



## AVANTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

(Approved by AICTE, Recg. By Govt. of T.S & Affiliated to JNTUH, Hyderabad)

NAAC “B++” Accredited Institute

Gunthapally (V), Abdullapurmet(M), RR Dist, Near Ramoji Film City, Hyderabad -501512.

[www.aietg.ac.in](http://www.aietg.ac.in) email: [principal.avanthi@gmail.com](mailto:principal.avanthi@gmail.com)

### 3.1.1 Grants received from Government and non-governmental agencies for research projects / endowments in the institution during the years ( 2020-21)

S.No	Name of the Principal Investigator/Co-investigator	Name of the Funding Agency	Department of Principal Investigator	Amount Sanctioned	Duration of the project
1	Mrs. E. Prasanna	Conscience Technologies	Electrical and Electronics Engineering	1.65 lakhs	6 Months
2	Mr. T Kranthi Kumar	Conscience Technologies	Electrical and Electronics Engineering	1.50 Lakhs	12 Months
3	Dr. G Sai Kumar	MANAC Infotech	Electronics and Communication Engineering	2.518 Lakhs	6 Months

PRINCIPAL

Avanthi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.



## CONSCIENCE TECHNOLOGIES

A Right Platform For All Engineers...

Date: 03/06/2020,

To,  
The Principal,  
Avanthi Institute of Engineering and Technology,  
Gunthapally, Hyderabad.

**Attention:** Mrs.E.PRASANNA, Associate Professor of Department of Electrical and Electronics Engineering.

**Subject:** Power Generation Using Speed Barkers

I am pleased to inform you that the R&D Team at CONSCIENCE TECHNOLOGIES, Hyderabad is pleased to approve a grant of INR 1.65 lakhs for the project "Power Generation Using Speed Barkers" "You are requested to prepare a detailed schedule and roadmap for the project. Completion and also the detailing on the utilization of funds within 15 days to release the payment

Looking forward to a meaningful collaboration with AVIH, Gunthapally





# AVANTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

(Approved by AICTE, Regg. By Govt. of T.S & Affiliated to JNTUH, Hyderabad)

NAAC "B++" Accredited Institute

Gunthapally (V), Abdullapurmet(M), RR Dist. Near Ramoji Film City, Hyderabad -501512.

[www.aietg.ac.in](http://www.aietg.ac.in) email: [principal.avanthi@gmail.com](mailto:principal.avanthi@gmail.com)

Dr.G. Ramachandra Reddy, M.Tech, Ph.D

Principal

AVIH/2020/R&D PROJECT

Dt: 06/06/2020,

TO

The Manager,

CONSCIENCE TECHNOLOGIES,

Hyderabad.

**Sub:** Power Generation Using Speed Barkers.

Respected Sir,

With reference to letter received from your end regarding "**Power Generation Using Speed Barkers**". We are happy to submit detailed proposal along with the milestones of Design and hardware Implementation of Power Generation Using Speed Barkers. We request you to discuss with your internal R&D team and communicate for further discussion.

Thank you and looking forward for your collaboration.

Principle Investigator

PRINCIPAL

PRINCIPAL

Avanthi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.

**Section A: General Information:**

<b>Project Title</b>	<b>Power Generation Using Speed Barkers</b>
Project Type Research Design & Demonstration of Automated Street Light Controller Research Other	Power Generation Using Speed Barkers
Project Location/s (District State)(Must be in India)	Avanthi Institute of Engineering and Technology, Gunthapally, Hyderabad
Stage of development (initial concept proof of demonstration/scale up)	Proof of Concept - Demonstration
Lead Implementing Organization	Avanthi Institute of Engineering and Technology, Gunthapally, Hyderabad
Any Partnering: Organization:	
In INDIA	NO
(I) Total Funding Request(INR In lakhs)	1,65,000 Rs/-
(II) Contribution in Cash/kind from lead/partnering institution if any	NO
Total cost (I+II)=	1,65,000 Rs/-

  
PRINCIPAL  
Avanthi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.



## **Section B: Project Information: Report submitted**

### **Project Description:**


Today we see many vehicles on road creating pollution and using its mechanical energy only for transportation purpose, but if we use that kinetic energy of vehicles to convert into some useful electrical energy then we can use that energy for street lights and can save at least some amount of electrical energy. In this article various methods of generating power using the speed breaker are listed and studied carefully. Many authors conducted many experiments on each type of power generation method, and the results are noted down here. The methods listed here are rack and pinion method, roller speed breaker, crankshaft and piston mechanism, hydraulic speed breaker.

### **INTRODUCTION**

The energy crisis is one of the major problems in our country. The pollution caused by generating power is enormously high. Even though we have many kinds of renewable energy sources we are affording the normal conventional methods in generating power. In addition to this pollution, we are having many vehicles on road creating more pollution. So, we are hurting our environment in many methods. So, this project can help the environment to escape from the pollution, not totally but a little bit. Since we see many vehicles on road, we can use the energy from those vehicles to generate electrical energy. All the vehicles use their kinetic energy in order to move from one place to another. In this process, it is wasting more energy. We can use that kinetic energy and convert it into electrical energy. We can provide the speed bumps on roads with specialized mechanisms under them. So, whenever a vehicle moves over the speed bump, the speed bump takes the kinetic energy of the vehicle and converts it into mechanical energy and which further converted into electrical energy. The process of generating electrical energy by this method is of different kinds.

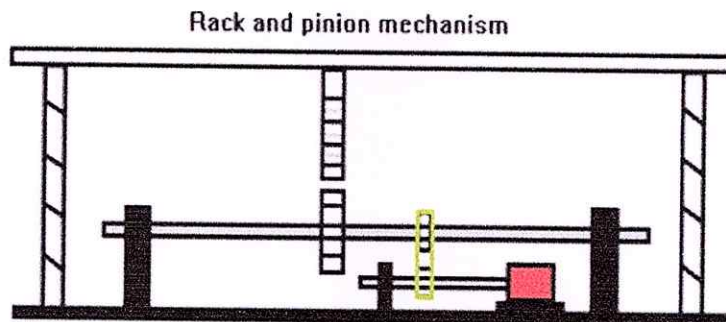
#### **They are:**

- 1.1 Rack and pinion mechanism
- 1.2 Roller speed breaker
- 1.3 Crankshaft and piston mechanism
- 1.4 Hydraulic speed breaker.

  
PRINCIPAL  
Avanthi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Md), R.R. Dist.

## 1.1 Rack and pinion Mechanism:

The process of generating power using the rack and pinion method is efficient and many authors conducted the experimental studies on this process. This method has a rack which creates linear motion and a pinion which converts that linear motion into rotatory motions. That rotary motions are transferred to the generator. In between a gear train or transmission system is built in order to transfer the energy efficiently. At the end of transmission system there is a generator connected. We all know the purpose of the generator that is to convert the mechanical energy to electrical energy. The power generated will depend upon the efficiency of rack and pinion mechanism and the transmission system.



### Working

So, we see many vehicles on roads and as well as speed bumps for controlling the speed of the vehicles indicating speed limit on roads. The design of the speed bump is of special kind that is the speed bump is designed as a kind of suspension system. The speed bump is spring supported at both ends. So, whenever a vehicle or weight passes over the speed breaker the springs under the speed breaker takes the energy and gets compressed. During this process the speed breaker is able to generate the linear motion. As the rack and pinion mechanism is connected to the speed breaker the linear motions created by the speed breaker is taken by the rack and pinion mechanism. So that rack and pinion mechanism converts the linear motion to the circular motion. That circular motions are transferred to the generator by using the transmission system. The transmission system is may be of different kinds i.e., gear train, belt drive, chain sprocket mechanism.

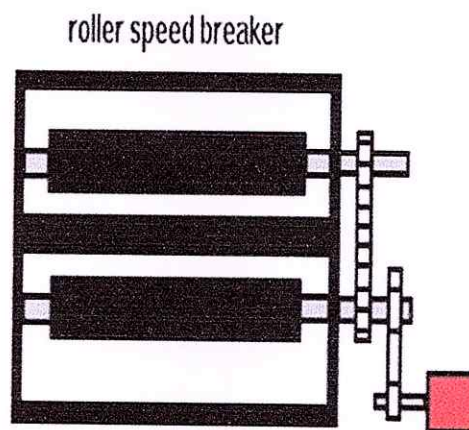


PRINCIPAL  
Avanthy Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.



## 1.2 Roller speed breakers:

In this type of process the circular motions are directly generated by the speed breakers. Many authors conducted experimental on this process by using the different kinds of friction material as a speed bump covering material. But in this method the efficiency of the system totally depends on the speed of the vehicle. The speed of the vehicle is directly proportional to the efficiency of the system. So, in many commercial areas the role of the speed bump is to reduce the speed of a vehicle. Keeping that factor in mind the speed breakers are designed with good friction material so that the speed bump can take more energy from the vehicle. Remaining mechanism is same to every process that is the rotational energy from speed breaker is transferred to generator by using transmission system and it may be of any kind i.e., gear train, chain sprocket, belt drive.



### Working

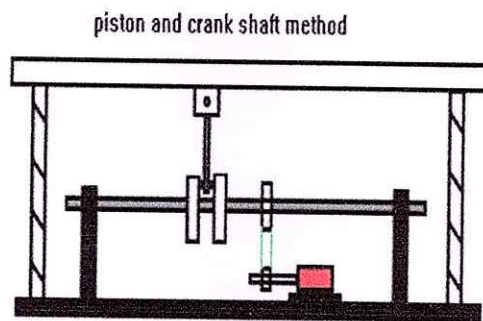
As the speed breaker is a roller both the ends of the speed breaker are bearing supported. The speed breaker is covered or wrapped in a friction material. So, whenever a vehicle passes over the speed breaker, due to the friction between the wheels and the speed breaker, and the bearing support makes the roller speed breaker to generate circular motions. So, the speed bump itself creates the circular motions here. That circular motions are transferred to generator by using the transmission system. Since here the speed breaker itself creates circular motion there no need of mechanical energy conversion, which means there is no lot of energy losses or may have less losses compared with other process. And the efficiency of the system depends on the type of the friction material using to wrap around the speed bump. and as usual the transmission system.

PRINCIPAL

Avanthi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.

### 1.3 Crank shaft mechanism:

As we all know the use of crank shaft i.e., converting of the linear motion to the circular or rotary motion. The use of this method for generating power good but as it has many moving parts there will be a lot of heat generated and vibrations in the system. So, the system should be designed carefully while selecting such type of systems. As the specialized speed breaker can afford linear motion the piston and crank shaft mechanism can generate circular motions. As our main motto is to generate electrical energy these circular motions can be transferred to generator by using an efficient transmission system.



#### Working

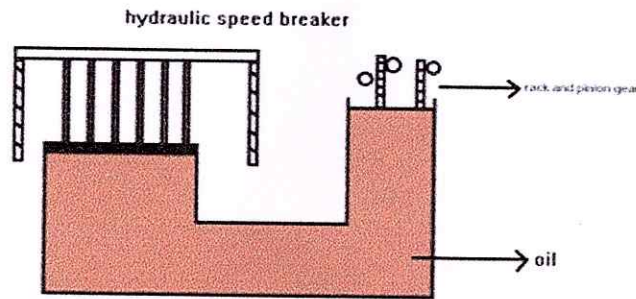
The use of piston in automobile engineering is to convert the thermal energy to mechanical linear motion. That mechanical linear motion is converted into circular or rotary motions using the crank shaft mechanism. That rotary motions generated by the crank shaft is sent to the differential using power transmission system. Here in the process of power generation by using the crank shaft mechanism uses kinetic energy instead of thermal energy to push the piston down or to generate the linear motion. So, whenever a vehicle passes over the speed breaker the speed breaker pushes down the piston due to the kinetic energy applied on the speed breaker. So, the piston makes the crank shaft to complete half revolution. As crank is designed on basis of inertia the crank itself makes the other half of the revolution in order to push the piston up. So, the piston comes to its original position by bringing the speed breaker to its original position. In such a way the crank shaft mechanism is able to create the circular motion. That circular motions are transferred to the generator by using the transmission system.

PRINCIPAL  
Avanathi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.



## 1.4 Hydraulic speed breaker

The hydraulic speed breaker mechanism shown better results while compared to crank shaft mechanism. This process uses pistons in order to compress the oil. So that the power is supplied to the system. All the equipment may be costlier here.



### Working

Here also the speed breaker is a spring supported at both the ends so that the speed breaker can create linear motion. And pistons are provided under the speed breaker such that the speed breaker pushes down the pistons whenever a vehicle passes over it. Such that piston can compress the oil provided under the piston. The compressed oil travels to the accumulator. The accumulator is further connected to the motor which generates torque. That torque is used to generate the electrical energy.

### LITERATURE REVIEW

The speed breaker is connected to the U-shaped shaft with help of the connecting rod, and springs are used in order to provide the return motion of the speed breaker after the vehicle passes over it. the U-shaped shaft is connected to the sprocket and using a chain drive mechanism the power from U shaped shaft is transferred to the small sprocket which is transferred to the DC motor using gear drives, which in result generates power. The specifications of the equipment used in this particular arrangement are as follows, permanent magnet D.C. generator, the voltage generated is 12 Volt D.C. This D.C. voltage is stored in the lead 12-volt battery. The battery and inverter are connected. The inverter is used to convert 12 volts D.C. to 230 volts A.C. [1].

PRINCIPAL

Avanathi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.

The speed breaker used is a roller type that rotates as the vehicle moves on it then the kinetic energy is converted into mechanical energy which is then converted into electrical energy. which means when a vehicle moves over a roller, the rollers are arranged in a way of free rotation and mounted on bearings on each side so the moving vehicle makes the roller rotate. The roller speed breaker is connected to a sprocket which is mounted on bearings. The chain drive is used to transfer the motion from a sprocket to gear which is used to drive the motor to generate electricity. As a result, we can see that if the speed of the car increases, then the speed of the roller also increases which helps in increasing the efficiency. [2]. The number of rollers used is 3 which are connected by a chain sprocket mechanism, to achieve uniform motion when a vehicle is passed over the speed breaker. the total mechanism is the same as explained before in roller type speed breaker as the kinetic energy is converted into mechanical energy which after is converted into electrical energy. but here it is mentioned the efficiency given by this speed breaker power generator is very low as the test is done by a two-wheeler and also mentioned that for a day the average number of vehicles passed on a speed breaker is more which automatically gives more efficiency. the fine advantage of this process is that the moving parts are less compared to other processes and also the maintenance cost is also less .in this process we are able to reduce the maintenance cost by replacing the chain mechanism with a V-belt mechanism which will reduce the lubricating cost. And The amount of friction can be increased by providing the texture on the roller in order to make the fine rotational motions of the roller when a vehicle passes over it.[3].

The power generated by the speed breaker process uses the rack and pinion mechanism to generate the power. The kinetic energy of the car is converted to linear motion when the car is passed on the speed breaker and the linear motion of the speed breaker is converted to the rotational motion using the rack and pinion mechanism. since the moving parts are less its maintenance cost is less. The circular motion created by the rack and pinion mechanism is transferred to the chain sprocket mechanism and transferred to the DC motor which in result generates the electricity. here a flywheel is used in order to maintain a uniform speed of rotation.[4] Ammar Ahmed explained about the designing of movable-speed bump-based mechanism is used to store kinetic energy which is dissipated when automobiles run on bumps. The system is designed as follows consists of Integrated double-sided rack which has two racks on either ends parallel to each other attached to each pinion and these pinions are connected to two separated gears. The pinion is placed between two gears to increase velocity further this pinion is attached to Flywheel for conservation of angular momentum so as to



Principal  
Sivanthi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.



increase efficiently store rotational energy which occurs during motion of rack and pinion. This flywheel is attached to generator for conversion of Mechanical into Electrical energy. The motion analysis of system is performed on cad model which is designed in Solid works. Different levels of frequencies are applied and analysed using Autodesk Inventor. The force sensors are placed for noting the amount of force applied by different automobiles. To find an accuracy of measured results the uncertainty calculations are performed for finding Errors further developed an Equation. Selection of Generator is based on less Electrical damping and resistive load for higher Efficiency. On basis of obtained results the overall Efficiency of mechanical energy harvester (MEH) is calculated as 57.5%. It is concluded by the both practical and simulation results are compared which results by 5.7% in difference of efficiency.[5] Aniket Mishra conducted an experiment with the load of 300kg, and Power developed for 60 minutes (1 hr) is 441.45 watts. The power generated by this can be more sufficient to run four street lights in the night time [6]. Mohammad Ramadan conducted the experimental studies and the results were roughly 26.2 to 44.7 W by the masses of 65 kg and 80 kg. if the masses increases then the output power also increases linearly. it is believed that the power generated can be supplied to the street lights, cameras, and the radars on the roads [7]. Sanket S. Khodke eliminated use of chain, sprocket and flywheel to make the model simple and installation easy. The rectifier is used to convert the AC power to pure DC power at the end of the circuit. The rectifier used is bridge rectifier which consists of 4 rectifier diodes [8]. The process of power generation by rack and pinion method is conducted and the power generation by using roller mechanism is also used. As we all know whenever a rolling motion transfers on the roller arrangement the rollers in the arrangement also get rolled. So, by using this simple process power can be generated. When a vehicle passes through this roller arrangement speed braker the rollers get rotated. The rotations of the roller are transferred to the gear arrangement and then the maximum amount of the rotations is transferred to the generator or motor and thus electricity is generatedand that generator is connected to the battery. By using this power road street lights can glow. The differences between roller, rack, and pinion method are mentioned here such as the roller method is less efficient and rack and pinion method are more efficient, the maintenance required for roller method is high compared to rack and pinion method, designing of roller method is easy as compared to rack and pinion method. [9]

**Crank Mechanism:** As we all know the crank mechanism is used to convert the linear motion to circular motion here also it is used to perform the same function. All this

  
PRINCIPAL

Avanthi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.




equipment is placed under a specialized speed breaker. When the vehicle passes over the speed breaker as the head of the piston is in contact with the speed breaker, the piston makes the linear motion and the crank at the end of the connecting rod converts the linear motion to the circular motion and using gear mechanism the speed of the rotations is increased and transferred to the generator. For a single crank mechanism when a vehicle passed on a speed breaker the piston makes a total of 4 strokes and for a double crank mechanism is 8 strokes. As this method consists of a large number of moving parts as compared to other methods so it needs a lot of maintenance and it also has more losses due to vibrations during motion.[10] M. Prasanth conducted the experiment with 250 kg (approximately) and the output power developed is 2.35 KW in 24 hours. The generator used is also a dynamo type electric generator, the gear used is spur gear. The output power increases with increase in load. The electric power generated can be used to burn four street lights in the night time.[11]

The power generation by using the kinetic energy of the vehicles on the road by using various processes like crank mechanism, roller mechanism, and rack and pinion mechanism is discussed and experiments are conducted on the rack and pinion mechanism.[12]

A pressure lever is placed under the specialized speed breaker. When the vehicle passes over the speed breaker the pressure is applied on the pressure lever which in result rotates the flywheel and the rotations are then transferred to the generator and are converted to electrical energy. when the pressure is applied on the pressure lever then by using a chain sprocket mechanism the rotations are transferred to the flywheel and then a DC motor [13].

Developing a mechanical roadway system for waste energy capture of vehicles and electric generation. In automobiles the complete fuel is not consumed to run vehicles whereas only 15% is used and all other exhausts as wastage. It is whole about developing a compressive system for capturing energy during braking by using hydraulic system. In downhill roadways the piston arrangement is placed and vehicles will decelerate during this energy is captured. These piston plates are pressed by vehicles and the fluid results in transporting in to potential energy for storage. These storage system drives a generator through hydraulic device by uplifted weight. This hydraulic drive consists of 136 pistons which is composed of piston plates. The energy is stored and connected to Generator for conversion of energy in to Electrical. The reservoir consists of oil is arranged to save hydraulic fluid. The overall efficiency depends on factors are plates of piston, potential storage and transmission of

  
PRINCIPAL  
Avanthi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.



hydraulic results as 90.38 %,95.09 % and 57.52 %.It is concluded that by using this mechanical roadway system results in overall efficiency is 41.03%.[14]

Energy harvesting sensitivity analysis and assessment of the potential power and full car dynamics for different road modes. In a MATLAB Environment the model of complete car suspension is implemented by giving different inputs of road irregularities. During complex situations of inputs given results the realistic views when compared to assumed results of vehicle dynamics on roads by using more input modes. On basis of different analysis, the vehicles which are loaded heavy is good for harvesting of energy per unit regarding cost. It is a completely comprehensive analysis considering the knowledge of vehicle dynamics. When a roll mode input is considered there is a reach of damper to 420 W of mean potential power for given driving cycles. During harvesting regarding tire parameters there is surely no effect on damping factor of tire due to its very minimum value which is completely different from impact of tire stiffness. The sensitivity considering to energy harvesting completely depends upon characteristics of tire, environment of road and driving velocity. By increasing Body of mass results in fluctuation of mean potential power in minimum range can be observed. The strong movement from power of wheelbody is relative movement for collection of vibration energy. It is concluded during steady-state velocity there is collection in more amount of energy at high speeds when compared to transient speed.[15]

## CONCLUSION

All the types of power generation using speed breaker are listed and studied carefully. Many authors conducted various experiments on each type of mechanism and the results are noted here. All the advantages and disadvantages of the all types of mechanisms are described here.

## REFERENCES

- [1]. Singh, A.K., Singh, D., Kumar, M., Pandit, V. and Agrawal, S., 2013. Generation of electricity through speed breaker mechanism. International Journal of Innovations in Engineering and Technology (IJIET), 2(2), pp.20-24.
- [2]. Gupta, A., Chaudhary, K. and Agrawal, B.N., 2012. An experimental study of generation of electricity using speed breaker. International Journal of Mechanical Engineering (IJME), 1(1).

  
PRINCIPAL  
vanthi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.

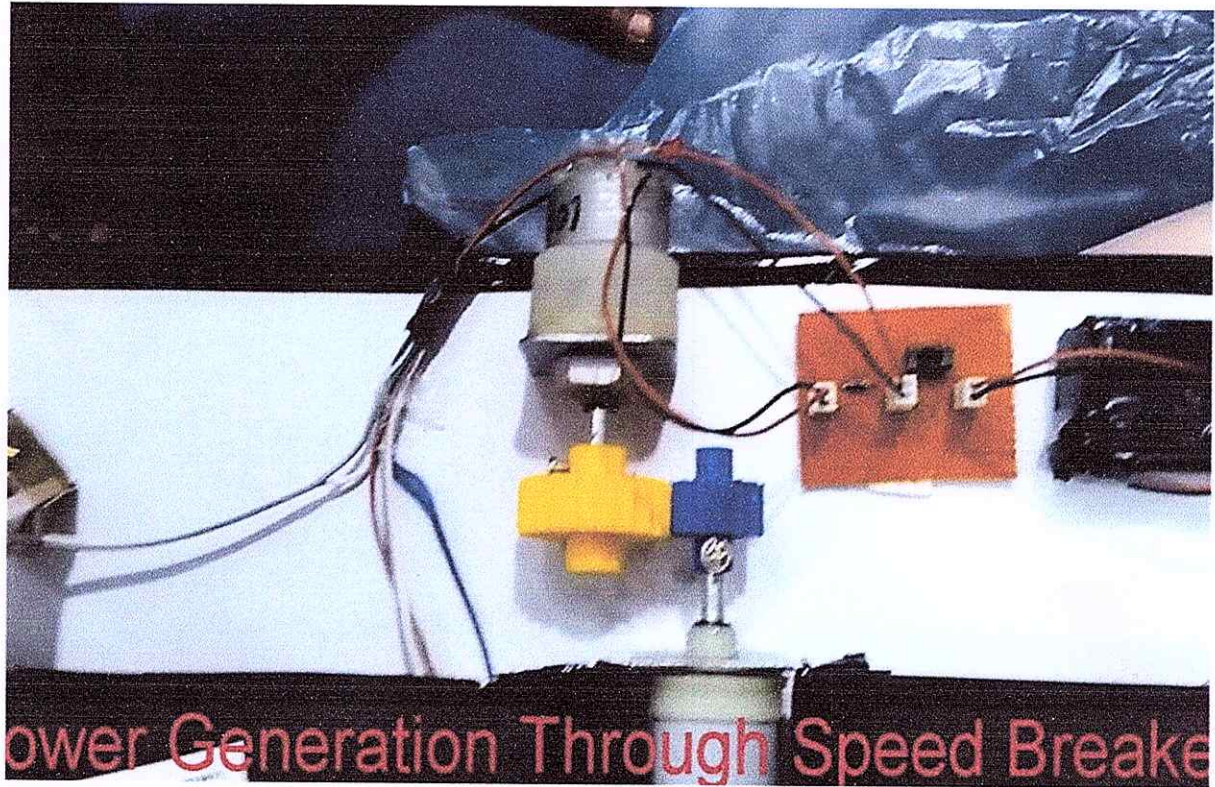
- [3]. Bhagdikar, P., Gupta, S., Rana, N. and Jegadeeshwaran, R., 2014. Generation of electricity with the use of speed breakers. International Journal of Advances in Engineering & Technology, 7(2), p.589.
- [4]. Maurya, J., Gupta, P., Gupta, P., Shahab, T. and Srivastava, A., 2016. Generation of electricity through speed breaker mechanism. IJES ISSN (e), pp.2319- 1813.
- [5]. Azam, A., Ahmed, A., Hayat, N., Ali, S., Khan, A.S., Murtaza, G. and Aslam, T., Design, fabrication, modelling and analyses of a movable speed bumpbased mechanical energy harvester (MEH) for application on road. Energy, 214, p.118894.
- [6]. Mishra, A., Kale, P. and Kamble, A., 2013. Electricity generation from speed breakers. The International Journal of Engineering And Science (IJES), 2(11), pp.25-27.
- [7]. Ramadan, M., Khaled, M. and EI Hage, H., 2015. Using speed bump for power generation-Experimental study. Energy Procedia, 75, pp.867-872.
- [8]. Khodke, SS., More, V.M., Malkhede, Y.A. and Madke, A.V., Generation of Electricity by using Speed Breaker Mechanism
- [9]. Hossain, M.E., Hasan, M.R., Ahmed, K.T. and Shawon, M.N.M., 2017, September. Design and performance of power generation using speed breaker with the help of Rack and Pinion mechanism. In 2017 4th International Conference on Advances in Electrical Engineering (ICAEE) (pp. 7-11). IEEE. [10]. Al Zebda, J., Msallam, M., Al Yazouri, M., Shaheen, T. and Radi, A., 2017, October. Power Generation Using Hydraulic and Double Crank Shaft Speed Breaker: Gaza Strip as a Case Study. In 2017 International Conference on Promising Electronic Technologies (ICPET) (pp. 93-98). IEEE.
- [11]. Prasanth, M., Sankar, R., Dharshan, T., Nagaraja, R. and Dheenathayalan, P., 2002. Power Generation from Speed Breaker Using Crank Shaft.
- [12]. Rokonzaman, M. and Hossam-E-Haider, M., 2015. Analysis of speed breaker mechanism for more effective electricity generation. In International conference on mechanical, industrial and materials engineering.
- [13]. Islam, M.S., Rahman, S.K. and Jyoti, J.S., 2013. Generation of electricity using road transport pressure. International Journal of Engineering Science and Innovative Technology (IJESIT), 2(3), pp.520-525

  
PRINCIPAL  
Avanthi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.



[14]. Ting, C.C., Tsai, D.Y. and Hsiao, C.C., 2012. Developing a mechanical roadway system for waste energy capture of vehicles and electric generation. Applied energy, 92, pp.1-8.

[15]. Abdelkareem, M.A., Xu, L., Guo, X., Ali, M.K.A., Elagouz, A., Hassan, M.A., Essa, F.A. and Zou, J., 2018. Energy harvesting sensitivity analysis and assessment of the potential power and full car dynamics for different road modes. Mechanical Systems and Signal Processing, 110, pp.307-332.



PRINCIPAL  
Avanathi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.

**Section C: Financial requirement (all figure must be INR)**

S. No	Item Head	Total (in Lakh)
<b>Capital Component</b>		
1	Permanent Equipment (Located in lab/implementing organization) as per billing	30,000/-
2	Fabricated systems/demonstration models (located at beneficiary location)	50,000/-
A	Subtotal (Capital Items)	80,000/-
<b>General Component</b>		
1	Manpower and Contingencies	50,000/-
2	Consumables	25,000/-
3	Travel	5,000/-
4	Overhead	-----
5	PC	-----
6	Printer and Scanner	5,000/-
B	Subtotal (General)	80,000/-
C	<b>Total cost of the project (A+B)</b>	<b>1,65,000/-</b>

- I. Project Cost:1,65,000/-  
II. Contribution of consortium (if any):  
III. Total Budget (I+II):1,65,000/-

  
PRINCIPAL  
Avanthi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.



### Section D: Applicant Details

Name of the Lead Organization	Avanthi Institute of Engineering and Technology	
Address, Please include phone numbers, fax, emails and website	Gunthapally (V), Abdullapurmet(M), RR Dist, Near Ramoji Film City, Hyderabad -501512. email: <a href="mailto:principal.avanthi@gmail.com">principal.avanthi@gmail.com</a> Ph No:9849714307 <a href="http://www.aietg.ac.in">www.aietg.ac.in</a>	
Applicant Type Broad: Government/Non-Government Sub entity: Academic or research institution	ACADEMIC INSTITUTION	
Primary Point of Contact Lead Principal investigator (PI)	Name:	Mrs.E.PRASANNA
	Designation	Assistant Professor
	Email	<a href="mailto:Avanthiee2005@gmail.com">Avanthiee2005@gmail.com</a>
	Telephone	9492492031
	Mobile	7337038221
Secondary Point of Contact	Name:	Dr Ramachandra Reddy
	Designation	Associate Professor
	Email	<a href="mailto:principal.avanthi@gmail.com">principal.avanthi@gmail.com</a>
	Telephone	9849714307
	Mobile	9849714234

<b>Information on Lead PI</b>	<p><b>Expertise available with the Principal Investigator</b></p> <p>Mrs.E.PRASANNA, Assistant Professor Dept. Of Electrical and Electronics Engineering, she would mentor the proposed research project from time to time.</p> <p>The Principal Investigator has gained good knowledge on Power systems and its related areas.</p> <p>1. Guided six M. Tech project students based on his Research area.</p> <p>Guided ten B. Tech project students out of his research area.</p> <p>2) During her research, PI has acquired knowledge of many simulations software &amp; used them for the above said project works.</p> <p>The tools learned by PI are as follows: The Power systems, mat lab, motor driver, and motors work. Word Processing: MS Office</p>
-------------------------------	---

PRINCIPAL  
Avanthi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.

## 1. Annexure 1: Monitoring & Evaluation approach

Time Schedule of Activities Giving milestones through BAR Diagram					
S.No	WORKPLAN	1 Month	2-3 Month	4-5 Month	6 Month
1	Basic Study of the literature related for the project implementation consolidation of the available expertise. Planning of execution of the proposed project scheme				
2	Procurement of experimental equipment and installation				
3	Design of basic simulation of the project and control strategy using power generation using speed brakers				
4	Implementation of research project and operational control of the test facility using Power testing				
5	Annual review of the progress of the project and effective guidance for implementation				
6	Commissioning of the project hardware				
7	Testing of the project and code				
8	Experimental validation of the project				
9	Report Writing				



PRINCIPAL  
Avanthi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.

**Avanthi Institute of Engineering and Technology, Gunthapally, Hyderabad**

<b>S No</b>	<b>Infrastructure Facility</b>	<b>Yes/No/Not required/Full or Sharing Bases</b>
1	Workshop Facility	Yes
2	Water & Electricity	Yes
3	Laboratory Space/Furniture	Yes
4	Power Generator	Yes
5	AC Room or AC	Yes
6	Telecommunication including e-mail & fax	Yes
7	Transportation	Yes
8	Administrative/ Secretarial support	Yes
9	Information facilities like Internet Library	Yes
10	Computational facilities	Yes
11	Animal/Glass House	Not required
12	Any other special facility being provided	R&D Lab



**PRINCIPAL**

**Avanthi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.**





# AVANTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

(Approved by AICTE, Recg. By Govt. of T.S & Affiliated to JNTUH, Hyderabad)

NAAC "B++" Accredited Institute

Gunthapally (V), Abdullapurmet(M), RR Dist, Near Ramoji Film City, Hyderabad -501512.

[www.aietg.ac.in](http://www.aietg.ac.in) email: [principal.avanthi@gmail.com](mailto:principal.avanthi@gmail.com)

AVIH/2020/ R&D PROJECT

Dt: 10.06.2020

TO

The Manager,

CONSCIENCE TECHNOLOGIES,

Hyderabad.

**Sub:** Power Generation Using Speed Bracers.

Respected Sir,

We are pleased to appoint faculty for coordination of power generation using speed brakers. We are happy to submit detailed proposal along with the milestones of microcontroller used is Arduino.


Details of the Faculty:

Mrs.E.PRASANNA, Assistant Professor

Department of EEE

Phone Number: 8328053969

Thank you and looking forward for your collaboration.

  
Principal Investigator

  
PRINCIPAL  
Avanthi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.





## CONSCIENCE TECHNOLOGIES

A Right Platform For All Engineers...

Date: 14.06.2020,

To,  
The Principal,  
Avanthi Institute of Engineering and Technology,  
Gunthapally, Hyderabad.

Subject: Power Generation Using Speed Bracers - Regarding

With reference to communication along with detailed submission of project milestones. We are pleased to invite for an internal discussion on execution of the project and other design and implementation regarding development of Power Generation Using Speed Bracers. We are deputing Engineer for the above state of project.

Details of the Engineer:

Mr.M.Manohar babu

Phone Number: 9505379414

Thank you and looking forward for your response.

Regards

Managing Partner Conscience Technology





## CONSCIENCE TECHNOLOGIES

A Right Platform For All Engineers...

### WORK ORDER

Date: 26/06/2020,

HYDERABAD,

To  
The Principal,  
Avanthi Institute of Engineering & Technology,  
Gunthapally, Abdullapurmet Mandal, Hyderabad.

**Sub:** Power Generation Using Speed Bracers

Further to your offer for preparing of Power Generation Using Speed Bracers as per the quotation, we are pleased to place the work order as below.

S.NO	Description	Quantity in no	Unit Cost Rs.	Total Cost in Rs.
1	Power Generation Using Speed Bracers	1	1,65,000	1,65,000/-

Work Order Valid: One Year (12th August 2021 to 11th August 2022)

### Terms & Conditions:

- Preparation of detailed drawings/Lay outs based on the reference design provided by the customer.
- Taking physical design for review and approval of our customer
- Submission of designs/lay outs for review and approval of our customer
- Incorporate any comments/feed back given by customer in the design/layouts
- Preparation of designs, lay outs, algorithms, part design, bill of materials for all designs.
- Preparation of built up designs, lay outs after completion of fabrication/Installation at site.

For CONSCIENCE TECHNOLOGIES

MANAGER







## AVANTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

(Approved by AICTE, Recg. By Govt. of T.S & Affiliated to JNTUH, Hyderabad)

NAAC "B++" Accredited Institute

Gunthapally (V), Abdullapurmet(M), RR Dist, Near Ramoji Film City, Hyderabad -501512.

[www.aietg.ac.in](http://www.aietg.ac.in) email: [principal.avanathi@gmail.com](mailto:principal.avanathi@gmail.com)

Date:27/08/2020,

TO  
The Manager,  
CONSCIENCE TECHNOLOGIES,  
Hyderabad.

Dear sir

The college does not have sufficient working capital to complete the next half of proposed project which we have been discussed. We are therefore requesting for advance funds to the staff and other expenses required to work on this project. Therefore we urge you to consider our request for approval to receive funding in advance for this project. Thank you for your consideration of this request. Sincerely,

Thanking you,

PRINCIPAL

Avanathi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.



## AVANTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

(Approved by AICTE, Recg. By Govt. of T.S & Affiliated to JNTUH, Hyderabad)

NAAC "B++" Accredited Institute

Gunthapally (V), Abdullapurmet(M), RR Dist, Near Ramoji Film City, Hyderabad -501512.

[www.aietg.ac.in](http://www.aietg.ac.in) email: [principal.avanthi@gmail.com](mailto:principal.avanthi@gmail.com)

Hyderabad,

Date: 08.12.2020.

From  
The Principal,  
Avanthi Institute of Engineering and Technology,  
Hyderabad.

To  
The Manager,  
CONSCIENCE TECHNOLOGIES,  
Hyderabad.

Respected Sir,

Sub: Project Completion-reg.

The project has been completed on a given time bond. It has been a great achievement by us to complete the prestigious project on time. It has been a great privilege, working in association with you and looking forward to working with you in future projects. We request you to please come along with your team for collecting, retrieving of important and confidential data.

Looking forward to a quick response from your side

Thanking you,

Principal  
Avanthi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.





## CONSCIENCE TECHNOLOGIES

A Right Platform For All Engineers...

Date: 14/09/2020,

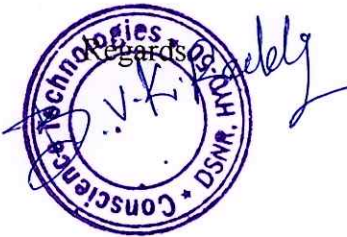
To,  
The Principal,  
Avanthi Institute of Engineering and Technology,  
Gunthapally, Hyderabad.

**Attention:** Mr.T.KRANTHI KUMAR, Associate Professor of Department of Electrical and Electronics Engineering .

Subject: HRM Practices by Neuro Fuzzy- Regarding

I am pleased to inform you that the R&D Team at CONSCIENCE TECHNOLOGIES, Hyderabad is pleased to approve a grant of INR 1.5 lakhs for the project "HRM Practices by Neuro Fuzzy" "You are requested to prepare a detailed schedule and roadmap for the project. Completion and also the detailing on the utilization of funds within 15 days to release the payment

Looking forward to a meaningful collaboration with AVIH, Gunthapally





# AVANTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

(Approved by AICTE, Recg. By Govt. of T.S & Affiliated to JNTUH, Hyderabad)

NAAC "B++" Accredited Institute

Gunthapally (V), Abdullapurmet(M), RR Dist. Near Ramoji Film City, Hyderabad -501512.

[www.aietg.ac.in](http://www.aietg.ac.in) email: [principal.avanathi@gmail.com](mailto:principal.avanathi@gmail.com)

Dr.G. Ramachandra Reddy, M.Tech, Ph.D

Principal

AVIH/2021/R&D PROJECT

Dt:17 /09/2020,

TO

The Manager,

CONSCIENCE TECHNOLOGIES,

Hyderabad.

**Sub:** HRM Practices by Neuro Fuzzy.

Respected Sir,

With reference to letter received from your end regarding "**HRM Practices by Neuro Fuzzy**". We are happy to submit detailed proposal along with the milestones of Design and hardware Implementation of HRM Practices by Neuro Fuzzy. We request you to discuss with your internal R&D team and communicate for further discussion.

Thank you and looking forward for your collaboration.

  
Principle Investigator




PRINCIPAL

PRINCIPAL  
Avanathi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.



**Section A: General Information:**

<b>Project Title</b>	<b>HRM Practices by Neuro Fuzzy</b>
Project Type Research Design & Demonstration of Automated Street Light Controller Research Other	HRM Practices by Neuro Fuzzy
Project Location/s (District State)(Must be in India)	Avanthi Institute of Engineering and Technology, Gunthapally, Hyderabad
Stage of development (initial concept proof of demonstration/scale up)	Proof of Concept - Demonstration
Lead Implementing Organization	Avanthi Institute of Engineering and Technology, Gunthapally, Hyderabad
Any Partnering Organization: In INDIA	NO
(I) Total Funding Request(INR In lakhs)	1,50,000 Rs/-
(II) Contribution in Cash/kind from lead/partnering institution if any	NO
Total cost (I+II)=	1,50,000 Rs/-

  
PRINCIPAL  
Avanthi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.

## **Section B: Project Information: Report submitted**

### **Project Description:**

In addition, weights for criterion and links between dimensions and criteria were obtained using the Decision-making trial and evaluation laboratory and fuzzy analytical hierarchy process. Both methods can be combined since they serve various goals; earlier studies proposed using three-way type-1 fuzzy sets to achieve criteria weights and linkages across dimensions and criteria. The topics of HRM and Operation Management, respectively, include human resource management (HRM) and supply chain management (SCM). Although academics in each sector continue to advance SCM and HRM's role in developing more sustainable companies, integrating these two modern topics has been significantly delayed based on a more significant integration gap between HRM and SCM and fuzzy. The findings suggest that the educational criterion is more important than the other criteria since it is a cause and affects HRM directly. The research findings show that the suggested F-HRM-SCM technique is feasible, suggesting the educational criterion as the most persuasive factor in human resources management. Therefore, the study aims to provide the HRM-SCM connection with a synergistic and inclusive framework and suggest the research agenda for this integration. After achieving these aims, this paper highlights the consequences of fuzzy HRM-SCM integration in organizational sustainability and genuinely sustainable supply chains for academics, managers, and practitioners. The experimental results demonstrate that the proposed F-HRMSCM model enhances the supply chain performance ratio of 98.9%, an efficiency ratio of 97.8%, employee satisfaction ratio of 96.7%, decision-making level by 98.2%, prediction ratio of 95.5%, and F1-score ratio of 97.4% compared to other existing approaches.

### **Keywords**

Human resource management · Supply chain · Fuzzy · Analytic hierarchy process

### **Overview of human resource management for supply chain management**

Supply Chain Management is the progress of expansion, development, execution, and monitoring of the supply chain processes professionally utilizing Information and Technology in their stride (Khudhair et al., 2020). SCM encompasses all operations beginning with raw material procurements, storages, work-in-process inventories, and completed items, i.e., from point-of-consumption and point-of-origin, guaranteeing organizational productivity while satisfying customer demands and pleasing the customer (Manogaran et al., 2020). Human

  
**PRINCIPAL**  
Avanthi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.



satisfying customer demands and pleasing the customer (Manogaran et al., 2020). Human resources ethics violations can lead to a wide range of legal issues, both civil and criminal, for both the company and its employees. BBB, Equal Employment Opportunity Commission, and other regulatory agencies receive a higher number of complaints from victims of ethics violations in the HR department than others (such as product development or accounting). Discrimination and hostile-work-environment issues can be avoided by companies with comprehensive ethics programs in place. This means lower costs for both litigation and settlements. Simultaneously, due to growing globalization, competition, privatization, liberalization, commoditization, and technological advancements, SCs have grown extremely complex (Malik et al., 2020). Despite the awareness that properly managing the Supply Chain may give a critical competitive benefit, there appears to be a lack of recognition that this element is dependent on human capital performance in the supply chain (Kumar et al., 2020). The value of a worker's experience and skills is called human capital. A company's human capital includes assets like education and training and intelligence, skills, and health. An intangible asset or quality not listed on a company's balance sheet is an "intangible asset." Increased productivity and profitability are linked to human capital. The more a company invests in its employees, the more likely it is to be successful and productive.

Human resource management that is effective and strategic may provide an equally solid foundation for competitive benefit, and very little of this knowledge has been applied to managing a team and training and developing people in the SC (Ramprasad & Amudha, 2014). Deliberately managing HR in the SC necessitates HR configurations and updated HR development aligned with the larger corporate strategy (Öztürk & Yildizbaşı, 2020). The company's involvement in HR development is required to enhance employee performance and control employee comfort and job satisfaction (Amudha, 2021). Competent Human Resource Management (HRM) and its tried-and-true techniques such as job design, recruiting, selecting and orienting, performance management, pay, training, and development may instill a sense of drive toward well-organized and successful work management (Gheisari et al., 2021). The data triangle is the foundation of the term quality employed in the organizational setting. In strategic HR management, HR department plays the main role and has a durable impact in strategic decision at the managerial level. Human resource management at the micro level (human resource practices and policies) is essential and not adequate for companies to gain a sustainable competitive benefit (Billah et al., 2021). To stand strong in the face of competition, businesses must adopt a strategic method to human

  
PRINCIPAL

Avanthi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.



resource management. Everything that makes a product, from raw materials to finished goods, is considered part of supply chain management. Maximizing customer value and gaining a competitive edge in the marketplace involves actively streamlining a company's supply-side activities.

The success or failure of a company is unlikely to be completely determined by its strategic HRM practices; nonetheless, these practices are possible to be critical to the cause. (Raut et al., 2020). The first round of evaluation between the employee and their manager and the second round of evaluation between their managers and their bosses before the third round. The HRmanager is included in the third round, the employee is not. Fuzzy logic-based systems and models can be found ubiquitously in our everyday life. Therefore, fuzzy set theories entice more and more attention (Nguyen et al., 2021). In fuzzy set theory, operators can use the assumed data to describe membership function to portray a component with fuzzy subsets (Khan et al., 2021). On every occasion the output and input parameters are known, it can utilize training information to design a rules base to system behavior of the to-be-controlled model (Ngan et al., 2019). Users can relate some methods to regulating the fuzzy system to acceptable efficiency (Muñoz-Pascual et al., 2020). Therefore, the analytical hierarchy process is prolonged by integrating the fundamental concepts of fuzzy sets theory (Manogaran et al., 2021). This technique is commonly known as the fuzzy AHP. The fuzzy AHP has been established, in which the pair-wise comparisons in the decision matrices are fuzzy numbers (Krishnan et al., 2021). The judgments are assessed systematically via subjective ratings like 'among three and five times less significant and 'roughly three times more essential (Asghar et al., 2021). The decision-makers are provided the power to choose the linguistic parameter that reproduces their confidence (Li et al., 2021). The fuzzy analytical hierarchy process employs fuzzy arithmetics and fuzzy aggregation operators to resolve the hierarchical structure of issues (Ezhilmaran & Adhiyaman, 2016). The fuzzy analytical hierarchy process calculation is done as per the normal analytical hierarchy process technique for weighting the criteria of decision issues in human resource management and supply chain management (Manickam & Devarasan, 2018).

**The major contribution of the article is**

- Designing the F-HRM-SCM model to analyze the key factors in establishing supply chain management.



PRINCIPAL  
Avanthi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Md), R.R. Dist.



- Evaluating the mathematical model of AHP and type-1 fuzzy sets to achieve criteria weights and linkages across dimensions and criteria.
- The simulation results have been accomplished, and the recommended model enhances the supply chain performance and decision-making ratio compared to other models. The rest of the study is arranged as follows: Sect. 2 discusses the background study of supply chain management. In Sect. 3, the F-HRM-SCM model has been recommended. In Sect. 4, simulation results have been performed. Finally, Sect. 5 concludes the research paper.

### **Background study on supply chain management**

hybrid method of the Best Worst Method and Decision-Making Trial and Evaluation Laboratory (BWM-DEMATEL) for implementing green supply chain management. The GSCM-oriented soft dimensions are prioritized using BWM, and their interrelationships are extracted using DEMATEL. According to the findings, 'Top management commitment,' 'Employee participation,' 'Organizational culture,' and 'Teamwork' are the most highly valued causal soft aspects in effective GSCM implementation. This research would assist industry managers, and practitioners determine where to focus on GSCM principles in the context of soft dimensions for long-term company growth. Structural Equation Modelling (SEM) for evaluating Green and Sustainable Supply Chain Management. In this article, they recognized and defined, reviewed, and considered the selected article in different essential perspectives, such as application part, research issue and study gap, type of technique, method, study purpose, country of authors, name of variables, related theory, publication year, unit of analysis, number of samples, hypotheses, and scope, number of instances, name of authors. The results of this review research exposed that earlier works had employed Structural Equation Modelling in green Ability-Motivation-Opportunity (AMO) theory for Green Human Resource Management. The goal of this research is first to investigate the impact of Green HRM practices (green competence constructing practices, green motivation improving practices, and green worker participation practices) on the academic workforce's organizational citizenship behavior toward the environment (OCBE) and, as a result, its impact on environmental performance. Secondly, the role of OCBE in mediating the association between each of the Green HRM practices and environmental performance is measured. the Fuzzy AHP and Fuzzy Type-2 DEMATEL (FAHP-DEMATEL) for sustainable human resource management (SHRM). The current paper aims to identify these elements. Based on existing theoretical underpinnings and expert perspectives, the variables influencing

  
PRINCIPAL

Avanthi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.



the execution of human resource management were grouped into three types: economic, social, and environmental aspects. Determine the weight of the indicated factors based on their lack of independence. The findings demonstrate that the environmental dimension was one of the effective variables and was regarded as the cause; nevertheless, the social and economic dimensions were influenced and were deemed the consequences. The most relevant elements were those related to the environment.

Based on the survey, there are several existing methods to implement efficient HRM in supply chain management. The design and evaluation of a supply chain's network is a critical and difficult decision. A new method for assessing the efficiency of a supply chain network is presented in this paper. Cost factors are the primary metric, divided into four groups: production costs, disruption costs, coordination costs, and vulnerability costs. In addition, some assumptions are made to quantify these cost factors. When searching for an optimal supply chain network design, numerical analysis demonstrates its efficiency and effectiveness. Hence in this article, the F-HRM-SCM model has been proposed. The following section discusses the suggested model briefly

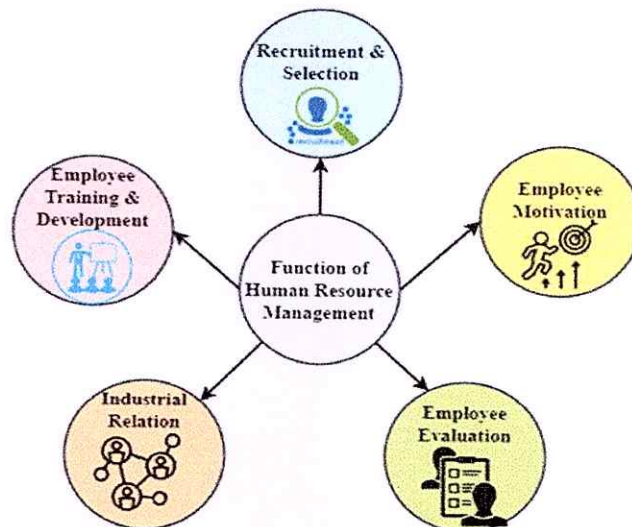
### **Fuzzy assisted human resource management for supply chain management (F-HRM-SCM)**

Supply chain management oversees goods and services and the processes that turn raw resources into finished items. It entails aggressively streamlining a firm's supply-side operations to optimize consumer value and achieve a competitive advantage in the market. This model's top-level has five distinct operations known as SCM components: Plan, Source, Make, Deliver, and Return. The researchers examined the concept of the supply chain and its control using management indicators, emphasizing operation management and information technology IT systems. However, the relationship between SC and human resource management and employee aspects is still absent. With the shifting perspective of human resource management, more organizations deliberate it as a partner. Sustainable HRM has been seen as a genetic approach to human resources management with the organization's view to be pursued. In contrast to its minimal involvement with its original development in implementing that strategy, HR aggressively executes a total strategic design. In the changing economic circumstances, this must be changed. While HR professionals play an essential role in supporting and promoting the value of human resources throughout the organization, it is the senior human resource executives who must demonstrate this value more insistently.

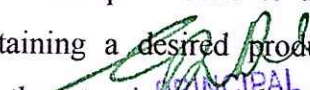
PRINCIPAL  
Avanathi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.



HRD, Executives, and employees must work together to guarantee that the initiatives industrialized and designed by the human resource team are driving business performance and allowing people to accomplish outcomes.



the function of HRM. There is a need for considerable attention and resources to attract, recruit and retain skilled, engaged, and motivated staff. This work includes numerous elements: job description, job postings publicity, screening of applications, interviews, bids and wages, and benefits trading. The appropriate group of skilled people can enhance their profile and assist them in reaching profitability to ensure their performance is successful and effective. The HR department provides all workers with on-the-job training and refresher training. The absence of training options raises employee dissatisfaction. Training methods must thus be simplified across all sites to make communication and resource sharing a straightforward process. Another important component of training to promote the development of their new abilities is measurement and monitoring. The practice of measuring employee performance and productivity is performance evaluation or performance evaluation. The evaluation is carried out based on certain preestablished criteria aligned with the organization's objectives. The success or failure of the company is influenced by performance management and an appropriate evaluation of human resources. The success of an organization depends very much on the efficient use of the assessment systems, including a selection of the appropriate evaluation techniques. "Scientific technique" refers to any systematic approach to obtaining scientific information or obtaining a desired product or material. Techniques of analysis, such as those that reveal the atomic or molecular

  
 PRINCIPAL  
 Avanthi Institute of Engg. & Tech  
 Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.

composition. Techniques for characterizing a material, such as ones that measure a specific property.

Even today, the compensation package, monitoring, and non-traditional perks are the true motivators and the methods by which fresh and talented workers will be attracted and retained. To guarantee improved industrial relations is the continuation of excellent connections and morality between employees, employers, and employers. For the company's continuing survival, compliance with industrial, labor, tax, and employability legislation is important. HR should focus on a government mandate, laws, and policy on employment practice, working conditions, tax allowances, work hours, overtime, break periods, minimum wages, and policies on discrimination, since non-compliance may influence productivity and, ultimately, corporate profitability. Companies seek a distinctive competitive advantage or solutions to meet industrial requirements and regulations.

Data mining is to extract from a huge amount of imperfect, fuzzy, noisy, random information, the procedure of not knowing in progress, and possibly beneficial data and knowledge. Data mining is termed knowledge extraction and mining. In the data mining procedure, data mining processes are the most vital. The data mining model can extract HR data from several databases about the job situation of workers in the company. The most critical roles of human resource management are.

- Management of human resources
- Selection and recruitment
- Management of performance
- Continuing education and advancement
- We are planning for the future of your career
- The evaluation of its functions
- Rewards



PRINCIPAL  
Avanthi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Md), R.R. Dist.



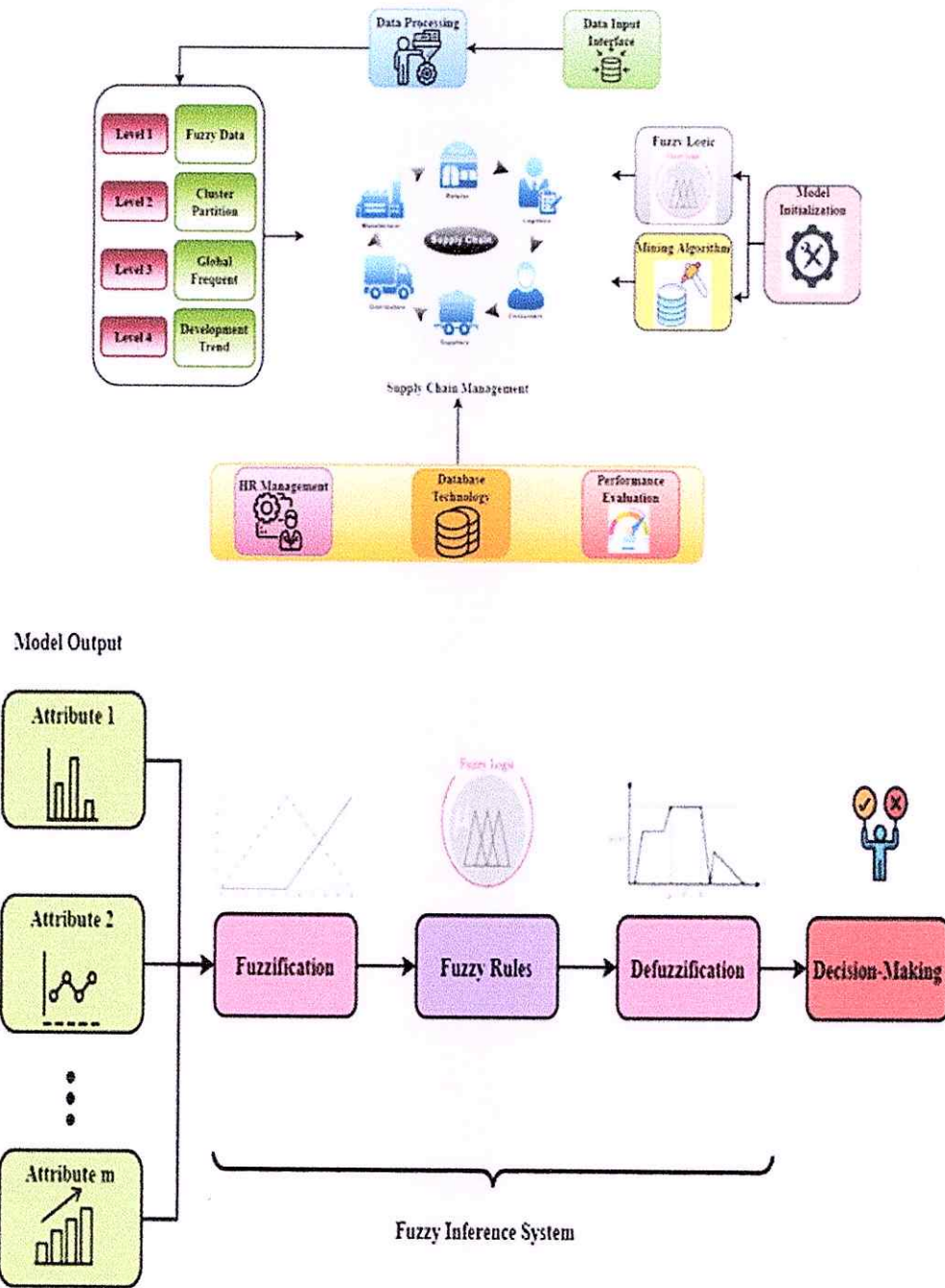


Fig. 3 Fuzzy logic for decision-making

There are several core functions of human resource management that include strategic planning, operational management of employees, recruitment, staffing, etc. This research conducts an empirical study of the human resource management issue to test the suggested combined technique. In this human resource management assessment, three decision-makers have been invited to assess the criteria and dimensions of the human resource management issue. Employee recruitment, hiring, deployment, and management are part of human

PRINCIPAL  
 Vanthi Institute of Engg. & Tech  
 Gunthapally (V), Abdullapurmet (Md), R.R. Dist.

resource management (HRM). When it comes to human resources management (HRM), "HR" is frequently used. Managing employees as a company's most valuable resource focus on human resources management (HRM). The causal relationships of accidents in construction are assessed using the fuzzy DEMATEL method. For the subjective and imprecise nature of human judgment, this combination is used. The fuzzy set theory makes use of interval sets rather than real numbers. Fuzzy numbers are used to represent linguistic concepts. Figure 4 shows the hierarchical structure of HRM and SCM. In the second tier of the hierarchical structure, it can be observed that HRM has three dimensions: input, infrastructures, and output. The third tier of the hierarchy is based around the eight criteria: value, education, collaboration, R&D costs, labor market, intermediate outputs, human capital, and immediate outputs. The pair-wise comparison is built between all criteria in the hierarchy system's dimensions using fuzzy numbers and linguistic parameters

### **Supply chain performance ratio**

SC Performance denotes the prolonged supply chain's activities in meeting end-client needs, involving on-time delivery, product availability, and every vital inventory and capability in the SC to deliver that performance responsively. Performance of most processes is measured from 5 perspectives: Responsiveness, Reliability, Cost, Flexibility, and Asset. Fuzzy logic is appropriate for dealing with subjectivity and uncertainty, which becomes an interesting auxiliary method to managing the performance of supply chains. A descriptive quantitative method has been adopted as a research technique based on the prediction model. The practical implication of the study can be viewed from the perspective of human resource practices and supply chain controlling for the enhanced business performance matrix. Such a relationship is essential for the business managers and main decision-makers dealing with supply chain management, control, and human resource practices.

### **Efficiency ratio**

The notion of direct objectives covers creating a balance between the tasks, management for the controlling and planning, and finally, the employment of information systems. In comparison, the indirect controlling objective consists of the objective system of the business companies, profit, and business effectiveness with liquidity purposes. Evidence denotes that the development of supply chain management ensued from the incorporation of manufacturing and marketing progressions. Natural and clinical sciences research is published in Scientific Reports. According to us, you deserve to have your research published

  
PRINCIPAL  
Avanthi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.



if it's scientifically valid and technically sound. Publish with us, and your research will receive the attention and coverage it deserves. There are many advantages to publishing your work in an open-access journal or journal that publishes your work on an ongoing basis. It's easy to see what people are saying about your work, thanks to Article-Level Metric. Such incorporation has concentrated performance measurement of supply chain management practices mainly on operational problems, like resource effectiveness and cost decrease, and marketing problems, like consumer service. Internal human resources development to enhance supply chain management practices has yet to be studied formally. Figure 7 demonstrates the efficiency ratio.

### **Employee satisfaction ratio**

The findings exposed that worker satisfaction is directly influenced by empowerment, training, and compensation and satisfaction; supply chain incorporation mediates between these relationships. The study results are significant for the supply chain practitioners in the supply chain industry in developing policies to improve employee satisfaction via supply chain incorporation and other human resource management practices. Effective communication with satisfied employees is necessary for coordinating material, information, and money to improve firm performance. Research has shown relations between internal communication, employee satisfaction, and organizational communication. Figure 8 illustrates the employee satisfaction ratio.

### **Decision making level**

For better business management, logistics controls, and supply chain control, there is a great requirement for skill needs for the core employees and department, involving finance, information technology, a human resource which can impact the strategic decisions for the business achievement. Performance measurement is a basic building block of effective companies. It establishes an important component of efficient control, planning, and decision-making by giving stakeholders and decision-makers the essential feedback to determine issues, diagnose them, and design enhancement policies consequently. In the SCM environment, measurement findings reveal the effects of policies and focus on possible opportunities for sustainable advancement. In an attempt to help executives to make helpful directed decisions to enhance the total SC performance. Figure 9 signifies the decision making level.

  
PRINCIPAL  
Avanathi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.


### **Prediction ratio**

Fuzzy technology and data mining can extract information on the human resource conditions of the personnel in the organization from many databases. It aims to help analysts find possible links between information and find ignored components useful in predicting trends and decision-making behavior. It is utilized to detect meaningful relations and links in a large number of data between item sets. Management of human resources faces huge amounts of data and requires technology to determine valuable information. The present model can effectively perform data entry, queries, statistics, or other functions, and the relationships and regulations existing in the data cannot be found. Compensation is one of the main predictors of job satisfaction. Previous research has carried out one study in the supply chain industry, and compensation has been discovered as the main predictor of work satisfaction. Figure 10 displays the prediction ratio.

### **F1-Score ratio**

The F1 score or F measure is described as the harmonic mean between recall and precision. It is utilized as a statistical measure to rate supply chain performance. An F-measure spreads its best value at 1 and worst value at 0. A low F-measure is an indication of both poor recall and poor precision. Thus, this score proceeds both false positive and false negative into account. Accuracy is utilized when the True Positives and True negatives are more significant, while F measure is utilized when the False Negative and False Positive are vital. In most real-life classification issues, imbalanced class delivery occurs, and therefore, F-measure is a better metric to assess our system. The suggested F-HRM-SCM method improves the Fmeasure ratio compared to other existing models. Figure 11 displays the F1-Score ratio of the recommended F-HRM-SCM method. The proposed F-HRM-SCM model improves the supply chain performance, efficiency ratio, employee satisfaction ratio, decision-making level, prediction ratio, and F1-score ratio compared to other existing Best Worst Method and Decision-Making Trial and Evaluation Laboratory (BWM-DEMATEL), Structural Equation Modelling (SEM), Ability-Motivation Opportunity (AMO) theory, Fuzzy AHP, and Fuzzy Type-2 DEMATEL (FAHP-DEMATEL) models.

### **Conclusion and future scope**



PRINCIPAL  
Avanathi Institute of Engg. & Tech  
Guntapally (V), Abdullapurmet (Mdl), R.R. Dist.



This study recommends many ways to gain a competitive benefit by manipulating HRM factors even if competitors have efficiently established SCM practices. Because of the innovative and customized supply chain techniques and the geographical position and associated supply chains restrictions, the consequences of our scientific research would be for manufacturing companies.

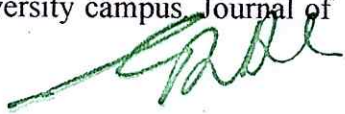
Integration is merging or combining two or more approaches to give a better and more efficient outcome. In addition, ambiguous and imprecise assessments have made the outcome in detecting causal diagrams less successful. This research has created a novel study to resolve issues by integrating the fuzzy DEMATEL and AHP type-1. Three policy-makers were asked to assess three aspects and eight criteria for the integration approach presented for human resources management. The education requirements from the infrastructure component were agreed on by consensus as to the most important criterion for the management of human resources. To verify the validity of the research, the number of decision-makers must be checked. The experimental results demonstrate that the proposed F-HRM-SCM model enhances the supply chain performance ratio of 98.9%, an efficiency ratio of 97.8%, employee satisfaction ratio of 96.7%, decision-making level by 98.2%, prediction ratio of 95.5%, and F1-score ratio of 97.4% compared to other existing approaches. Future studies consider a higher number of decision-makers. The revised threshold value is anticipated to give different Fuzzy DEMATEL and establish a new network relationship map. Further study is required to check the given approach. It is necessary. Other genuine case studies in group policy issues, including supplier choices and customer satisfaction, may be tested in the manner proposed.

## References

Amudha, G. (2021). Dilated transaction access and retrieval: improving the information retrieval of blockchain assimilated internet of things transactions. *Wireless Personal Communications*, 8, 1–21.

Anwar, N., Mahmood, N. H. N., Yusliza, M. Y., Ramayah, T., Faezah, J. N., & Khalid, W. (2020). Green Human Resource Management for organisational citizenship behaviour towards the environment and environmental performance on a university campus. *Journal of Cleaner Production*, 256, 120401.

Asghar, M. Z., Subhan, F., Ahmad, H., Khan, W. Z., Hakak, S., Gadekallu, T. R., & Alazab, M. (2021). SentieSystem: A sentiment-based eSystem-using hybridized fuzzy and deep neural

  
PRINCIPAL  
Avanthi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.

network for measuring customer satisfaction. Software: Practice and Experience, 51(3), 571–594



PRINCIPAL  
Avanthi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.



**Section C: Financial requirement (all figure must be INR)**

S. No	Item Head	Total (in Lakh)
<b>Capital Component</b>		
1	Permanent Equipment (Located in lab/implementing organization) as per billing	20,000/-
2	Fabricated systems/demonstration models (located at beneficiary location)	50,000/-
A	Subtotal (Capital Items)	70,000/-
<b>General Component</b>		
1	Manpower and Contingencies	45,000/-
2	Consumables	25,000/-
3	Travel	5,000/-
4	Overhead	-----
5	PC	-----
6	Printer and Scanner	5,000/-
B	Subtotal (General)	80,000/-
C	<b>Total cost of the project (A+B)</b>	<b>1,50,000/-</b>

- I. Project Cost:1,50,000/-**  
**II. Contribution of consortium (if any):**  
**III. Total Budget (I+II):1,50,000/-**



**PRINCIPAL**  
**Avanthi Institute of Engg. & Tech**  
**Gunthapally (V), Abdullapurmet (Md), R.R. Dist.**

### Section D: Applicant Details

Name of the Lead Organization	Avanthi Institute of Engineering and Technology	
Address, Please include phone numbers, fax, emails and website	Gunthapally (V), Abdullapurmet(M), RR Dist, Near Ramoji Film City, Hyderabad -501512. email: <a href="mailto:principal.avanthi@gmail.com">principal.avanthi@gmail.com</a> Ph No:9849714307 <a href="http://www.ajetg.ac.in">www.ajetg.ac.in</a>	
Applicant Type Broad: Government/Non-Government Sub entity: Academic or research institution	ACADEMIC INSTITUTION	
Primary Point of Contact Lead Principal investigator (PI)	Name:	Mr.T.Kranthi Kumar
	Designation	Associate Professor
	Email	<a href="mailto:Avanthiee2005@gmail.com">Avanthiee2005@gmail.com</a>
	Telephone	9652224466
	Mobile	9652224466
Secondary Point of Contact	Name:	Dr Ramachandra Reddy
	Designation	Associate Professor
	Email	<a href="mailto:principal.avanthi@gmail.com">principal.avanthi@gmail.com</a>
	Telephone	9849714307
	Mobile	9849714234

<b>Information on Lead PI</b>	<p><b>Expertise available with the Principal Investigator</b></p> <p>Dr. T.Kranthi Kumar, Associate Professor, Dept. Of Electrical and Electronics Engineering, he would mentor the proposed research project from time to time.</p> <p>The Principal Investigator has gained good knowledge on Power systems and its related areas.</p> <p>1. Guided five M. Tech project students based on his Research area.</p> <p>Guided four B. Tech project students out of his research Area.</p> <p>2) During his research, PI has acquired knowledge of automatic control and fault and obstacle detection system for street lamps &amp; used them for the above said project works.</p> <p>The tools learned by PI are as follows: Computational skills: Simulation Software: the HRM Practices by Neuro Fuzzy Word Processing: MS Office.</p>
-------------------------------	---

**PRINCIPAL**  
Avanthi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.



## 1. Annexure 1: Monitoring & Evaluation approach

Time Schedule of Activities Giving milestones through BAR Diagram					
S.No	WORKPLAN	1 -3 Month	4-6 Month	7-9 Month	10-12 Month
1	Basic Study of the literature related for the project implementation consolidation of the available expertise. Planning of execution of the proposed project scheme				
2	Procurement of experimental equipment and installation				
3	Design of basic simulation of the project and control strategy using HRM Practices by Neuro Fuzzy				
4	Implementation of research project and operational control of the test facility using HRM Practices by Neuro Fuzzy				
5	Annual review of the progress of the project and effective guidance for implementation				
6	Commissioning of the project hardware				
7	Testing of the project and code				
8	Experimental validation of the project				
9	Report Writing				



PRINCIPAL  
Avanathi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.

**Avanthi Institute of Engineering and Technology, Gunthapally, Hyderabad**

S No	Infrastructure Facility	Yes/No/Not required/Full or Sharing Bases
1	Workshop Facility	Yes
2	Water & Electricity	Yes
3	Laboratory Space/Furniture	Yes
4	Power Generator	Yes
5	AC Room or AC	Yes
6	Telecommunication including e-mail & fax	Yes
7	Transportation	Yes
8	Administrative/ Secretarial support	Yes
9	Information facilities like Internet Library	Yes
10	Computational facilities	Yes
11	Animal/Glass House	Not required
12	Any other special facility being provided	R&D Lab



PRINCIPAL  
Avanthi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.





# AVANTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

(Approved by AICTE, Regg. By Govt. of T.S & Affiliated to JNTUH, Hyderabad)

NAAC "B++" Accredited Institute

Gunthapally (V), Abdullapurmet(M), RR Dist, Near Ramoji Film City, Hyderabad -501512.

[www.aietg.ac.in](http://www.aietg.ac.in) email: [principal.avanthi@gmail.com](mailto:principal.avanthi@gmail.com)

AVIH/2020/ R&D PROJECT

Dt: 22.09.2020

TO

The Manager,

CONSCIENCE TECHNOLOGIES,

Hyderabad.

**Sub:** HRM Practices by Neuro Fuzzy.

Respected Sir,

We are pleased to appoint faculty for coordination of HRM Practices by Neuro Fuzzy. We are happy to submit detailed proposal along with the milestones of microcontroller used is Arduino.

Details of the Faculty:

Mr.T.Kranthi Kumar, Associate Professor

Department of EEE

Phone Number: 9652224466

Thank you and looking forward for your collaboration.

  
PRINCIPAL  
Avanthi Institute of Engg. & Tech  
Principal Investigator



## CONSCIENCE TECHNOLOGIES

A Right Platform For All Engineers...

Date: 28.09.2020,

To,  
The Principal,  
Avanthi Institute of Engineering and Technology,  
Gunthapally, Hyderabad.

Subject: HRM Practices by Neuro Fuzzy - Regarding

With reference to communication along with detailed submission of project milestones. We are pleased to invite for an internal discussion on execution of the project and other design and implementation regarding development of HRM Practices by Neuro Fuzzy. We are deputing Engineer for the above state of project.

Details of the Engineer:

Mr.M.Manohar babu

Phone Number: 9505379414

Thank you and looking forward for your response.

Regards

Managing Partner Conscience Technology









## AVANTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

(Approved by AICTE, Recg. By Govt. of T.S & Affiliated to JNTUH, Hyderabad)

NAAC "B++" Accredited Institute

Gunthapally (V), Abdullapurmet(M), RR Dist, Near Ramoji Film City, Hyderabad -501512.

[www.aietg.ac.in](http://www.aietg.ac.in) email: [principal.avanthi@gmail.com](mailto:principal.avanthi@gmail.com)

Date:22/12/2020,

TO  
The Manager,  
CONSCIENCE TECHNOLOGIES,  
Hyderabad.

Dear sir

The college does not have sufficient working capital to complete the next half of proposed project which we have been discussed. We are therefore requesting for advance funds to the staff and other expenses required to work on this project. Therefore we urge you to consider our request for approval to receive funding in advance for this project. Thank you for your consideration of this request. Sincerely,

Thanking you,

Principal  
PRINCIPAL  
Avanathi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.





## AVANTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

(Approved by AICTE, Recg. By Govt. of T.S & Affiliated to JNTUH, Hyderabad)

NAAC "B++" Accredited Institute

Gunthapally (V), Abdullapurmet(M), RR Dist, Near Ramoji Film City, Hyderabad -501512.

[www.aietg.ac.in](http://www.aietg.ac.in) email: [principal.avanathi@gmail.com](mailto:principal.avanathi@gmail.com)

Hyderabad,

Date: 30.01.2021.

From  
The Principal,  
Avanathi Institute of Engineering and Technology,  
Hyderabad.

To  
The Manager,  
CONSCIENCE TECHNOLOGIES,  
Hyderabad.

Respected Sir,

Sub: Project Completion-reg.

The project has been completed on a given time bond. It has been a great achievement by us to complete the prestigious project on time. It has been a great privilege, working in association with you and looking forward to working with you in future projects. We request you to please come along with your team for collecting, retrieving of important and confidential data.

Looking forward to a quick response from your side

Thanking you,

Principal

PRINCIPAL  
Avanathi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.

Date: 08/06/2020,

To  
The principal,  
Avanthi Institute of Engineering and Technology,  
Gunthapally (V), Abdullapurmet (M), Hyderabad, Telangana.

**Subject: Request for Enhancements of project” Intelligent Access Control System for Safety In Industries”**

Dear Sir,

I hope this letter finds you in good health and high spirits. I am writing to you as the Managing Director, MANAC infotech (P) Ltd , 201, 2nd, Sagarview Building, Dilsukhnagar, Hyderabad, Telangana with regard to a project that our agency funded in collaboration with your esteemed college.

Firstly, I would like to express my gratitude for the opportunity given to us to collaborate on such a promising project. After careful evaluation and analysis, we have identified several areas where the project could benefit from additional enhancements. These enhancements would undoubtedly contribute to further elevating the overall quality and impact of the project.

We are open to further collaboration with your college in terms of sharing our expertise and resources to facilitate the successful implementation of these enhancements. Meanwhile we will start the process of payment. We kindly request your prompt attention and favorable consideration of our proposal. We would be more than willing to provide any additional supporting documentation or answer any queries you may have.

Thank you for your time and support. We eagerly await your positive response and look forward to our continued collaboration for the advancement of this admirable project.







# AVANTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

(Approved by AICTE, Recg. By Govt. of T.S & Affiliated to JNTUH, Hyderabad)

NAAC "B++" Accredited Institute

Gunthapally (V), Abdullapurmet(M), RR Dist, Near Ramoji Film City, Hyderabad -501512.

[www.aietg.ac.in](http://www.aietg.ac.in) email: [principal.avanthi@gmail.com](mailto:principal.avanthi@gmail.com)

Dr.G. Ramachandra Reddy, M.Tech, Ph.D

Principal

AVIH/2020/R & D PROJECT

Dt: 10/06/2020,

TO

The Manager,

MANA Infotech (P) Limited,

Dilsukhnagar, Hyderabad.

**Sub:** Intelligent Access Control System for Safety In Industries.

Respected Sir,

With reference to letter received from your end regarding **Intelligent Access Control System for Safety In Industries**, We are happy to submit detailed proposal along with the milestones of Design and hardware Implementation of Intelligent Access Control System for Safety In Industries. We request you to discuss with your internal R&D team and communicate for further discussion.

Thank you and looking forward for your collaboration.

  
Principal Investigator



PRINCIPAL

PRINCIPAL  
Avanthi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.

**Section A: General Information:**

<b>Project Title</b>	Intelligent Access Control System for Safety In Industries
Project Type Research Design & Demonstration of Automated Street Light Controller Research Other	Intelligent Access Control System for Safety In Industries
Project Location/s (District State)(Must be in India)	Avanathi Institute of Engineering and Technology, Gunthapally, Hyderabad
Stage of development (initial concept proof of demonstration/scale up)	Proof of Concept - Demonstration
Lead Implementing Organization	Avanathi Institute of Engineering and Technology, Gunthapally, Hyderabad
Any Partnering: Organization: In INDIA	NO
(I) Total Funding Request(INR In lakh)	2,51,800 Rs/-
(II) Contribution in Cash/kind from lead/partnering institution if any	NO
Total cost (I+II)=	2,51,800 Rs/-



PRINCIPAL  
Avanathi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.



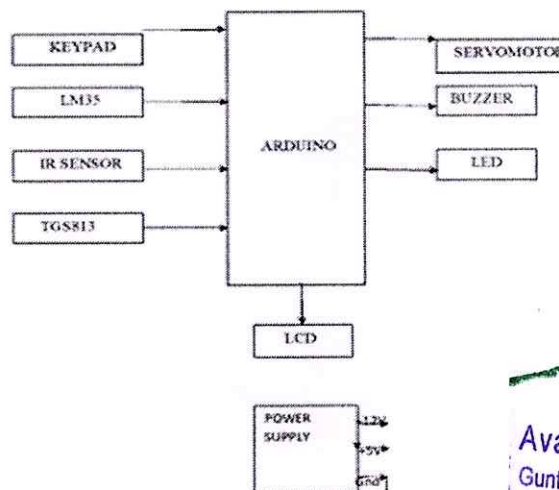
## Section B: Project Information: Report submitted

### Project Description:

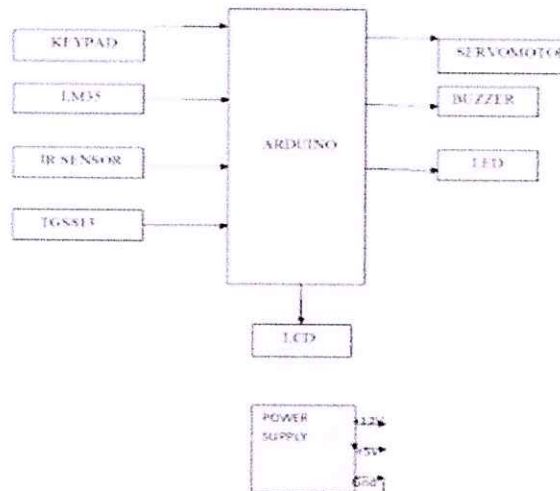
Now days the technology is increasing rapidly, that leads to an up gradation in industrial security system. Automation in security sector makes it more authentic. There are many electrical equipment's are available in industry which are in necessity of monitoring from a remote area all at a time. In this paper a smart industry and security system is proposed along with the sensors detection technique. Arduino is used as controlling unit coded in c language.

### INTRODUCTION

An intelligent security and safety system is a crucial element for any industry to ensure the well-being of its employees and the smooth functioning of its operations. Such a system not only helps to prevent accidents and unauthorized access, but also allows for quick response to emergencies. In this project, we will be using Arduino to develop an intelligent security and safety system for industries. Arduino is an open-source platform that uses easy-to-use hardware and software to enable people to build a variety of interactive electronic projects. Our system will be able to detect potential security breaches and alert the relevant authorities, as well as monitor environmental conditions and alert employees of any potential hazards. It will also be able to track the location of employees and equipment in real-time, making it easier to respond to any incidents that may occur. Overall, this project aims to enhance the security and safety of industries by providing a reliable and efficient system that can help to prevent accidents and unauthorized access, as well as respond quickly to emergencies.

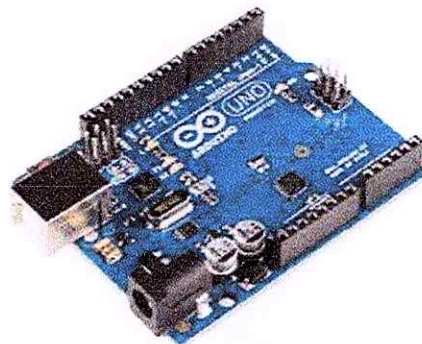


  
PRINCIPAL  
Avanathi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Md), R.R. Dist.



## ARDUINO

Arduino is an open-source electronics platform based on easy-to-use hardware and software. It is intended for anyone interested in creating interactive objects or environments. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online. You can tell your board what to do by sending a set of instructions to the microcontroller on the board. To do so you use the Arduino programming language (based on C++), and the Arduino Software (IDE), which runs on your computer, to write and upload computer code to the physical board.



## KEYPAD

The keyboard is an input device that allows you to enter letters, numbers and symbols into your computer. The keyboard keys include the alphanumeric keys (letters and numbers),

PRINCIPAL  
 Avanthi Institute of Engg. & Tech  
 Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.

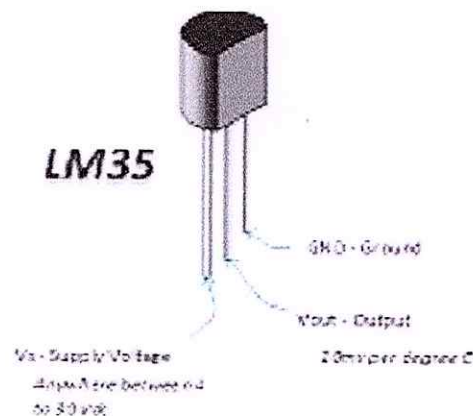


numeric keypad (may not be available on net books/laptops), special function keys, mouse cursor moving keys, and status lights.



### LM35

The LM35 is a temperature sensor that is used to measure temperature. It is a linear temperature sensor, which means that the output voltage of the sensor is directly proportional to the temperature. The LM35 has a range of  $-55^{\circ}\text{C}$  to  $150^{\circ}\text{C}$  and an accuracy of  $\pm 1^{\circ}\text{C}$ . It is available in a small, 3-pin TO-92 package, making it easy to integrate into a variety of applications. The LM35 does not require any external calibration or trimming to provide accurate readings, making it a simple and cost-effective temperature sensing solution.

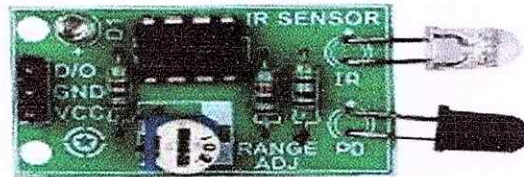


### IR SENSOR

An IR sensor is a type of electronic sensor that detects and measures infrared radiation (IR). Infrared radiation is a type of electromagnetic radiation with a wavelength longer than visible light, but shorter than radio waves. IR sensors are used in a wide variety of applications, including remote control systems, security systems, and temperature sensing. They work by detecting the presence of IR radiation and converting it into an electrical signal that can be

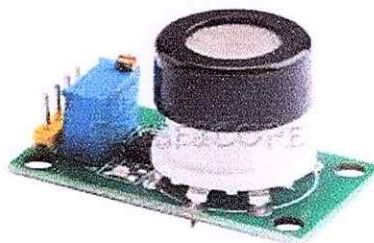
  
PRINCIPAL  
Avanathi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.

read and interpreted by a microcontroller or other type of control system. Some common types of IR sensors include photodiodes, thermopiles, and pyroelectric sensors.



### TGS813

The TGS813 is a gas sensor that is designed to detect the presence of gases such as hydrogen, methane, and propane. It is a metal oxide (MOX) gas sensor, which means that it uses a metal oxide semiconductor material to detect the presence of gases. The TGS813 is a low-cost, small-sized sensor that is suitable for use in a variety of applications, including indoor air quality monitoring, gas leak detection, and combustion efficiency monitoring. The sensor has a high sensitivity to a range of gases, and it can operate over a wide temperature range. It is also relatively easy to integrate into a control system, making it a popular choice for gas detection in a variety of applications.



### SERVOMOTOR

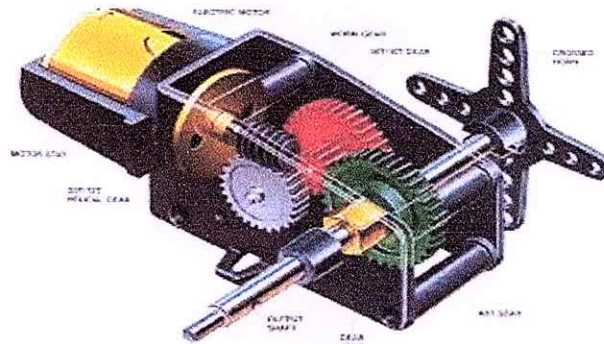
A servomotor is a type of rotary actuator that is used for precise control of angular position, velocity, and acceleration. It consists of a motor, a position sensing device and a control circuit. The control circuit compares the actual position of the shaft with the target position, and drives the motor in the appropriate direction to move the shaft to the target position.

  
PRINCIPAL

Avanthi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.



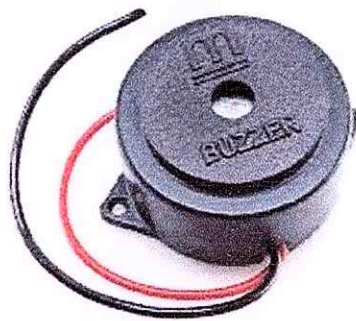
Servomotors are commonly used in a wide range of applications, including robotics, aerospace, and precision instrumentation. They are highly reliable and efficient, and can be easily programmed to perform a wide range of motion control tasks.



Construction of Servo Motor

## BUZZER

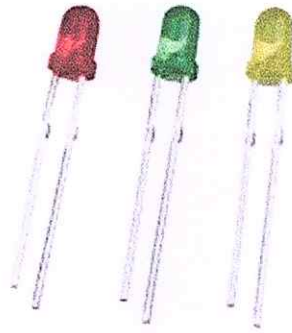
A buzzer is a simple electronic device that makes a buzzing sound when an electric current is applied to it. Buzzers are often used as alarms, timers, or to indicate the completion of a task. There are several types of buzzers, including piezoelectric buzzers, electromagnetic buzzers, and mechanical buzzers.



## LED

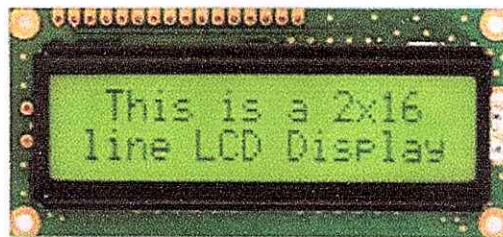
An LED (Light Emitting Diode) is a small, solid-state device that emits light when an electric current passes through it. LEDs are widely used in a variety of applications, including electronics, lighting, and display technology. They are highly efficient, longlasting, and durable, and are available in a wide range of colors and sizes.

PRINCIPAL  
Avanthi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.



## LCD

An LCD (Liquid Crystal Display) is a flat panel display technology that uses liquid crystals to produce images. It consists of a layer of liquid crystals sandwiched between two layers of glass, with a backlight behind it. When an electric current is applied to the liquid crystals, they align and allow light to pass through, creating an image. LCDs are widely used in a variety of applications, including TVs, computer monitors, and mobile phones. They are energy-efficient, lightweight, and have a high image quality.



A handwritten signature in blue ink, appearing to be "R. R. R.", is written above the printed name.

PRINCIPAL  
Avanthi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.



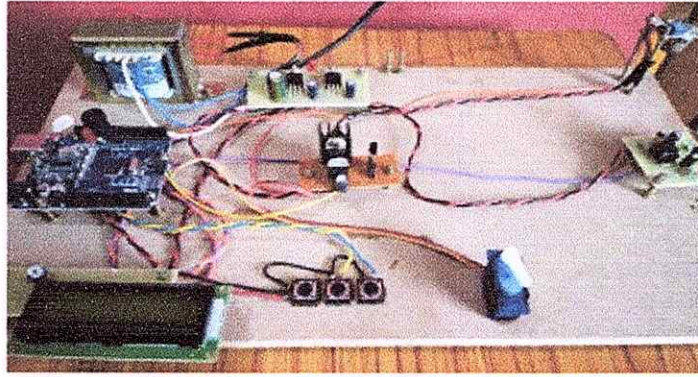
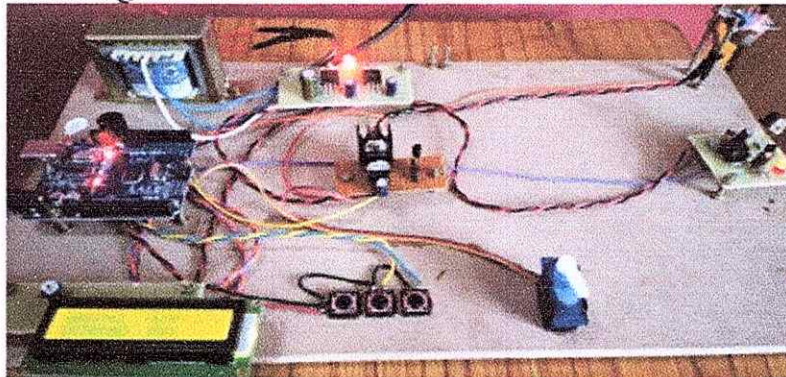


Fig: 3.2 WITHOUT POWER SUPPLY



## ADVANTAGES

Enhanced security: Industrial security systems help to secure facilities and protect against unauthorized access, theft, and vandalism. This can help to prevent losses and downtime caused by security breaches. Improved safety: Industrial safety systems help to prevent accidents and injuries by monitoring for potential hazards and alerting workers to potential dangers. This can help to improve the overall safety of the facility and reduce the risk of costly injuries or accidents. Increased productivity: By ensuring a safe and secure working environment, an industrial security and safety system can help to increase worker productivity by reducing distractions and disruptions caused by demonstrate that the company has taken appropriate measures to protect its employees and assets. Cost savings: Implementing an industrial security and safety system can help to reduce costs associated with security and safety incidents, such as lost productivity, equipment damage, and legal fees. security or safety incidents. Reduced liability: Industrial security and safety systems can help to reduce the risk of liability in the event of an accident or security breach.

## APPLICATIONS

Access control system for a manufacturing facility: Design and implement a system to control access to a manufacturing facility using identification cards and biometric scanners.

  
PRINCIPAL  
Avanthi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.



The system should be able to grant access to authorized personnel and deny access to unauthorized individuals. Alarm system for a chemical plant: Design and implement an alarm system for a chemical plant to notify employees and security personnel of potential hazards, such as gas leaks or equipment malfunctions. Safety monitoring system for a construction site: Design and implement a safety monitoring system for a construction site using sensors and other monitoring technologies to detect potential hazards and alert workers to take appropriate action. Training and drills program for an oil refinery: Design and implement a training and drills program for an oil refinery to help employees understand how to respond to emergencies and potential threats. Risk assessment tool for a mining operation: Design and implement a risk assessment tool for a mining operation to help identify potential hazards and evaluate the risks associated with various activities and operations.

## **CONCLUSION**

In conclusion, intelligent security and safety systems have the potential to significantly improve the security and safety of industrial facilities. It is used to monitor for potential hazards and security threats, and to respond appropriately. By implementing intelligent security and safety systems, industries can enhance security, improve safety, increase productivity, reduce liability, and save costs. However, it is important to carefully consider the costs, complexity, privacy concerns, reliability, and resistance to change that may be associated with these systems. Mini projects can be a useful way to explore the potential applications of intelligent security and safety systems in specific industries and to develop a deeper understanding of the benefits and challenges of these systems.

## **FUTURE SCOPE**

Integration with other systems: Security and safety systems could be integrated with other systems, such as building management systems and emergency response systems, to provide a more comprehensive approach to security and safety. Advanced analytics: Security and safety systems could use advanced analytics, such as machine learning and predictive modeling, to more accurately detect and respond to potential threats and hazards. Internet of Things (IoT) integration: Security and safety systems could be integrated with IoT devices, such as sensors and smart devices, to provide realtime monitoring and response capabilities. Human-machine collaboration: Security and safety systems could be designed to work collaboratively with humans, using technologies such as augmented reality and wearable

  
**PRINCIPAL**  
Avanathi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.



devices, to enhance situational awareness and response times. Cybersecurity: As security and safety systems become increasingly reliant on technology, it will be important to focus on cybersecurity to protect against cyber threats and vulnerabilities. Ethical and legal considerations: As security and safety systems become more advanced, it will be important to consider ethical and legal implications, such as privacy concerns and the potential for bias.



PRINCIPAL  
Ananthi Institute of Engg. & Tech  
Ananthapally (V), Abdullapurmet (Mdl), R.R. Dist.

**Section C: Financial requirement (all figure must be INR)**

S. No	Item Head	Total (in Lakh)
<b>Capital Component</b>		
1	Permanent Equipment (Located in lab/implementing organization) as per billing	55,000/-
2	Fabricated systems/demonstration models (located at beneficiary location)	1,05,000/-
A	Subtotal (Capital Items)	1,60,000/-
<b>General Component</b>		
1	Manpower and Contingencies	50,000/-
2	Consumables	30,000/-
3	Travel	5,800/-
4	Overhead	-----
5	PC	-----
6	Printer and Scanner	5,000/-
B	Subtotal (General)	91,800/-
C	<b>Total cost of the project (A+B)</b>	<b>2,51,800/-</b>

- I. Project Cost:3,65,000/-  
II. Contribution of consortium (if any):  
III. Total Budget (I+II):3,65,000/-



PRINCIPAL  
Avanthi Institute of Engg. & Te  
Gunthanelly (V) Abdullapur



### Section D: Applicant Details

Name of the Lead Organization	Avanthi Institute of Engineering and Technology	
Address, Please include phone numbers, fax, emails and website	Gunthapally (V), Abdullapurmet(M), RR Dist, Near Ramoji Film City, Hyderabad -501512. email: <a href="mailto:principal.avanthi@gmail.com">principal.avanthi@gmail.com</a> Ph No:9849714307 <a href="http://www.aietg.ac.in">www.aietg.ac.in</a>	
Applicant Type Broad: Government/Non-Government Sub entity: Academic or research institution	ACADEMIC INSTITUTION	
Primary Point of Contact Lead Principal investigator (PI)	Name:	Dr.G Sai kumar
	Designation	Associate Professor
	Email	<a href="mailto:Avanthiece2005@gmail.com">Avanthiece2005@gmail.com</a>
	Telephone	9490407827
	Mobile	9490407827
Secondary Point of Contact	Name:	Dr Ramachandra Reddy
	Designation	Associate Professor
	Email	<a href="mailto:principal.avanthi@gmail.com">principal.avanthi@gmail.com</a>
	Telephone	9849714307
	Mobile	9849714234



PRINCIPAL  
Avanthi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.

<b>Information on Lead PI</b>	<b>Expertise available with the Principal Investigator</b>
	<p>Dr. G Sai kumar , Associate Professor Dept. Of ECE, he would mentor the proposed research project from time to time.</p> <p>The Principal Investigator has gained good knowledge on Embedded systems design &amp; Image Processing And Its Related Areas.</p> <p>1.Guided five M.Tech project students based on his research area.</p> <p>Guided two B. Tech project students out of his research area.</p> <p>2) During his research, PI has acquired knowledge of many simulations software&amp; used them for the above said project works.</p> <p>The tools learned by PI are as follows: Computational skills: Simulation Software: Embedded C programming. Word Processing: MS Office</p>



PRINCIPAL  
Avanthi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.



**1. Annexure 1:Monitoring & Evaluation approach**

<b>Time Schedule of Activities Giving milestones through BAR Diagram</b>							
<b>S.No</b>	<b>WORKPLAN</b>	<b>1<sup>ST</sup> Month</b>	<b>2<sup>nd</sup> Month</b>	<b>3<sup>rd</sup> Month</b>	<b>4<sup>th</sup> Month</b>	<b>5<sup>th</sup> Month</b>	<b>6<sup>th</sup> Month</b>
1	Basic Study of the literature related for the project implementation consolidation of the available expertise. Planning of execution of the proposed project scheme						
2	Procurement of experimental equipment and installation						
3	Design of basic simulation of the project and control strategy using Embedded C & Embedded RTOS						
4	Implementation of research project and operational control of the test facility using Embedded C & Embedded RTOS						
5	Annual review of the progress of the project and effective guidance for implementation						
6	Commissioning of the project hardware						
7	Testing of the project and code						
8	Experimental validation of the project						
9	Report Writing						



**PRINCIPAL**  
**Avanthi Institute of Engg. & Tech**  
**Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.**

**Avanathi Institute of Engineering and Technology, Gunthapally, Hyderabad**

<b>S No</b>	<b>Infrastructure Facility</b>	<b>Yes/No/Not required/Full or Sharing Bases</b>
1	Workshop Facility	Yes
2	Water & Electricity	Yes
3	Laboratory Space/Furniture	Yes
4	Power Generator	Yes
5	AC Room or AC	Yes
6	Telecommunication including e-mail & fax	Yes
7	Transportation	Yes
8	Administrative/ Secretarial support	Yes
9	Information facilities like Internet Library	Yes
10	Computational facilities	Yes
11	Animal/Glass House	Not required
12	Any other special facility being provided	Dedicated Embedded C Lab

  
PRINCIPAL  
Avanathi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.





## AVANTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

(Approved by AICTE, Recg. By Govt. of T.S & Affiliated to JNTUH, Hyderabad)

NAAC "B++" Accredited Institute

Gunthapally (V), Abdullapurmet(M), RR Dist, Near Ramoji Film City, Hyderabad -501512.

[www.aietg.ac.in](http://www.aietg.ac.in) email: [principal.avanathi@gmail.com](mailto:principal.avanathi@gmail.com)

AVIH/2020/R&D PROJECT

Dt: 13.06.2020,

TO

The Manager,

MANA Infotech (P) Limited,

Dilsukhnagar, Hyderabad.

**Sub:** Details of Project coordinator of **Intelligent Access Control System for Safety In Industries.**

Respected Sir,

We are pleased to appoint faculty for coordination of **Intelligent Access Control System for Safety In Industries**, We are happy to submit detailed proposal along with the milestones of Embedded Automation Design and Prototype.

Details of the Faculty:

Dr. G Sai kumar , Associate Professor

Department of ECE

Phone Number: 9490407827

Thank you and looking forward for your collaboration.

  
Principal Investigator

  
PRINCIPAL  
Avanathi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.

Date: 16.06.2020,

To,  
The Principal,  
Avanthi Institute of Engineering and Technology,  
Gunthapally, Hyderabad.

**Subject: Intelligent Access Control System for Safety In Industries - Regarding**

With reference to communication along with detailed submission of project milestones. We are pleased to invite for an internal discussion on execution of the project and other design and implementation regarding development of Toward Better Statistical Validation Of Machine Learning-Based Multimedia Quality Estimators. We are deputing Engineer for the above state of project.

Details of the Engineer:  
Mr.Sk Saleem  
Phone Number: 8576902121

Thank you and looking forward for your response.

Regards,





WORK ORDER

Date: 20/06/2020,

HYDERABAD,

To  
The Principal,  
Avanthi Institute of Engineering & Technology,  
Gunthapally, Abdullapurmet Mandal, Hyderabad.

**Sub:** Intelligent Access Control System for Safety In Industries Further to your offer for preparing of Portal/Control for face recognition as per the Telephone Discussion quotation, we are pleased to place the work order as below

S.NO	Description	Quantity in no	Unit Cost Rs.	Total Cost in Rs.
1	Intelligent Access Control System for Safety In Industries	1	2,51,800	2,51,800

Work Oder Valid: One Year (20<sup>th</sup> June 2020 to 19<sup>th</sup> June 2021)

Terms & Conditions:

- Preparation of detailed drawings/Lay outs based on the reference design provided by the customer.
- Taking physical design for review and approval of our customer
- Submission of designs/lay outs for review and approval of our customer
- Incorporate any comments/feed back given by customer in the design/layouts
- Preparation of designs, lay outs, algorithms, part design, bill of materials for all designs.
- Preparation of built up designs, lay outs after completion of fabrication/Installation at site.

For MANA Infotech (P) Limited,





# AVANTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

(Approved by AICTE, Recg. By Govt. of T.S & Affiliated to JNTUH, Hyderabad)

NAAC "B++" Accredited Institute

Gunthapally (V), Abdullapurmet(M), RR Dist, Near Ramoji Film City, Hyderabad -501512.

[www.aietg.ac.in](http://www.aietg.ac.in) email: [principal.avanathi@gmail.com](mailto:principal.avanathi@gmail.com)

Hyderabad,

Date: 05.01.2021,

From  
The Principal,  
Avanathi Institute of Engineering and Technology,  
Hyderabad.

To  
The Manager,  
MANA Infotech (P) Limited,  
Hyderabad.

Respected Sir,

Sub: Project Completion-reg.

The project has been completed on a given time bond. It has been a great achievement by us to complete the prestigious project on time. It has been a great privilege, working in association with you and looking forward to working with you in future projects. We request you to please come along with your team for collecting, retrieving of important and confidential data.

Looking forward to a quick response from your side

Thanking you,

Principal

Avanathi Institute of Engineering and Technology

PRINCIPAL  
Avanathi Institute of Engg. & Tech  
Gunthapally (V), Abdullapurmet (Mdl), R.R. Dist.





D.NO.5-9-89/1 & 2, CHAPEL ROAD  
P.B.NO.370, HYDERABAD, TELANGANA (INDIA) Pin - 500001  
IFSC : IBKL0000133

The instrument is valid for three months from the date of issue

21 01 2021  
D D M M Y Y Y Y

PAY Avantha Institute of Engineering and Technology रा. धारक को OR BEARER

₹ Two Lakh Fifty one thousand hundred only

₹ 2,51,800/-

आणि सं. /  
A/C No. 0142003080800

Payable at Par at All IDBI Bank Branches

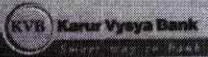
MANAC INFOTECH PVT.LTD / MR.Y.SRINIVAS AUTHORISED

*Y. Srinivas*  
Please sign above

८०५१११ ५००२५९००८ ०१३३०० २९

**PRINCIPAL**  
Avantha Institute of Engg. & Tech  
Guntur (M. Abdulrahman) Ph: 91111 R.R.Dist





Payable at all branches

Valid for 3 months from the date of issue

14122020  
D D M M Y Y Y Y

THE KARUR VYSYA BANK LIMITED दि कारुर वैश्य बैंक लिमिटेड  
HYD DILSUKH NAGAR, 9-75 B GROUND FLOOR, LALITHA NAGAR, SAIBABA TEMPLE ROAD, DILSUKH NAGAR, HYDERABAD, TELANGANA - 500060  
IFSC : KVBL0001456

Pay अदा करें Avanthe Institute of Engineering and Tech or Bearer  
Rupees रुपये Three lakh fifteen thousand Rupees only या धारक को  
₹ 3,15,000/-

A/c. No. खाता क्र. 1456135000003912

INITIAL आक्षर

FOR CONSCIENCE TECHNOLOGIES

*[Signature]* K.V.R.

PARTNER(S)/AUTHORISED SIGNATORY

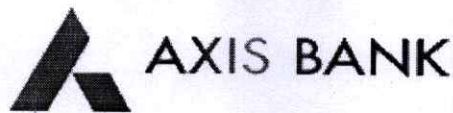
Please sign above

⑈000300⑈ 500053010⑈ 000000⑈ 29

*[Signature]*

**PRINCIPAL**  
**Avanthe Institute of Engg. & Tech**  
Guntihapally (V), Abdulapurmet (Mdl) R.R. Dist





**AVANTHI INSTITUTE OF ENGINEERING & TECHNOLOGY**

Joint Holder :-

GUNTHAPALLY VILLAGE, HAYATH NAGAR  
MANDAL RANGA REDDY DIST  
HYDERABAD  
TELANGANA-INDIA  
501512

Customer ID : 879983002  
IFSC Code : UTIB0002738  
MICR Code : 500211055  
Nominee Registered : N

Registered Mobile No : XXXXXX5659

Registered Email ID:

PAN : AAATA3530B

Scheme : SB-TRUST/SOCIETY/NGO/GOVT

**Statement of Axis Account No : 918010018620123 for the period (From : 15-12-2020 To : 17-12-2020)**

Tran Date	Chq No	Particulars	Debit	Credit	Balance	Init. Br
		<b>OPENING BALANCE</b>			<b>593225.35</b>	
15-12-2020		NEFT/0115122014574/2	13500.00		579725.35	2738
15-12-2020		IFT/0115122014574/1	6000.00		573725.35	2738
16-12-2020	40641	SAK/CASH WDL/SAK213188651/2738/VANASTHAL/SELF	200000.00		373725.35	2738
16-12-2020		TDS ON CASH WITHDRAWAL UNDER SECTION 194N	4000.00		369725.35	2738
16-12-2020		RTGS/011612203886/1	200000.00		169725.35	2738
16-12-2020		AVANTHI INST OF ENG & TECH - 05 15.12.2020		20020.00	189745.35	274
17-12-2020		AVANTHI DEGREE /Internel Transferred		400000.00	589745.35	2738
17-12-2020		NEFT/0117122013771/1	11950.00		577795.35	2738
17-12-2020		TRF/CONSCIENCE TECHNOLOGIES/REDDY		315000.00	892795.35	1456
		<b>TRANSACTION TOTAL</b>	<b>435450.00</b>	<b>735020.00</b>		
		<b>CLOSING BALANCE</b>			<b>892795.35</b>	

Unless the constituent notifies the bank immediately of any discrepancy found by him/her in this statement of Account, it will be taken that he/she has found the account correct.

The closing balance as shown/displayed includes not only the credit balance and / or overdraft limit, but also funds which are under clearing. It excludes the amount marked as lien, if any. Hence the closing balance displayed may not be the effective available balance. For any further clarifications, please contact the Branch.

We would like to reiterate that, as a policy, Axis Bank does not ask you to part with/disclose/revalidate of your iConnect passord, login id and debit card number through emails OR phone call Further, we would like to reiterate that Axis Bank shall not be liable for any losses arising from you sharing/disclosing of your login id, password and debit card number to anyone. Please co-operate by forwarding all such suspicious/spam emails, if received by you, to customer.service@axisbank.com

With effect from 1st August 2016, the replacement charges for Debit card and ATM card applicable on Current accounts have been revised. To know more about the applicable charges, please visit www.axisbank.com

Deposit Insurance and Credit Guarantee Corporation (DICGC) insurance cover is applicable in all Banks' deposits, such as savings, current, fixed, recurring etc\* up to maximum amount of Rs 5 Lakh including principal & interest both\* (\* or exceptions and details please refer www.dicgc.org.in )

In compliance with regulatory guidelines, the non-CTS cheque books attached to the accounts would be destroyed in banks core banking System. Thus, Non CTS cheques will not be valid for CASH, Clearing and Transfer transactions

REGISTERED OFFICE - AXIS BANK LTD, TRISHUL, Opp. Samartheswar Temple, Near Law Garden, Ellisbridge, Ahmedabad . 380006. This is a system generated output and requires no signature.

BRANCH ADDRESS - AXIS BANK LTD, VANASTHALIPURAM HYD TG, DOOR NO 5-5-1189, SY NO.15(P), PLOT NO 2/A & 3/B, SAHEB NAGAR, KURD, HAYATHNAGAR(M), LB NAGAR CIRCLE III, 500070, HYDERABAD, TELANGANA, INDIA, TEL:040-24113411 FAX:

**Legends :**

- ICONN - Transaction through Internet Banking
- VMT-ICON - Visa Money Transfer through Internet Banking
- AUTOSWEEP - Transfer to linked fixed deposit

**PRINCIPAL**  
**Avanthi Institute of Engg. & Tech**  
Guntihapally (V), Abdullapurmet (Mdl) R.R. Dist

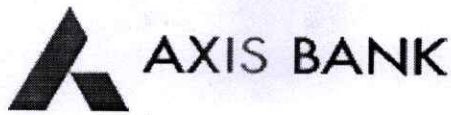


REV SWEEP - Interest on Linked fixed Deposit  
SWEEP TRF - Transfer from Linked Fixed Deposit / Account  
VMT - Visa Money Transfer through ATM  
CWDR - Cash Withdrawal through ATM  
PUR - POS purchase  
TIP/ SCG - Surcharge on usage of debit card at pumps/railway ticket purchase or hotel tips  
RATE.DIFF - Difference in rates on usage of card internationally  
CLG - Cheque Clearing Transaction  
EDC - Credit transaction through EDC Machine  
SETU - Seamless electronic fund transfer through AXIS Bank  
Int.pd - Interest paid to customer  
Int.Coll - Interest collected from the customer

++++ End of Statement +++++

  
**PRINCIPAL**  
Avanthi Institute of Engg. & Tech  
Guntihapally (V), Abdulapurmet (Md) R.R. Dist



**AVANTHI INSTITUTE OF ENGINEERING & TECHNOLOGY**

Joint Holder :-  
GUNTHAPALLY VILLAGE, HAYATH NAGAR  
MANDAL RANGA REDDY DIST  
HYDERABAD  
TELANGANA-INDIA  
501512

Customer ID :879983002  
IFSC Code :UTIB0002738  
MICR Code :500211055  
Nominee Registered : N

Registered Mobile No :XXXXXX5659  
Registered Email ID:  
Scheme :SB-TRUST/SOCIETY/NGO/GOVT

PAN :AAATA3530B

**Statement of Axis Account No :918010018620123 for the period (From : 28-01-2021 To : 30-01-2021)**

Tran Date	Chq No	Particulars	Debit	Credit	Balance	Init. Br
		<b>OPENING BALANCE</b>			<b>1325231.12</b>	
28-01-2021		NEFT/0128012115515/2	100400.00		1224831.12	2738
29-01-2021		SAK/CASH DEP/SAK220299114/2738/RAMAKRISHNA		180000.00	1404831.12	2738
29-01-2021		IFT/0128012126691/45	999531.00		405300.12	2738
29-01-2021		NEFT/0128012126738/6	77953.00		327347.12	2738
29-01-2021		NEFT/RETURN/AXISP00176382134/R03/K SWAPNA		8129.00	335476.12	248
30-01-2021	40643	DD/CC ISSUED	10000.00		325476.12	2738
30-01-2021		AVANTHI INST OF ENG & TECH - 05 29.01.2021		10520.00	335996.12	274
30-01-2021		TRF/MANAC INFOTECH PVT. LTD./SRINIVAS		251800.00	587796.12	133
30-01-2021		IFT/013001216120/1	32400.00		555396.12	2738
		<b>TRANSACTION TOTAL</b>	<b>1220284.00</b>	<b>450449.00</b>		
		<b>CLOSING BALANCE</b>			<b>555396.12</b>	

Unless the constituent notifies the bank immediately of any discrepancy found by him/her in this statement of Account, it will be taken that he/she has found the account correct.

The closing balance as shown/displayed includes not only the credit balance and / or overdraft limit, but also funds which are under clearing. It excludes the amount marked as lien, if any. Hence the closing balance displayed may not be the effective available balance. For any further clarifications, please contact the Branch.

We would like to reiterate that, as a policy, Axis Bank does not ask you to part with/disclose/revalidate of your iConnect passord,login id and debit card number through emails OR phone call Further,we would like to reiterate that Axis Bank shall not be liable for any losses arising from you sharing/disclosing of your login id, password and debit card number to anyone. Please co-operate by forwarding all such suspicious/spam emails, if received by you, to customer.service@axisbank.com

With effect from 1st August 2016, the replacement charges for Debit card and ATM card applicable on Current accounts have been revised. To know more about the applicable charges,please visit www.axisbank.com

Deposit Insurance and Credit Guarantee Corporation (DICGC) insurance cover is applicable in all Banks' deposits, such as savings, current, fixed, recurring etc\* up to maximum amount of Rs 5 Lakh including principal & interest both\* (\* or exceptions and details please refer www.dicgc.org.in )

In compliance with regulatory guidelines, the non-CTS cheque books attached to the accounts would be destroyed in banks core banking System. Thus, Non CTS cheques will not be valid for CASH, Clearing and Transfer transactions

REGISTERED OFFICE - AXIS BANK LTD,TRISHUL,Opp. Samartheswar Temple, Near Law Garden, Ellisbridge, Ahmedabad . 380006.This is a system generated output and requires no signature.

BRANCH ADDRESS - AXIS BANK LTD, VANASTHALIPURAM HYD TG, DOOR NO 5-5-1189, SY NO.15(P), PLOT NO 2/A & 3/B, SAHEB NAGAR, KURD,HAYATHNAGAR(M), LB NAGAR CIRCLE III, 500070, HYDERABAD, TELANGANA,INDIA, TEL:040-24113411 FAX:☎

**Legends :**

- ICONN - Transaction trough Internet Banking  
VMT-ICON - Visa Money Transfer through Internet Banking

**PRINCIPAL**

**Avanthi Institute of Engg. & Teci.**  
Guntihapally (V), Abdulapurmet (Mdl) R.R.Dist



REV SWEEP - Interest on Linked fixed Deposit  
SWEEP TRF - Transfer from Linked Fixed Deposit / Account  
VMT - Visa Money Transfer through ATM  
CWDR - Cash Withdrawal through ATM  
PUR - POS purchase  
TIP/ SCG - Surcharge on usage of debit card at pumps/railway ticket purchase or hotel tips  
RATE.DIFF - Difference in rates on usage of card internationally  
CLG - Cheque Clearing Transaction  
EDC - Credit transaction through EDC Machine  
SETU - Seamless electronic fund transfer through AXIS Bank  
Int.pd - Interest paid to customer  
Int.Coll - Interest collected from the customer

++++ End of Statement +++++



**PRINCIPAL**  
**Avanthi Institute of Engg. & Tech**  
Guntihapally (V), Abdullapurmet (Mdl) R.R.Dist