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Future India using IOT and Autonomous Robotics

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Abstract: ***As per the growing rate of the population and technology results in the spontaneous consumption of the resources. As the new technology is developing and come in daily life it enhances the life of the peoples. The peoples use lot of vehicles and we also know that how much road accidents are taking place. It creates a need to develop a module to manage the outflow of the resources and to prevent these accidents. This module is proposed only to make the things more autonomous so that such type of problems can be reduced to a low extent. This module incorporates arduino uno and some related sensors. So I am working on a project in which we are using new technology which is being used to make every digital system more smart i.e., Internet of Things (IOT). The advantage of this module is the only one to make our country smart, safe and to use more natural resources. The advantage of the alerting system (using GSM module) offers the users or consumers the quickest response and the accurate detection of an emergency situation, which in turn helps in the faster diffusion of the critical situation***
Keywords: ***Internet of Things, Future India, Arduino, Safe & Secure India, Autonomous system.***

I. INTRODUCTION

As per the growing rate of the population and technology results in the spontaneous consumption of the resources**,** it creates a need to develop a module to manage the outflow of the resources**.** Keeping in mind all about the things happening across our country (**INDIA**)**,** we may find lots of major problems such as regarding safety of peoples**,** road accidents**,** digitalization etc**.** Now there is need felt to develop a module that would be able to resolve all these problems and also able to sort out the problem where the resources are wasted in rural as well as urban areas**.** The resource (electricity) is basically wasted due to negligent activities of officials who are in charge of resource management**.** Most of the time the street lights remain on throughout the day**,** which results in loss of electricity **.**We also see that the roads of the country are not safe**,** everyday there are more accidents happening at highways or at any other roads of the country**.** This may be sometime due to bad driving of the drivers and the hurry of the peoples**.** We also observed that the peoples of the country are not safe on the roads even in the democratic country having goods rules and regulations**.** Due to this a lot of peoples have been injured and some got dead in the road accidents**.**

As during a survey report**,** the official data show more people died on Indian roads in 2016 than 2015**;** Uttar Pradesh (UP) and Tamil Nadu accounted for largest number of fatalities**.**

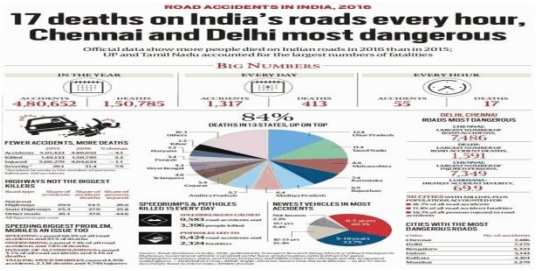

Figure (1) - Road Accidents in India

Also one other survey report shows the India sets year-on-year targets to reach ambitious 2020 Solar goal**.**

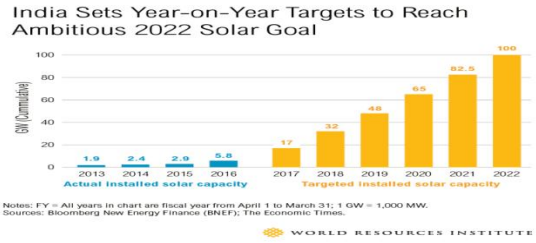

Figure (2) - India goal to reach ambitious solar energy.

So using modern technology and the statistical survey based study it was found that the major portion could be managed out which results in the decrement of the road accidents and a increment in the use of more Solar energy goal**.**

1) *Primarily* this module will be capable to reduce the road accidents which will result into the more safe roads of the India**.**
2) *Secondly* this module helps in storing the more solar energy in a smart way which results in the usage of more solar energy and it saves other limited resources**.**

II. TECHNOLOGY ADOPTED

The developed model**,** thus incorporates the solution for both of the issues**:**

1) *Advanced autonomous and smart vehicles.* It includes grouping together of various peripherals together using IoT and autonomous robotics which will help in **:**

a) No collision of the vehicles.
b) If some gas leakage or smoke found in the vehicle the owner will get a text message on his/her mobile number

2) *More use of solar energy.* Provide automatically rotation of the solar panels accordingly with the sun which results in :

a) More utilization of the solar energy which save the resources (like coal**,** petroleum etc**.**)
b) The automatic rotation of the panels will also help the India in becoming smart and developing country in the field of technology**.**

III. ADVANCED AUTONOMOUS AND SMART VEHICLES

1) *Problem Observed:* Over the course of time it was observed that much of the road accidents are occurring in the country. It was surveyed that every hour 55 accidents occurs in which 17 got dead**.** The main reason found out for such accidents are the fast speed of a vehicle or the reckless driving by the driver**.** At this current era every-one wants to finish their work as soon as it possible**.** Due to which many of them drive in a reckless manner without following the traffic rules**,** which results into an accident**.** The other main reason behind them is the trifling participation of the officials who are in account with it. Sometimes the vehicle got fired during driving**,** and peoples were not aware about it and in most of the cases it results into an untoward incident**.**
2) *Solution:* Thus as a solution for this serious problem a small model is prepared that is completely automatic and highly efficient .This would help to prevent the road accidents, which will help in less accidents and also save the life of peoples and make the roads of the country safe to travel without no fear. It also makes the country more autonomous and smart in the field of technology.

The ultrasonic sensor (HC-SR04) used in the module if some obstacle come in front of it in the particular range, the arduino (brain of the vehicle) monitor the vehicle automatically by slowing down the speed of the vehicle or if a need occur it will stop it. Then the vehicle found some way from where it can bypass the obstacle, if a path is obtained the vehicle bypass the obstacle otherwise it will stop at its position (Figure 8 and 9). It will result in few accidents of the vehicles, if all the vehicles adapt such type of technology.

Figure (3) – The smart autonomous vehicle.

The MQ2, MQ6 gas sensors are used to detect the gasses and smoke from the vehicle. They are placed at such particular locations inside the vehicle where there are lots of chances of causing smoke or leakage. As the threshold value of gas or smoke increases it will be detected by the sensors and buzzer will start buzzing. The GSM module also sends a text message to the owner of the vehicle that “Dear username there is smoke or gas leakage found in your vehicle, please take some action before an accident occur” (Figure 10).

Using such type of technology on the roads we can reduces the accident up to a huge extent or may be to zero. Which will saves lots of life of people, who lost their lives in such type of road accidents.

IV. SMART SOLAR PANEL

1) *Problem Observed:* Over the course of the time it is observed that as the new technology is growing at a fast rate. Every day lots of resources are consumed in these technologies (like coal, petroleum, diesel, etc). So a need come to find a solution to protect these resources for the sake of country and for coming future generation
2) *Solution:* By seeing this vast problem a solution is tried to find out by making a small model which track the sun rays and it automatically rotates the solar panel facing towards the sun. In this model a solar panel is attached with four LDRs. The LDRs sensed the sun-rays and the arduino gives the instruction to the servo motors attached with the solar-panel. The servo automatically sets the solar panel to the direction of the coming sun rays. This will result in more absorption of the solar energy, which can be used in various fields and up to a long period of time.

This model can be used in various areas some of them are as follows**:**

a) *Street Lights:* The batteries of panel at street lights get more charged which will light the lamps up to more hours and also save electricity.
b) *Homes:* Now a day lots of peoples are using solar panel in their homes for their domestic needs to save the electricity, but if they started using such technology they will use more energy comparatively to it which they are using now.
c) *Smart:* Suppose if this model comes into real life, when the peoples seems that the solar panels are rotating along with the sun it will provide extent impact of the country in the field of technology. It will increase the position of our country (India) globally in field of smart and technology.
d) *Other:* This technology can be used almost everywhere, where we need the energy and where the peoples visit more. Some of the places are like colleges, schools, universities, stations, heritage places, etc. As lot of peoples visit these places and there is more consumption of resources (electricity), so if such type of technology will implemented there it reduce the consumption of resources and make country smart.

V. HARDWARE & SOFTWARE REQUIRED

In this proposed model we want to achieve following aspects**:**

1) *Arduino:* In this we are using arduino uno that control all the module, other components and peripheral devices connected to it**.** Some of them work as input units and others as output units
2) *GSM Module:* GSM module is used to send the message of gas leakage or smoke release to the user's number provided in the program**.** This module is also used to setup an internet connection and use for IOT Applications**.**
3) *Alerting System:* This part includes a buzzer and a LCD display. Buzzer is used to work as an alerting or emergency alarm and the LCD is used to display the alert message and other necessary details required to show while driving**.**
4) *Sensor Module:* This module is used to sense the obstacle or vehicles, gas or smoke leakage and the sunlight. In this module we use the MQ2**,** MQ6 gas sensors to detect the gas and the smoke leakage**.** LDRs are used to detect the coming sunlight rays from the sun and Ultrasonic sensor HC-SR04 used to detect the front vehicles or obstacles in front of the vehicle**.**
5) *Software:* Only one software is required in developing this system i.e., arduino. The arduino is an open source software (IDE) which makes it easy to write code and upload it to the board. It runs on the Windows, Mac OS X, and Linux. The environment is written in Java and based on processing and other open source software. This software can be used with any Arduino board.

VI. FLOW CHARTS AND BLOCK DIAGRAMS

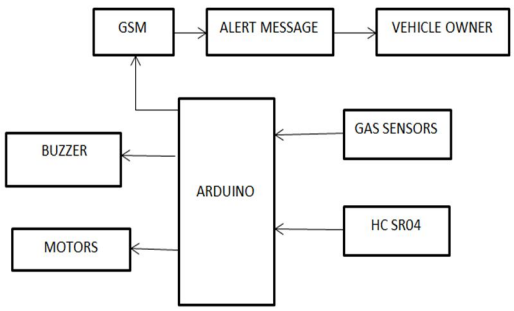

Figure 4: Advance Autonomous and Smart vehicle block diagram.

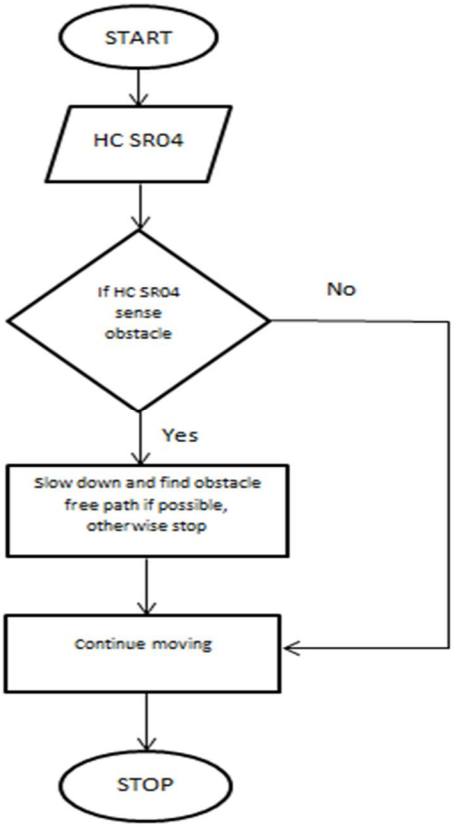

Figure 5: Autonomous Vehicle Flow Chart

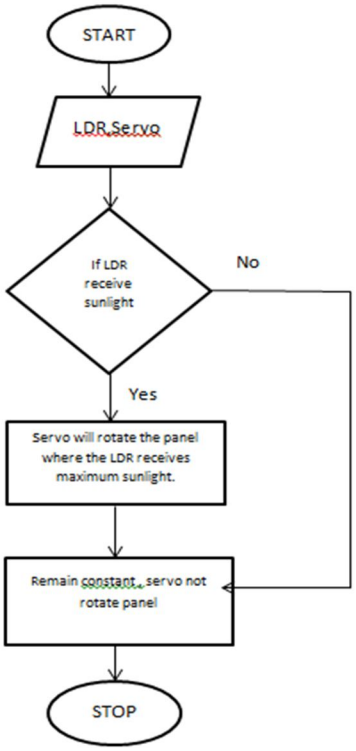

Figure 6: Smart Solar Panel Flow Chart

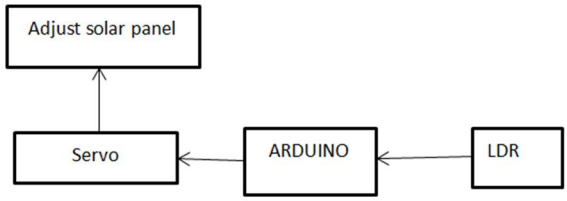

Figure 7: Block diagram of smart solar panel.

VII. IMPLEMENTATION AND WORKING

The vehicles that are moving in the front of the vehicle or appear to come in the front of the vehicle the ultrasonic sensor (HC-05) sensed the vehicle as obstacle and are monitored by the arduino, which slows down the vehicle or if the need occurs it stop the vehicle at a particular distance. If all the vehicles have the same technology, this results in that all the vehicles move at a particular distance having in between them. If one vehicle stops, the others following it also slow down. If sometime there is smoke or a leakage inside the vehicle the MQ2 and MQ6 gas sensor detects it, the arduino monitored it and the GSM module sends an alert message to the registered mobile number of the user. The LCD display attached with the module also displays the alert/warning message which can be easily seen by the peoples and they can rescue themselves before a big accident takes place. The working of the autonomous vehicle is shown below.

Figure 8: When obstacle come in front of vehicle.

Figure 9: Bypassing the obstacle.

Figure 10: Alert message from GSM module

The LDRs connected at all the four parts of the solar panel will sense the sunlight. As the sun rays strike upon them the arduino monitored the servo and the panel rotates facing itself towards the sun. This helps in making the country smart and autonomous as there are rotating solar panels which uses more solar energy and will increase the position of the country globally in use of more solar energy. And the electricity that will save after using solar energy that amount of money can be used for the welfare of the country.

VIII. SIGNIFICANCE OF THE PROJECT

A. Advantages

1) GSM wireless module is most popular and fastest growing wireless platform in the wireless communication.
2) The lives of the peoples can be saved on the roads.
3) Number of road accidents in India may be reduced up to a higher extent.
4) More use of solar energy.
5) As the solar energy come into more usage then there will be a lower use of other resources.

B. Disadvantages

1) The speed of the vehicles on the roads will be reduced.
2) Implementation of this module into real world is more complex and it will take more time.
3) The changing wind directions and the quick dispersion of the gas cloud from a leaking outdoor installation often cause gas detection to fail simply because the gas never reaches the detector.
4) Installation cost of this model is more.

C. Conclusion

1) After installation of the module practically many live of peoples can be save, as there are very few road accidents.
2) There will be more solar energy which helps to safe the fuels.
3) As now more electricity is wasted in various purposes. We can use smart solar panel at those places, it will save electricity and money too.
4) The money which will saved from the smart solar panel that money can be used for the welfare and the development of the country.

IX. FUTURE SCOPE

A. We can make this whole module better via accessing through internet.
B. This module can become cost effective.
C. More things can be added.

X. ACKNOWLEDGMENT

I extend my sincere thanks to the faculties of my college who gave us such a beautiful responsibility to show our skills and also make us able to explore our mind. Last but not the least we thank our parents and god almighty.

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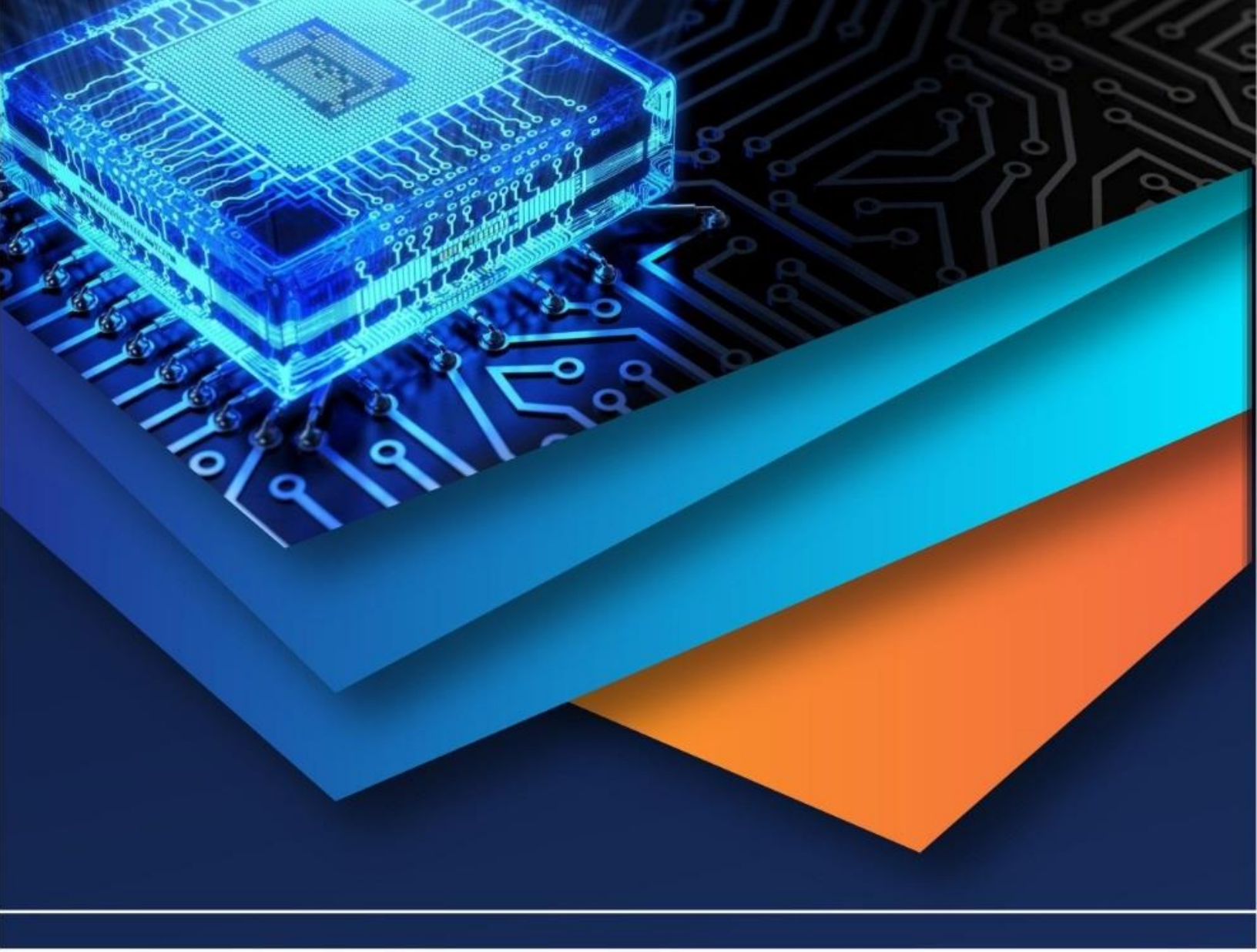

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