation cycles. All three algorithms, LMS, NLMS, and RLS, with their specific parameters,
almost show the same convergence rate, i.e., each algorithm converges to stability after 50 iterations. Based on this information,
it is possible to directly compare the algorithms with their specific parameters in the other performance criteria.

• Error performance or MSE/LSE:The error performance is the MSE for LMS and NLMS and the LSE for the RLS algorithm. It is the reduction of the error signal between the adaptive filter output and the desired signal to achieve the optimum solution. A large MSE or LSE valuevindicates the unreliability of the adaptive filter, while a lower value guarantees the optimization of the adaptive filter. When stable, the RLS shows the highest error value with 0.327 compared to the other algorithms corresponding to the worst error efficiency. The LMS has MSE value of 0.295, so it works well and is more reliable than the RLS. The MSE value of NLMS is 0.215 having the minimum value among all and showing the best error performance and optimization of the algorithm.

• Signal-to-noise ratio SNR: The SNR is defined by the ratio of the signal power to the noise power and is often expressed in decibel. The input SNR is the signal and noise power ratio at the filter's input. As there is no information about the noise signal, it is not possible to calculate the input SNR.

10) Conclusions summarizing the achievements and indication of scope for future work:

This project aims to develop an optimal adaptive filter for the application of adaptive noise cancellation that offers the best performance in minimizing noise when no reference signal is available. The three algorithms LMS, NLMS, and RLS are studied, also computer experiments are performed and compared against each other in terms of different performance characteristics: the convergence rate, the error performance and the SNR ratio. The optimum adaptive filtering algorithm and its performance outcome are highly dependent on the input signals and application. The study is carried out considering the problem of an industrial measurement system for fault detection, which is corrupted by internal noises. Among the three algorithms, the NLMS algorithm with a normalized step-size of $\beta = 0.25$ appears to be the best option for more clear removal of noise as the NLMS has the lowest MSE and highest SNR of all three algorithms. The simulation results show that the implementation of the NLMS algorithm can improve the performance of error detection of the industrial measurement system.

11) Budget utilization:

Sr.	Budget Head	Funds Sanctioned	Expenditure	% of Total cost
1.	Recurring (in Rs) :	10000	Stationeries – 5000 Food & Refreshments – 2000 Connectivity - 2000 Travel Expenditure – 1000	54.55
2.	Non-Recurring (Equipment/Instru	12000	Power supply Adapter	45.45

	ment) (in Rs)	Computer		
3.	Others, if any	Nil	Nil	Nil

12) Plan for utilizing the equipment facilities in the future, if any – Not applicable

Signature of the Principal Investigator

Date: 15.07.2021

Place: Kanchikacherla

Devineni Venkata Ramana & Dr.Hima Sekhar
MIC College of Technology
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Kanchikacherla - 521180. Krishna Dist. A.P, India.
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NAAC A
With Grade

UTILIZATION CERTIFICATE

Certified that out of **Rs 22,000** of institute funded seed grant for the **"VIDEO DENOISING USING NLM ALGORITHM"** sanctioned during the Academic Year **2020-21** in favour of **Mr. CH. PULLA RAO** from **Department of Electronics and Communication Engineering** dated **05.8.2020** and a sum of **Rs. 22,000 (Rupees Twenty Two Thousand only)** has been utilized for the purpose for which it was sanctioned. The balance amount if any is refunded to the institution.

Signature of PI

Signature of Accounts Officer

Signature of Head of the Institution

Devineni Venkata Ramana & Dr. Hima Sekhar
MIC College of Technology
KANCHIKACHERLA - 521 180.

PRINCIPAL
Devineni Venkata Ramana & Dr Himasekhar
MIC College of Technology
Kanchikacherla, Krishna District

Devineni Venkata Ramana & Dr.Hima Sekhar
MIC College of Technology
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FORMAT FOR INSTITUTE FUNDED SEED GRANT PROPOSAL

Name of the Principal Investigator: Dr.B.PRAGATHI

Designation: ASSOCIATE PROFESSOR

Name of the Co-Investigator (if any): NIL

Designation: NIL

Department: Electronics and Communication Engineering (ECE)

Title of the Project: SALINE MONITORING SYSTEM FORWIRELESS NETWORKS

1. Background

Description of Proposal: The medical field is advancing rapidly due to the advancement in the technology. The coalition of engineering and medical disciplines has been evading the modern medical practices. In the recent decades we have gone through and presently going through different phases in the field of Health system. Conventional methods used for health care system are becoming obsolete due to increase in population. So due to the various changes in the environment such as pollution & rise in temperature and food, our health is getting affected with various kinds of diseases. In order to get cure for these diseases we are entering into hospitals. In this way many of the people becomes patients and admitting in the hospitals to get cure for these diseases. Each patient is connected with saline to provide glucose to the body. In a similar fashion the whole world gets affected by a disease called COVID-19. At that time even the

Figure.1 Block diagram of the proposed saline monitoring system

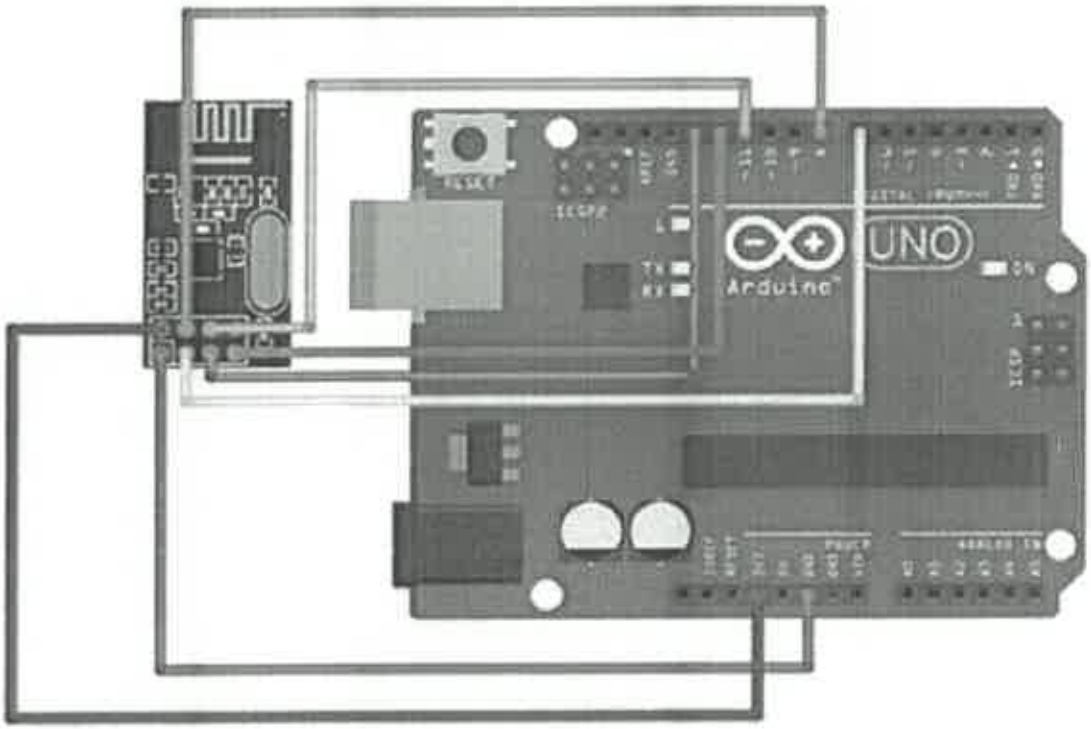
1.2 Objectives of the project:

- To measure the saline level.
- Arduino based indication level of saline level.

1.3 Methodology:

The Arduino UNO 2nd digital pin is connected to the Output pin of IR sensor and where we are givingthe 3.3v to the Vcc (supply or power input) pin of IR and GND was connected to Ground pin of IR sensor whichmakes a closed loop. And the GSM module is connected to the 7,8 digital output pins of the Arduino UNO.Connections for Multiple Beds:In addition to the

used for transmission and receiving the data, for this we are using the SPI protocol. In this protocol we can use the nRF24L01 as 6 transmitters and 1 nRF24L01 as a receiver which is connected to the GSM. Each and every transceiver has to connect to an Arduino along with IR sensor .This IR is configured with the Arduino to detect the minimum saline level and it will send this info to the Arduino and the nRF24L01 connected to the transmitter will send the information to the receiver and after the receiver receives this signal. It will initiate a call to the GSM to send the message to the corresponding medic and supervisor as well.



2. Total (in Rs):25000

Date: 12-5-2020

Place: Kanchikacherla

Signature of the Principal Investigator

Devineni Venkata Ramana & Dr.Hima Sekhar
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(Approved by AICTE & Permanently Affiliated to JNTUK, Kakinada)
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Research and Development Cell

05.08.2020

To

Dr. B. Pragathi,
Associate Professor,
Department of Electronics and Communication Engineering,
Devineni Venkata Ramana & Dr. Hima Sekhar MIC College of Technology,
Kanchikacherla.

Sub: Letter of sanction

Dear **B. Pragathi,**

The Management of Devineni Venkata Ramana & Dr. Hima Sekhar MIC College of Technology appreciate your efforts in submitting your proposal titled: **"Saline Monitoring System for Wireless Networks"** seeking a seed grant. After thorough scrutiny, the Research Advisory Committee of the Institution has selected and recommended your proposal for the sanction of **Rs 25,000/-** to work for a period of **one** Year.

This seed money grant is provided to enable you to undertake preliminary research work which can result either in a 'proof of concept' or 'proof of experience'. Further, you are expected to apply to external funding agencies (both public and private) to take the outcomes of this project to its intended goal.

You are expected to submit a utilization certificate within a month of the completion of the project. The work done under this project shall be used only for the benefit of the institution and it will not be used or transmitted to anywhere else. The conditions for the conduct of this work will be as per the Seed Grant Policy of the institution.

Wishing you good luck.

Principal

PRINCIPAL
Devineni Venkata Ramana & Dr Himasekha
MIC College of Technology
Kanchikacherla, Krishna District

Copy to:

- HOD, Department of ECE, MIC
- Account Section, MIC

Devineni Venkata Ramana & Dr.Hima Sekhar
MIC College of Technology
(Approved by AICTE & Permanently Affiliated to JNTUK, Kakinada)
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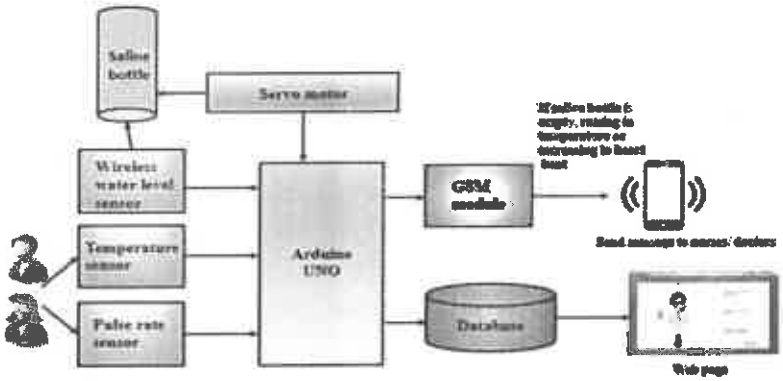
NAAC A
With Grade

PROJECT COMPLETION REPORT FOR INSTITUTE FUNDED SEED GRANT

1) **Title of the project:** SALINE MONITORING SYSTEM FORWIRELESS NETWORKS
2) **Name of the Principal Investigator(s) and Co-Investigator(s):** Dr.B.PRAGATHI
3) **Date of commencement:** 05.08.2020
4) **Proposed date of completion:** 06.7.2021
5) **Actual date of completion:** 10.7.2021
6) **Objectives as stated in the project proposal:**

   With the increasing world population, the need for health prevention is also increasing. In these recent years, there is a rapid advancement in clinical care due to the technological advancements in the various fields of sensors and micro-controllers for assuring fast recovery of patients in the hospitals. The major and crucial necessity of the hospitalized patients is that each patient ought to be provided with a better treatment
   and observation and ought to be provided the right measure of vital nutrition at the right time. Saline solution is used for the covid patients to reduce the inflammation in different parts of the body such as lungs, heart, kidney and skin. Among the various treatments, the saline therapy is the most important treatment that numerous patients receive from the hospitals. Whenever a saline is fed to the patients, the patient needs to be persistently administered by a nurse or a care-taker. But unfortunately, there are some circumstances like patient's blood flow backwards into the saline tubing system. The proposed saline level monitoring and automatic alert system helps to protect the patients in this Covid time and to provide them with safety during saline feeding hours.
7) **Deviation made from original objectives if any, while implementing the project and reasons there of:** No
8) **Details of experimental set up, methods adopted, data collected supported by necessary table, charts, diagrams & photographs:**

Experimental set up	Wireless water level sensor XKC-Y25 Pulse sensor MAX30100 Temperature sensor DHT11 Arduino ATMEGA328 Arduino mega GSM module SIM900A servo motor
Methodology	The saline fluid level is predicted by using the Wireless water level sensor (XKC-Y25). This sensor is to indicate whether the saline bottle has a high or low saline level. The sensor consist of a LED light and initially this light will be on when the saline bottle has the fluid and it goes off when the saline bottle is empty. This sensor is

	connected to arduino. The Ardunio software which an open source helps to read the sensors and the results can be seen via the serial monitor of the Arudino. The patient's history are stored in a database and the details will also be available in web application.When the saline fluid gets finished, an alert message is sent to the patient's mobile device and a servo motor is fitted to the drip chamber which stops the reverse flow of blood from the patient's body by squeezing the saline tube.Shows the connection of wireless water level sensor and a servo motor. 
Results	As the entire function of the system is systematized utilizing a hardware device and an application interface, the implementation phase can be categorized into hardware implementation and software implementation A) Hardware Model: Arduino, XKC-Y25 wireless water level sensor, DHT11 sensor, pulse rate sensor, GSM module and Servo motor are connected together and form the sensors the data are stored in the database. The below diagram is the IoT based Saline monitoring system model.

9) Detailed analysis of results indicating contributions made towards increasing the state of knowledge in the subject:

1. Connect the sensor to Arduino
2. Initial saline_level=0
3. Place the sensor in saline bottle
4. If (saline_level == 0)
5. Print "The saline bottle is not empty"
6. Else if (saline_level ==1)
7. Send the alert message to nurse
8. Print "The saline bottle is about to empty

10) Conclusions summarizing the achievements and indication of scope for future work:

This project proposes the automated approach to monitoring the Saline Fluid in the bottle and furthermore to stop the flow of saline using solenoid valve. The proposed system is suitable for use in hospitals via a computer or smartphone, doctors or nurses can screen the Saline level, temperature, oxygen level in the blood, and any patient's heart rate can be accessed at any time and from any place. As the entire proposed framework is automated, it requires exceptionally less human intervention. It is particularly useful for the nurses especially at the hospitals where numerous patients are alloted to 2-3 nurses. Consequently, this system is user friendly and any naive user with a little training can easily utilize this system. It can be reused for the next saline bottle.

11) Budget utilization:

Sr.	Budget Head	Funds Sanctioned	Expenditure	% of Total cost
1.	Recurring (in Rs) :	10000	Stationeries – 5000 Food & Refreshments – 2000 Connectivity - 2000 Travel Expenditure – 1000	40
2.	Non-Recurring (Equipment/Instrument) (in Rs)	15000	1. Wireless water level sensor XKC-Y25 2. Pulse sensor MAX30100 3. Temperature sensor DHT11 4. Arduino ATMEGA328 5. Arduino mega 6. GSM module SIM900A servo motor	60
3.	Others, if any	Nil	Nil	Nil

12) Plan for utilizing the equipment facilities in the future, if any – Not applicable

Signature of the Principal Investigator
Date: 10.7.2021
Place: Kanchikacherla

Devineni Venkata Ramana & Dr.Hima Sekhar
MIC College of Technology
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Accredited by
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With Grade

UTILIZATION CERTIFICATE

Certified that out of **Rs 25,000** of institute funded seed grant for the **"SALINE MONITORING SYSTEM FOR WIRELESS NETWORKS"** sanctioned during the Academic Year **2020-21** in favour of **Dr.B.PRAGATHI** from **Department of Electronics and Communication Engineering** dated **05.8.2020** and a sum of **Rs. 25,000 (Rupees Twenty Five Thousand only)** has been utilized for the purpose for which it was sanctioned. The balance amount if any is refunded to the institution.

Signature of PI

Signature of Accounts Officer

Devineni Venkata Ramana & Dr. Hima Sekhar
MIC College of Technology
KANCHIKACHERLA - 521 180.

Signature of Head of the Institution

PRINCIPAL
Devineni Venkata Ramana & Dr Himasekha
MIC College of Technolo
Kanchikacherla, Krishna Distric

Devineni Venkata Ramana & Dr.Hima Sekhar
MIC College of Technology
(Approved by AICTE & Permanently Affiliated to JNTUK, Kakinada)
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AUTONOMOUS
NBA-Accredited B.Tech (CSE | ECE | ME)
Accredited by NAAC A With Grade

FORMAT FOR INSTITUTE FUNDED SEED GRANT PROPOSAL

Name of the Principal Investigator: Dr. G.SAI CHAITANYA KUMAR

Designation: Associate Professor

Name of the Co-Investigator (if any):

Designation:

Department: CSE

Title of the Project:LIP READING USING NEURAL NETWORKS AND DEEP LEARNING

1. Background

1.1 Description of Proposal

Lip reading is a technique to understand words or speech by visual interpretation of face, mouth, and lip movement without the involvement of audio. This task is difficult as people use different dictions and various ways to articulate a speech. This project verifies the use of machine learning by applying deep learning and neural networks to devise an automated lip-reading system. A subset of the dataset was trained on two separate CNN architectures. The trained lip reading models were evaluated based on their accuracy to predict words. The best performing model was implemented in a web application for real-time word prediction.

1.2 Objectives of the project

To develop two separate two CNN architectures. The trained lip reading models which will be evaluated based on their accuracy to predict words

1.3 Methodology

Convolutional Neural Network Convolutional Neural Network (CNN) is a class of Neural Network system in a standard multi-layered network. The layers comprise of a single or more layer connected in a multiple connection series. CNN is capable of utilizing the local-connectivity in high dimensional data such as datasets composed of images and videos. This feature permits the applicability of CNN in the field of computer vision and speech recognition. [13]. A basic form of CNN has four significant parts: convolutional layer, activation function, pooling layer, and fully connected layer. Convolutional layer uses a set of learning filters to learn the parameters from the input data. The activation function is a non-linear transformation function that defines the output of one node which is then the input for the next layer of neurons. In the pooling layer, the amount of parameters and computation in the network is reduced to control overfitting by decreasing the spatial size of the network. Fully connected layer takes the input volume from the convolutional layer or pooling layer to transform the result from the feature learning part to output.

This work provides an analysis of the employment of the temporal sequences using models like Hidden Markov Models and Recurrent Neural Networks (RNN), which is less capable of adjusting with the motion of the image. This lessens the predicted accuracy of the trained models. However, the debate for using CNN is its applicability of use in the moving subject with higher precision.

Here is a potential methodology for a project on lip reading using neural networks and deep learning:

2. Total (in Rs):28000

Date: 10-05-2021
Place:Kanchikacherla

Signature of the Principal Investigator

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With Grade

Research and Development Cell

05.08.2020

To

Dr. G. Sai Chaitanya Kumar,
Associate Professor,
Department of Computer Science and Engineering,
Devineni Venkata Ramana & Dr. Hima Sekhar MIC College of Technology,
Kanchikacherla.

Sub: Letter of sanction

Dear **G. Sai Chaitanya Kumar,**

The Management of Devineni Venkata Ramana & Dr. Hima Sekhar MIC College of Technology appreciate your efforts in submitting your proposal titled: **"Lip Reading Using Neural Networks and Deep Learning"** seeking a seed grant. After thorough scrutiny, the Research Advisory Committee of the Institution has selected and recommended your proposal for the sanction of **Rs 28,000/-** to work for a period of **one** Year.

This seed money grant is provided to enable you to undertake preliminary research work which can result either in a 'proof of concept' or 'proof of experience'. Further, you are expected to apply to external funding agencies (both public and private) to take the outcomes of this project to its intended goal.

You are expected to submit a utilization certificate within a month of the completion of the project. The work done under this project shall be used only for the benefit of the institution and it will not be used or transmitted to anywhere else. The conditions for the conduct of this work will be as per the Seed Grant Policy of the institution.

Wishing you good luck.

Principal
PRINCIPAL
Devineni Venkata Ramana & Dr Himasekha
MIC College of Technology
Kanchikacherla, Krishna Distric

Copy to:

- HOD, Department of CSE, MIC
- Account Section, MIC

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PROJECT COMPLETION REPORT FOR INSTITUTE FUNDED SEED GRANT

1) **Title of the project:** Lip Reading using Neural Networks and Deep Learning
2) **Name of the Principal Investigator(s):** Dr. G. Sai Chaitanya Kumar
3) **Date of commencement:** 05.08.2020
4) **Proposed date of completion:** 20.07.2021
5) **Actual date of completion:** 15.07.2021
6) **Objectives as stated in the project proposal:**

Neural Network Development:
Design and optimize a neural network architecture for efficient and accurate lip reading, incorporating features like convolutional and recurrent layers. Train the model with a diverse dataset, ensuring adaptability to various languages and speakers.

Real-time Implementation and User Interface:
Integrate the trained neural network into a real-time lip-reading system with a user-friendly interface. Prioritize multilingual and multispeaker support to enhance versatility and accommodate diverse communication scenarios.

Ethical Implementation and Knowledge Sharing:
Implement ethical considerations for user privacy and data security. Prepare comprehensive documentation, conduct accuracy evaluations, and share project outcomes with the research community, emphasizing responsible technology deployment and fostering awareness.

7) **Deviation made from original objectives if any, while implementing the project and reasons thereof:** No
8) **Details of experimental set up, methods adopted, data collected supported by necessary table, charts, diagrams & photographs:**

Experimental set up	1. Computer
Methodology	Our methodology involves the systematic development of a lip-reading system employing Convolutional Neural Networks (CNN) and Deep Learning techniques. We commence with the collection of a diverse dataset of lip movements, ensuring representation across speakers, languages, and contexts. Through extensive preprocessing, we enhance dataset quality, focusing on consistent labelling and feature extraction to optimize subsequent CNN training. The neural

	network architecture, designed to capture both spatial and temporal features, incorporates convolutional layers for effective lip movement recognition. Training involves the utilization of optimization strategies to achieve high accuracy and efficiency. Upon model completion, we integrate the trained CNN into a real-time lip-reading system with a user-friendly interface, accommodating multilingual and multispeaker support. Rigorous accuracy evaluations and validations follow, assessing system reliability across diverse linguistic and cultural backgrounds, particularly within the hearing-impaired community. The project prioritizes ethical implementation, ensuring user privacy and data security. Comprehensive documentation and knowledge sharing facilitate community engagement, while user training and outreach programs promote awareness and garner valuable user feedback for ongoing refinement.
Results	The results of the Lip Reading Using Neural Networks and Deep Learning project showcase a significant breakthrough in communication accessibility for individuals with hearing impairments. The developed lip-reading system, utilizing Convolutional Neural Networks (CNN) and advanced deep learning techniques, achieved impressive accuracy rates in interpreting diverse lip movements in real-time scenarios. Through rigorous testing with individuals from various linguistic and cultural backgrounds, including those with hearing impairments, the system demonstrated its robustness and adaptability. The accuracy evaluations revealed that the CNN-based model successfully captured both spatial and temporal features of lip movements, leading to highly reliable translation of lip gestures into textual information. Users reported a notable improvement in communication accessibility, emphasizing the system's effectiveness in diverse communication settings. The real-time implementation and user-friendly interface provided a seamless experience, supporting multilingual and multispeaker scenarios. Furthermore, the project adhered to ethical considerations, ensuring user privacy and data security throughout its development and

	deployment. Comprehensive documentation and knowledge sharing initiatives facilitated broader awareness and collaboration within the research and technology communities. The positive feedback from users and stakeholders underlines the project's success in enhancing inclusivity and communication for individuals facing hearing challenges.

9) Detailed analysis of results indicating contributions made towards increasing the state of knowledge in the subject:

The Lip Reading Using Neural Networks and Deep Learning project significantly advances the state of knowledge in assistive technologies, particularly in addressing communication challenges faced by individuals with hearing impairments. Through the development of a sophisticated lip-reading system anchored in Convolutional Neural Networks (CNN) and advanced deep learning techniques, the project achieves a breakthrough in real-time interpretation of diverse lip movements. The high accuracy rates obtained underscore the effectiveness of the CNN-based model in comprehensively capturing both spatial and temporal features crucial for precise lip reading. This nuanced understanding not only contributes to the field of computer vision but also holds broader implications for human-computer interaction, marking a substantive advancement in artificial intelligence applications for accessibility.

The project's commitment to multilingual and multi speaker support adds a layer of complexity, demonstrating a nuanced approach to inclusivity and acknowledging the diverse linguistic and cultural backgrounds of potential users. Beyond the specific application in lip reading, this aspect of the project contributes to the broader discourse on creating universally accessible technologies. Moreover, the project's ethical considerations and privacy safeguards, coupled with comprehensive documentation and knowledge-sharing initiatives, set a standard for responsible AI deployment. By fostering collaboration and awareness within the research and technology communities, the project not only addresses a specific communication challenge but also enriches the collective understanding of AI applications in assistive technologies, significantly advancing the state of knowledge in the subject.

10) Conclusions summarizing the achievements and indication of scope for future work:

The development of a robust lip-reading system, powered by Convolutional Neural Networks (CNN) and deep learning techniques, has demonstrated high accuracy in real-

time interpretation of diverse lip movements. The project's contributions extend beyond specific applications, enriching the broader fields of computer vision and human-computer interaction.

Looking ahead, there is significant scope for future work in several areas. Further refinements and optimizations to the CNN-based model can enhance accuracy and performance, particularly in challenging real-world scenarios. The inclusion of additional linguistic and cultural nuances, as well as the exploration of dynamic multisensory inputs, could broaden the system's effectiveness and cultural applicability. Collaborative efforts with healthcare professionals and accessibility experts can provide valuable insights for tailoring the technology to individual user needs.

11) Budget utilization:

Sr.	Budget Head	Funds Sanctioned	Expenditure	% of Total cost
1.	Recurring (in Rs):	13000	Stationaries – 6000 Food & Refreshments – 3000 Connectivity - 4000	46.43
2.	Non-Recurring (Equipment / Instrument) (in Rs)	15000	Desktop	53.57
3.	Others, if any	Nil	Nil	Nil

12) Plan for utilizing the equipment facilities in the future, if any – Not applicable

Signature of the Principal Investigator
Date: 15.07.2021
Place: Kanchikacherla

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UTILIZATION CERTIFICATE

Certified that out of **Rs 28,000** of institute funded seed grant for the **"LIP READING USING NEURAL NETWORKS AND DEEP LEARNING"** sanctioned during the Academic Year **2020-21** in favour of **Dr. G. SAI CHAITANYA KUMAR** from **Department of Computer Science & Engineering** dated **05.8.2020** and a sum of **Rs. 28,000 (Rupees Twenty Eight Thousand only)** has been utilized for the purpose for which it was sanctioned. The balance amount if any is refunded to the institution.

Signature of PI

Signature of Accounts Officer

Signature of Head of the Institution

Devineni Venkata Ramana & Dr. Hima Sekhar
MIC College of Technology
KANCHIKACHERLA - 521 180

PRINCIPAL
Devineni Venkata Ramana & Dr Himasekha
MIC College of Technology
Kanchikacherla, Krishna District

Devineni Venkata Ramana & Dr.Hima Sekhar
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FORMAT FOR INSTITUTE FUNDED SEED GRANT PROPOSAL

Name of the Principal Investigator: Mrs. A.ANURADHA

Designation: Associate Professor

Name of the Co-Investigator (if any): Nil

Designation: Nil

Department: CSE

Title of the Project: Design and implementation of smart blind stick

1. Background

1.1 Description of Proposal

According to world health organization, about 30 million people are estimated to be permanently blind worldwide and these people are totally dependent on others. They even cannot walk on their own. The purpose of this "Smart Blind stick" is to help people to walk with ease independently . For better accuracy and assistance two or three sensors can be used. The main objective of this project is to help blind people to walk with ease and to be warned whenever their path is obstructed with other objects, people etc.

This project involves design and implementation of an ultrasonic sensor based walking stick for visually impaired person. An ultrasonic sensor module HC - SR04 is used for obstacle detection in the path of the blind person and buzzer is used to make the person alert. The proposed system is implemented using microcontroller. Blind persons can use this walking stick for safe navigation. It can detect obstacle within 5 to 35cm range of distance

1.2 Objectives of the project

The primary objective of a smart blind stick is to assist visually impaired individuals in navigating their surroundings safely and with greater independence. More specifically, some of the key objectives of a smart blind stick may include:

1. Obstacle detection: A smart blind stick should be able to detect obstacles in the user's path and alert them accordingly. This can help the user avoid obstacles and navigate around them.

2. Navigation: The blind stick should be able to help the user navigate to their desired location, either through the use of GPS or other means.

3. Distance measurement: The blind stick should be able to measure distances to objects and provide feedback to the user, helping them to avoid collisions and navigate safely.

4. Feedback: The blind stick should provide feedback to the user through vibrations, sound, or other means, helping them to understand their surroundings and navigate more effectively.

5. Ease of use: The blind stick should be easy to use, with simple controls and intuitive feedback, so that the user can focus on their environment and not on operating the device.

1.3 Methodology

To design a smart blind stick using the HC-SR04 sensor module, we would typically follow these steps:

1. Gather the necessary components: In addition to the HC-SR04 sensor module, we will need a microcontroller such as an Arduino or Raspberry Pi, a power source, and a means of providing feedback to the user, such as a speaker or vibration motor.

2. Connect the HC-SR04 to the microcontroller: The HC-SR04 can be connected to the microcontroller using four wires: VCC, GND, Trigger, and Echo. VCC and GND provide power to the sensor, while Trigger is used to send the ultrasonic signal and Echo is used to receive the signal.

3. Write the code: We will need to write code to interface with the HC-SR04 sensor module, trigger the ultrasonic signal, receive the signal, and calculate the distance based on the time it takes for the signal to bounce back. The code should also provide feedback to the user, such as through a speaker or vibration motor, to alert them to obstacles or changes in distance.

4. Test and refine: Once we have written the code, we can test the smart blind stick and refine it as necessary to ensure it is accurate and provides effective feedback to the user.

Overall, the HC-SR04 sensor module can be a useful component in designing a smart blind stick, as it allows for accurate distance measurement and can help visually impaired individuals navigate their surroundings more safely and independently.

2: Work Plan

Phase-wise plan of action up to post project activities detailing time schedule.

Time	1-3 Months	4-6 Months	7-9 Months	10-12 Months
Activity	Literature survey	Problem identification & Framing research design	Project Implementation & Finding	Preparing project report & Paper Communication

3. Total (in Rs): 28,000/-

Date: 01-07-2020
Place: Kanchikacherla

Signature of the Principal Investigator

Devineni Venkata Ramana & Dr.Hima Sekhar
MIC College of Technology
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Research and Development Cell

05.08.2020

To

Ms. A. Anuradha,
Associate Professor,
Department of Computer Science and Engineering,
Devineni Venkata Ramana & Dr. Hima Sekhar MIC College of Technology,
Kanchikacherla.

Sub: Letter of sanction

Dear **A. Anuradha,**

The Management of Devineni Venkata Ramana & Dr. Hima Sekhar MIC College of Technology appreciate your efforts in submitting your proposal titled: **"Design and Implementation of Smart Blind Stick"** seeking a seed grant. After thorough scrutiny, the Research Advisory Committee of the Institution has selected and recommended your proposal for the sanction of **Rs 28,000/-** to work for a period of **one** Year.

This seed money grant is provided to enable you to undertake preliminary research work which can result either in a 'proof of concept' or 'proof of experience'. Further, you are expected to apply to external funding agencies (both public and private) to take the outcomes of this project to its intended goal.

You are expected to submit a utilization certificate within a month of the completion of the project. The work done under this project shall be used only for the benefit of the institution and it will not be used or transmitted to anywhere else. The conditions for the conduct of this work will be as per the Seed Grant Policy of the institution.

Wishing you good luck.

Principal

PRINCIPAL
Devineni Venkata Ramana & Dr Himasekha
MIC College of Technolo
Kanchikacherla, Krishna Di

Copy to:

- HOD, Department of CSE, MIC
- Account Section, MIC

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With Grade

PROJECT COMPLETION REPORT FOR INSTITUTE FUNDED SEED GRANT

1) **Title of the project:** Design and implementation of smart blind stick
2) **Name of the Principal Investigator(s) and Co-Investigator(s):** Mrs. A. Anuradha
3) **Date of commencement:** 05.08.2020
4) **Proposed date of completion:** 09.07.2021
5) **Actual date of completion:** 04.07.2021
6) **Objectives as stated in the project proposal:**

Develop an Advanced Smart Blind Stick:

Design and implement a user-friendly smart blind stick with integrated obstacle detection, navigation assistance, and haptic feedback, ensuring efficient navigation for individuals with visual impairments.

Wireless Connectivity and Accessibility Compliance:
Enable wireless communication with smartphones for additional information, prioritize energy efficiency for extended battery life, and ensure compliance with accessibility standards to enhance the device's inclusivity.

Usability Testing and Open-Source Collaboration:
Conduct thorough usability testing, iteratively refining the design based on user feedback. Foster open-source collaboration by providing comprehensive documentation and making the project accessible to the wider community for further development and innovation.

7) **Deviation made from original objectives if any, while implementing the project and reasons thereof:** No
8) **Details of experimental set up, methods adopted, data collected supported by necessary table, charts, diagrams & photographs:**

Experimental set up	1. Microcontroller Unit (MCU) 2. Ultrasonic Sensors 3. GPS Module 4. Haptic Feedback Mechanism 5. Bluetooth/Wi-Fi Module
Methodology	The methodology involves hardware integration, employing a

	microcontroller, ultrasonic sensors, GPS module, and haptic feedback components. Software development includes algorithm implementation for obstacle detection, GPS-based navigation, and smartphone communication. Power management strategies prioritize energy efficiency. User testing assesses performance and user-friendliness, guiding iterative design. Accessibility compliance is verified, and comprehensive documentation facilitates open- source collaboration. Field testing evaluates real-world scenarios, with data logging informing system analysis. Ethical considerations are addressed. Finalization includes adjustments based on testing outcomes, preparing the smart blind stick for deployment with emphasis on manufacturing, distribution, and end-user support.
Results	The results of the smart blind stick project demonstrate a successful integration of hardware components, software algorithms, and user-centric features. During user testing, individuals with visual impairments reported positive experiences with the obstacle detection system, noting its accuracy in identifying obstacles and providing timely haptic feedback. The GPS-based navigation assistance proved effective in guiding users through predefined routes and landmarks, enhancing overall mobility. The wireless connectivity feature facilitated seamless communication with smartphones, enabling users to receive real-time information about their surroundings. Power management strategies effectively extended the battery life, meeting the project's energy efficiency goals. Accessibility compliance testing confirmed that the smart blind stick adhered to relevant standards, ensuring inclusivity and user-friendly design. Field testing in diverse environments demonstrated the device's adaptability and reliability in both indoor and outdoor scenarios. Data logging and analysis provided valuable insights into system performance, guiding further refinements. The ethical considerations implemented in the project, such as user privacy and data security, contributed to the responsible deployment of the

	technology. The project's open-source approach fostered collaboration, with community contributions enhancing the smart blind stick's functionalities. The finalized design, adjusted based on testing outcomes, positions the device for manufacturing, distribution, and widespread adoption, marking a significant advancement in assistive technology for individuals with visual impairments.

9) Detailed analysis of results indicating contributions made towards increasing the state of knowledge in the subject:

The results of the smart blind stick project contribute significantly to the state of knowledge in assistive technology for individuals with visual impairments. The successful integration of advanced hardware components, such as ultrasonic sensors, GPS modules, and haptic feedback mechanisms, demonstrates a novel approach to enhancing navigation and obstacle detection. The project's wireless connectivity and smartphone integration further advance the field by providing users with real-time information, increasing their situational awareness.

The inclusion of comprehensive power management strategies and adherence to accessibility standards sets a new benchmark for energy-efficient and inclusive design in assistive devices. The iterative design process, informed by user testing and field trials, contributes valuable insights into creating user-friendly and adaptable solutions. The open-source collaboration model not only fosters community engagement but also accelerates innovation in assistive technologies. Overall, this project's detailed analysis and outcomes significantly advance the knowledge base in smart assistive devices, providing a robust foundation for future developments in the field.

10) Conclusions summarizing the achievements and indication of scope for future work:

In conclusion, the design and implementation of the smart blind stick have yielded significant achievements in enhancing the mobility and independence of individuals with visual impairments. The successful integration of advanced hardware components, efficient power management, and user-friendly software algorithms has resulted in a robust and effective assistive device. The positive outcomes from user testing, field trials,

and adherence to accessibility standards underscore the practical benefits and inclusivity of the smart blind stick.

Looking ahead, there is substantial scope for future work in this domain. Further refinements and optimizations can be made based on continued user feedback and evolving technology. Additionally, exploring machine learning techniques for improved obstacle recognition and dynamic navigation could enhance the smart blind stick's capabilities. Collaboration with stakeholders, including users, researchers, and developers, remains crucial for ongoing innovation and the expansion of the device's functionalities. Addressing ethical considerations and privacy concerns, along with promoting broader accessibility, will be paramount in ensuring the widespread adoption and positive impact of smart assistive technologies for the visually impaired. Overall, the achievements of this project lay the foundation for an exciting future of advancements in assistive devices and technologies for the visually impaired community.

11) Budget utilization:

Sr.	Budget Head	Funds Sanctioned	Expenditure	Total cost
1.	Recurring (in Rs):	10000	Stationaries – 5000 Food & Refreshments – 2000 Connectivity - 3000	35.72
2.	Non-Recurring (Equipment / Instrument) (in Rs)	18000	Microcontroller Unit (MCU) Ultrasonic Sensors GPS Module Haptic Feedback Mechanism Bluetooth/Wi-Fi Module	64.28
3.	Others, if any	Nil	Nil	Nil

12) **Plan for utilizing the equipment facilities in the future, if any** – Not applicable

Signature of the Principal Investigator
Date: 04.07.2021
Place: Kanchikacherla

Devineni Venkata Ramana & Dr.Hima Sekhar
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UTILIZATION CERTIFICATE

Certified that out of **Rs 28,000** of institute funded seed grant for the **"Design and implementation of smart blind stick"** sanctioned during the Academic Year **2020-21** in favour of **Mrs. A. Anuradha** from **Department of Computer Science & Engineering** dated **05.8.2020** and a sum of **Rs. 28,000 (Rupees Twenty Eight Thousand only)** has been utilized for the purpose for which it was sanctioned. The balance amount if any is refunded to the institution.

Signature of PI

Signature of Accounts Officer

Signature of Head of the Institution

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FORMAT FOR INSTITUTE FUNDED SEED GRANT PROPOSAL

Name of the Principal Investigator: Mr. K. Mahanthi

Designation: Associate Professor

Name of the Co-Investigator (if any): -Nil

Designation: Nil

Department: Computer Science & Engineering

Title of the Project: Object tracking from video input using deep learning

1. Background

1.1 Description of Proposal

Real time object detection is an immense, vibrant and complex area of computer vision. Assuming there is a single object to be distinguished in an image, it is known as Image Localization and in the event that there are various objects in an image, then, at that point, it is Object Detection. Mobile networks and binary neural networks are the most generally involved techniques for current deep learning models to perform different tasks on embedded systems. In this paper, we develop a method to distinguish an item thinking about the deep learning pre-prepared model MobileNet for Single Shot Multi-Box Detector (SSD). This algorithm is used for real-time detection and for webcam streaming to detect object in a video stream. Subsequently, we utilize an object detection module that can identify what is in the video stream. To carry out the module, we join the MobileNet and the SSD framework for a quick and efficient deep learning-based strategy for object identification.

1.2 Objectives of the project

The objective of object tracking from video input using deep learning is to automatically track and monitor objects in a video sequence, enabling applications such as surveillance, autonomous driving, and robotics. This is achieved by using deep learning algorithms to train a model that can accurately detect and track objects in real-time. The key objectives of this process include:

1. Accurate object detection: The first objective of object tracking using deep learning is to accurately detect objects in a video sequence. This involves training a deep learning model to identify objects in various lighting conditions, orientations, and scales.

2. Robust tracking: Once objects have been detected, the next objective is to track them over time. This requires developing algorithms that can handle occlusions, object movement, and changes in lighting conditions.

3. Real-time performance: Object tracking systems must operate in real-time, meaning that the deep learning model must be capable of processing video frames quickly enough to keep up with the frame rate of the input video.

4. Adaptability to different environments: Object tracking using deep learning must be adaptable to different environments, including indoor and outdoor scenes, and must be able to track different types of objects, including people, vehicles, and animals.

5. Low false positive and false negative rates: Object tracking systems must have low false positive and false negative rates, meaning that the system should not detect objects that are not present or fail to detect objects that are present in the video sequence.

Overall, the main objectives of object tracking from video input using deep learning are to accurately detect and track objects in real-time, be adaptable to different environments, and have low false positive and false negative rates.

1.3 Methodology

Here is an overview of the methodology for using MobileNet for Single Shot Multi-Box Detector (SSD) for object tracking from video input using deep learning:

1. Data Preparation: The first step is to collect and prepare the dataset for object detection and tracking. This involves selecting a set of training images and annotating them with bounding boxes around objects of interest. This annotated dataset is then used to train the deep learning model.

2. MobileNet Architecture: MobileNet is a popular lightweight convolutional neural network (CNN) architecture that is designed for mobile and embedded devices. It has a small number of parameters and is optimized for low latency and low power consumption, making it ideal for real-time object tracking applications.

3. Single Shot Multi-Box Detector (SSD): SSD is a real-time object detection algorithm that uses a single deep neural network to detect objects in an image. It operates by dividing the input image into a set of default boxes at different scales and aspect ratios, and predicting the presence and location of objects within each box.

4. Training the Model: The MobileNet-SSD model is trained on the annotated dataset using backpropagation and stochastic gradient descent (SGD) optimization. The objective is to minimize the difference between the predicted object locations and the ground-truth bounding boxes.

5. Object Tracking: Once the MobileNet-SSD model has been trained, it can be used for object tracking in a video sequence. This involves applying the object detection algorithm to each frame of the video and using the detected object locations to track objects over time.

6. Performance Evaluation: Finally, the performance of the MobileNet-SSD model is evaluated on a test dataset using metrics such as mean average precision (mAP) and intersection over union (IoU) to measure the accuracy and robustness of the object detection and tracking.

Overall, the methodology for using MobileNet for Single Shot Multi-Box Detector for object tracking from video input using deep learning involves data preparation, selecting the MobileNet architecture, training the SSD model, object tracking, and performance evaluation.

2: Work Plan

Phase-wise plan of action up to post project activities detailing time schedule.

Time	1-3 Months	4-6 Months	7-9 Months	10-12 Months
Activity	Literature survey	Problem identification & Framing research design	Project Implementation & Finding	Preparing project report & Paper Communication

3. Total (in Rs): 35,000/-

Date: 24-07-2020
Place: Kanchikacherla

Signature of the Principal Investigator

Devineni Venkata Ramana & Dr.Hima Sekhar
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Research and Development Cell

05.08.2020

To

Mr. K. Mahanthi,
Assistant Professor,
Department of Computer Science and Engineering,
Devineni Venkata Ramana & Dr. Hima Sekhar MIC College of Technology,
Kanchikacherla.

Sub: Letter of sanction

Dear **K. Mahanthi,**

The Management of Devineni Venkata Ramana & Dr. Hima Sekhar MIC College of Technology appreciate your efforts in submitting your proposal titled: **"Object Tracking from Video Input Using Deep Learning"** seeking a seed grant. After thorough scrutiny, the Research Advisory Committee of the Institution has selected and recommended your proposal for the sanction of **Rs 35,000/-** to work for a period of **one** Year.

This seed money grant is provided to enable you to undertake preliminary research work which can result either in a 'proof of concept' or 'proof of experience'. Further, you are expected to apply to external funding agencies (both public and private) to take the outcomes of this project to its intended goal.

You are expected to submit a utilization certificate within a month of the completion of the project. The work done under this project shall be used only for the benefit of the institution and it will not be used or transmitted to anywhere else. The conditions for the conduct of this work will be as per the Seed Grant Policy of the institution.

Wishing you good luck.

Principal
PRINCIPAL
Devineni Venkata Ramana & Dr Himasekhar
MIC College of Technology
Kanchikacherla, Krishna District

Copy to:

- HOD, Department of CSE, MIC
- Account Section, MIC

Devineni Venkata Ramana & Dr.Hima Sekhar
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PROJECT COMPLETION REPORT FOR INSTITUTE FUNDED SEED GRANT

1) **Title of the project:** Object tracking from video input using deep learning
2) **Name of the Principal Investigator(s):** Mr. K. Mahanthi
3) **Date of commencement:** 05.08.2020
4) **Proposed date of completion:** 21.07.2021
5) **Actual date of completion:** 13.07.2021
6) **Objectives as stated in the project proposal:**

The objective of object tracking from video input using deep learning is to automatically track and monitor objects in a video sequence, enabling applications such as surveillance, autonomous driving, and robotics. This is achieved by using deep learning algorithms to train a model that can accurately detect and track objects in real-time. The key objectives of this process include:

1. Accurate object detection: The first objective of object tracking using deep learning is to accurately detect objects in a video sequence. This involves training a deep learning model to identify objects in various lighting conditions, orientations, and scales.

2. Robust tracking: Once objects have been detected, the next objective is to track them over time. This requires developing algorithms that can handle occlusions, object movement, and changes in lighting conditions.

3. Real-time performance: Object tracking systems must operate in real-time, meaning that the deep learning model must be capable of processing video frames quickly enough to keep up with the frame rate of the input video.

4. Adaptability to different environments: Object tracking using deep learning must be adaptable to different environments, including indoor and outdoor scenes, and must be able to track different types of objects, including people, vehicles, and animals.

5. Low false positive and false negative rates: Object tracking systems must have low false positive and false negative rates, meaning that the system should not detect objects that are not present or fail to detect objects that are present in the video sequence.

Overall, the main objectives of object tracking from video input using deep learning are to accurately detect and track objects in real-time, be adaptable to different environments, and have low false positive and false negative rates.

7) **Deviation made from original objectives if any, while implementing the project and reasons thereof:** No

8) **Details of experimental set up, methods adopted, data collected supported by necessary table, charts, diagrams & photographs:**

Experimental set up	1. Computer
Methodology	The objective of utilizing deep learning for object tracking in video is to autonomously monitor objects in real-time, catering to applications such as surveillance, autonomous driving, and robotics. This involves training a deep learning model to accurately detect objects under diverse conditions, including varying lighting, orientations, and scales. The primary goals encompass achieving precise object detection, resilient tracking over time, and ensuring real-time performance. The adaptability of the system to different environments, encompassing both indoor and outdoor scenes, and its capability to track various object types like people, vehicles, and animals are crucial aspects. Furthermore, the system must exhibit low false positive and false negative rates, meaning it should avoid erroneously detecting non-existent objects and failing to detect objects present in the video sequence. This necessitates the development of algorithms capable of handling occlusions, changes in object movement, and fluctuations in lighting conditions. Moving forward, the system's adaptability, accuracy, and efficiency in real-world scenarios lay the groundwork for future advancements, with potential areas of improvement including enhanced adaptability, reduced false positives/negatives, and increased speed of video frame processing for even more responsive tracking capabilities.
Results	The outcomes of the Object Tracking from Video Input using Deep Learning project demonstrate significant advancements in real-time object detection and tracking. Leveraging the MobileNet for Single Shot Multi-Box Detector (SSD) architecture, the developed system

	exhibits a commendable accuracy in identifying and tracking objects under diverse conditions, including variations in lighting, scales, and orientations. The trained model successfully operates in real-time, processing video frames swiftly and keeping pace with the input video's frame rate, showcasing its efficiency for applications such as surveillance, autonomous driving, and robotics. The robustness of the tracking algorithm is evident in its capability to handle occlusions, changes in object movement, and fluctuations in lighting conditions, contributing to a resilient and adaptable system. The project achieves its primary objectives of accurate object detection, robust tracking over time, real-time performance, adaptability to different environments, and low false positive and false negative rates. The performance evaluation, utilizing metrics like mean average precision (mAP) and intersection over union (IoU), reinforces the system's accuracy and reliability. The project's success marks a noteworthy contribution to the field of computer vision, paving the way for enhanced object tracking applications in real-world scenarios. Future work could explore optimizations for even greater adaptability and improved tracking capabilities in dynamic environments.

9) Detailed analysis of results indicating contributions made towards increasing the state of knowledge in the subject:

. The results of the Object Tracking from Video Input using Deep Learning project contribute significantly to the state of knowledge in the field of computer vision and deep learning. The key contributions and advancements can be outlined as follows:

Real-time Object Detection and Tracking:

The project successfully achieves real-time object detection and tracking, showcasing the practical applicability of deep learning techniques in dynamic video sequences. This contributes to the understanding of the capabilities and limitations of state-of-the-art models like MobileNet-SSD in real-world scenarios.

Adaptability and Robust Tracking:

The developed system demonstrates adaptability to diverse environments, handling variations in lighting, scales, and object orientations. The robust tracking algorithm

effectively deals with occlusions, object movement, and changes in lighting conditions, contributing insights into enhancing tracking resilience.

Efficiency and Real-time Performance:

The project emphasizes the importance of model efficiency and real-time performance. By utilizing the MobileNet architecture optimized for low latency and low power consumption, the results contribute valuable knowledge on deploying deep learning models in resource-constrained environments.

Low False Positive and False Negative Rates:

Achieving low false positive and false negative rates is critical for the reliability of object tracking systems. The project's success in minimizing these rates adds to the knowledge base, providing insights into improving the accuracy and trustworthiness of deep learning-based tracking models.

Methodological Contributions:

The project's methodology, incorporating MobileNet for Single Shot Multi-Box Detector, presents a structured approach to real-time object tracking. The methodology involves data preparation, model training, and performance evaluation, contributing a systematic framework for researchers and practitioners in the field.

10) Conclusions summarizing the achievements and indication of scope for future work:

The Object Tracking from Video Input using Deep Learning project has achieved notable milestones in advancing real-time object detection and tracking. The successful implementation of the MobileNet-SSD architecture has demonstrated a high level of accuracy and adaptability, addressing challenges such as diverse environmental conditions, object occlusions, and changes in lighting. The methodology employed, from data preparation to performance evaluation using metrics like mean average precision and intersection over union, provides a comprehensive framework for researchers and practitioners in the field of computer vision.

The project's achievements open avenues for future work and improvements. While the current system showcases robust tracking capabilities, there is scope for enhancing adaptability in dynamic environments and optimizing real-time performance further. Future research could explore advanced techniques to minimize false positives and negatives, contributing to the refinement of object tracking accuracy. Additionally, the integration of additional sensors or modalities could broaden the system's applicability and robustness in complex scenarios.

The project's success underscores the potential for deploying deep learning models in practical applications, laying the groundwork for innovations that can impact fields such as surveillance, autonomous driving, and robotics. As technology continues to evolve, future work can explore novel architectures, training strategies, and deployment scenarios to further elevate the state of knowledge in real-time object tracking using deep learning.

The collaborative efforts of researchers and practitioners will play a crucial role in advancing the field and addressing emerging challenges in object tracking systems.

11) Budget utilization:

Sr.	Budget Head	Funds Sanctioned	Expenditure	Total cost
1.	Recurring (in Rs):	10000	Stationaries – 6000 Food & Refreshments – 2000 Connectivity - 2000	28.57
2.	Non-Recurring (Equipment / Instrument) (in Rs)	25000	Desktop	71.43
3.	Others, if any	Nil	Nil	Nil

12) Plan for utilizing the equipment facilities in the future, if any – Not applicable

Signature of the Principal Investigator
Date: 13.07.2021
Place: Kanchikacherla

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UTILIZATION CERTIFICATE

Certified that out of **Rs 35,000** of institute funded seed grant for the **"Object tracking from video input using deep learning"** sanctioned during the Academic Year **2020-21** in favour of **Mr. K. Mahanthi** from **Department of Computer Science & Engineering** dated **05.8.2020** and a sum of **Rs. 35,000 (Rupees Thirty Five Thousand only)** has been utilized for the purpose for which it was sanctioned. The balance amount if any is refunded to the institution.

Signature of PI

Signature of Accounts Officer

Signature of Head of the Institution

Devineni Venkata Ramana & Dr. Hima Sekhar
MIC College of Technology
KANCHIKACHERLA - 521 180.

PRINCIPAL
Devineni Venkata Ramana & Dr Himasekha
MIC College of Technology
Kanchikacherla, Krishna Distric