AN AUTOMATIC HIGH BEAM OPTION FOR ELECTRIFIED VEHICLES WITH A SMART CHARGING SYSTEM

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ABSTRACT:

The automotive industry has actively pursued research over the past 20 years to Modern electronic and computational developments have led to the creation of entertainment, security, and safety systems for singam vehicles. The night time hours have the highest crash rates. Additionally, compared to daytime, nighttime traffic mortality rates are three to four times greater. The risk comes from the fact that visibility isseverely restricted, headlight glare from other cars can temporarily blind you, and it is more probablethat people will be driving while intoxicated or fatigued. Since it can result in temporary blindness,vertigo, and most importantly, confusion, glare is very harmful. So that these high beams of light that create some issues are reduced, we can build an automatic intensity controller for headlights. While operating a vehicle. This project also includes a number of extra elements that will allow the driver tooperate the vehicle comfortably and with case uncertainty on the road. Many individuals nowadays aremaking the environmentally friendly choice, which has been made feasible by the development of electrical automobiles. In addition to generating less pollution, electric cars also require less up keep. The majority of automakers are now concentrating on creating powerful and economical electrical automobiles. The causes are battery break out in electrical vehicles, which is primarily caused byprolonged charging and temperature rise. Therefore, in order to address the aforementioned drawbacks,we developed the concept of automatic electric vehicle charging shut-off, as well as a temperature alert system to prevent electric vehicle blasting. Next, in order to prevent accidents brought on by light beams,we are implementing automatic beam detection.

Keywords-Headlight,vehicle,temporary blindness,LDR.

INTRODUCTION:

When they were first introduced 120 years ago, electric vehicles(EV) held great promise and were more widely used than gasoline-powered vehicles. Lack of access to household electricity for EV battery charging, mass production, and the development of the starter EVs had limited commercialization because to the need for motors for fuel vehicles [2]. Due to environmental concerns, interest in electric vehicles has increased. For instance, the state of California launched its Low-Emission Vehicle (LEV1) programme in 1990, requiring automakers to create EVs [3] while the Tesla Roadster was created in2008 [4]. The majority of the major automakers produce EVs with batteries that are recharged by the power grid[5]. However, this has increased the load on the grid, resulting in voltage and frequency

instability. Driving demands efficient visual, motor, and cognitive synchronisation. At night, reducedlighting and the presence of headlight glare put visual skills to their absolute maximum. Around theworld, there have been more reports of traffic incidents involving night time driving. Accident risk is 40% higher at night than it is during the day. There are limits on night time driving in many nations.
When two cars are driving towards each other, a sensor detects the high beam light of the one coming from the opposite direction. This sensor directs the intensity controller to adjust the light intensity of that particular car so that only the amount of light needed for the driver to see clearly on the road is kept, and the rest is automatically controlled. The LIGHT SENSOR sensor is utilized in this case to detect the
Head light of the opposing vehicle. It is programmed through AURDINO, and after that, the controller controls them as king unit,which partially conceals It is programmed through AURDINO, and after that, the controller controls the masking unit, which partially concealsthe car's headlight. The demand forcutting-edge technologies and intelligent electronic systems is rising. As the system's brain,micro controllers are crucial to the creation of intelligent systems. The brains of the new technologies that are being launched every day have evolved into microcontrollers. A microcontroller is primarily asingle chip microprocessor designed for machine and process automation. In many fields of life now a days, microcontrollers are employed to do automated activities more precisely. Microcontrollersare used in almost every modern gadget, including air conditioners, power tools, toys, and office equipment. An analogue to digital converter (ADC), memory, input/output ports, interrupts, timers and counters,and a central processing unit(CPU) are all components of a microcontroller that are allocated on a single chip

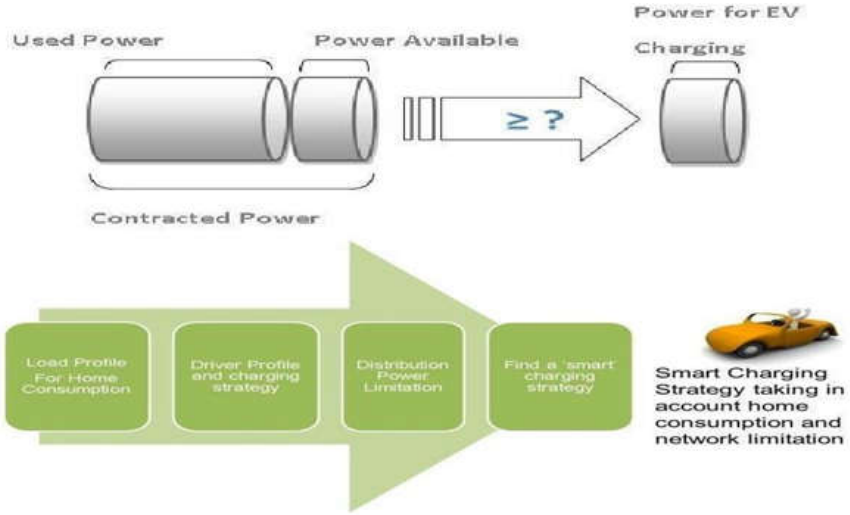


Fig.1.Main system goals.

In order to accomplish the objectives shown in Fig.1, which include identifying a smart charging strategy while taking into consideration home consumption and distribution network constraints, a smart charging system is proposed in this research. This system's foundation is a centralized information repository that has the capacity to store and handle historical information on power production and consumption. The creation of tools to extract information from historical electricity exchange log files, EM pricing, the availability of renewable energy sources, home energy usage (if an EV is attached at home), and the limitations of the electrical distribution network are all possible from

this central repository.

SMART EV CHARGING SYSTEM:

Our research plan is to apply computer science research in software development, Web 2.0, geographic information systems, mobile computation, and wireless communication to the emerging fields of smartgrids (SG), electric vehicles (EVs), and other emerging technologies. (Electric Vehicle). Users in Electrical Markets (EM) will require assistance from software applications, mostly on mobile devices, when performing an EVcharging process due to the growing complexity and diversity of possibilities.

In order to assist consumers with the process of charging or discharging an electric vehicle(EV),as well as with participating in EM, our proposals, as outlined in this article,are the conception and development of a mobile application and surrounding system.

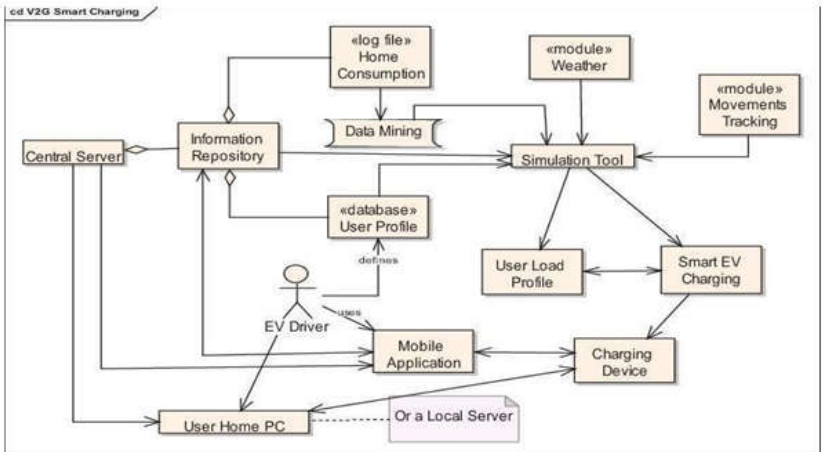


Fig.2.Main modules of the Smart EV Charging System.

As shown in Figure2, the main components of the proposed system, dubbed the Smart EV Charging System, are as follows: (1)Central Repository, which contains data on user energy consumption (amount and time), energy production with available information of power, energy supplier and source (e.g.,hydropower,windpower,photovoltaic,etc.), energy prices, and weather information (temperature,winddirectionandspeed,rainamount,solarradiation,etc.), user profile information, and other data.

(3)Movements Tracking software created for a mobile device with GPS;

(4)Net log-based simulation software;

(5)a device for charging or discharging electric vehicle batteries; and

(6)a mobile application that runs on a mobile device. To receive and send control information for charging the EV batteries, use a device (such as a PDA or IP phone). The following sections provide descriptions of these modules.

Heating and cooling demand in the residential and commercial sectors is greater than 40% of total energy consumption. As a result, depending on annual average temperatures, energy consumption in such industries might fluctuate dramatically from year to year (http://www.energy.eu/). Many studies demonstrate a connection between power use and temperature, particularly for higher temperatures. (most peak power consumption were reached on very hot days [4]). Peak electricity use occurs during

the sweltering summer months as cooling is tied to air conditioners, which are driven by electricity,and heating is related to central heating, which is powered by gas[4].

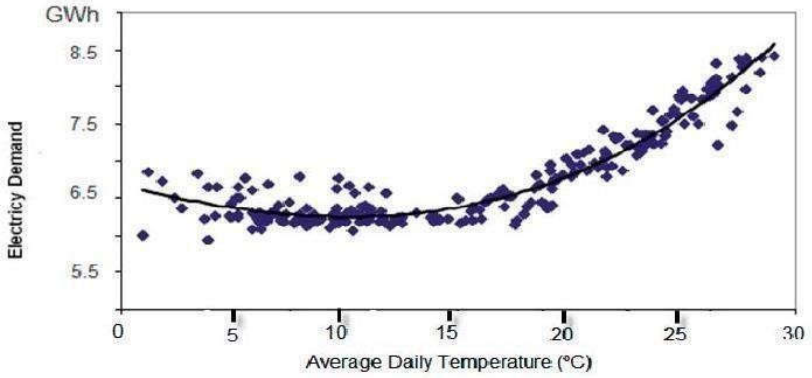


Fig.3. Electricity demand in the Cal ISO area as function of average daily temperatures: 2004[5].

CHARACTERIZATION OF GLARE:

According to the National Highway Traffic Safety Administration, glare contributed to approximately1300 fatal car and motorcycle accidents in 2012. (NHTSA). According to NHTSA figures, each year,driver drowsiness causes close to 1 lakh of the crashes that the police report. As a result, there are approximately1550 fatalities,71,000 injuries,and
$12.5 billion in financial losses.The saddestaspect is that the number off at a lities and accidents is rising yearly. In addition, people frequently break traffic laws and cause chaos on the roads and highways,which increases the number of accidents, particularly in India. It's a significant problem, and numerous studies and ideas have already been conducted and are being conducted to increase the safety of vehicles and the roads.

A person who is in its field of vision will have a strong sensation or some form of disturbance known as glare. It is brought on by bright light or a strong intensity beam and can impair a person's visibility. Due to a phenomenon known as the "Troxlereffect," which reduces retinal visual contrast, a specific type of glare temporarily renders the eyes of the driver blind. A study has shown that humans can experience glare when our eyes are exposed to a light source that is over 10,000 lumens bright [4]. The contrast of things on the road is decreased by light scattering in the eyes. Disability glare may result from it. The more discomfort and trouble it causes, the brighter the intensity of the light and closer the glare is to where the person is gazing. The areas of a car that are affected by visibility and glare from another car are shown in Fig. 4.

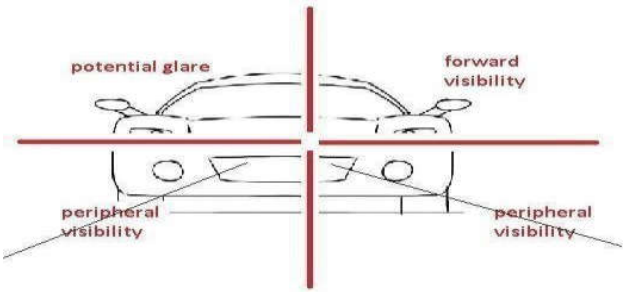


Fig.4.Regions in a vehicle contributing to visibility and glare for on coming vehicles

A. Factorscausingsuchtroublecanbe:

- Smaller size of head lamps.
- Bright color of the head lamps.
- Very high intensity of the head light.
- Mounting height of head lamps in larger vehicles like trucks and buses.
- HID head lamps produce more glare than normal halogen head lamps[5].
- Adaptability of the pupils of the eyes.

B. Areaswhereaccidentduetoheadlampglareismaximum:

The worst headlamp glare-related accidents and problems occur on two-lane, divided or undividedroadways. And regrettably, single-lane tracks make for more than 26% of Indian roadways [6]. Theissue with such roads is that the approaching car will frequently be in close proximity to the other car.There might not be any lane markers. Due to a lack of available space, the shape of the roadways canbe complicated in some places. On the otherside, problems will be less of a problem on multi-lane highways because they will be more open and the headlights of approaching traffic will not be as close as they may be. Their radius of curvature will be greater, which will result in less glare discomfort because headlamp direct light cannot reach the eyes. As shown in Fig. 5, the "visual angle" towards approaching vehicles can be up to three times greater on a multi-lane highway than on a two-lane highway. As a result, the risk of accidents will decrease since the glare will be more evenly dispersed and direct contact on the eyes will be avoided[7].

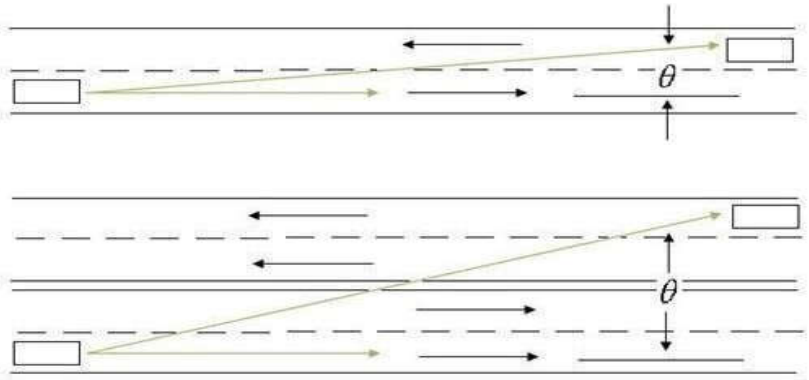
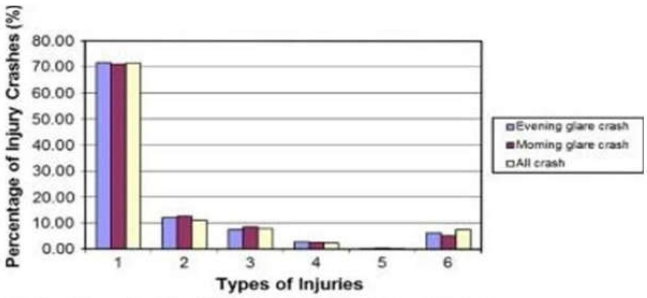


Fig.5:Visual angle affecting the intensity of the glare

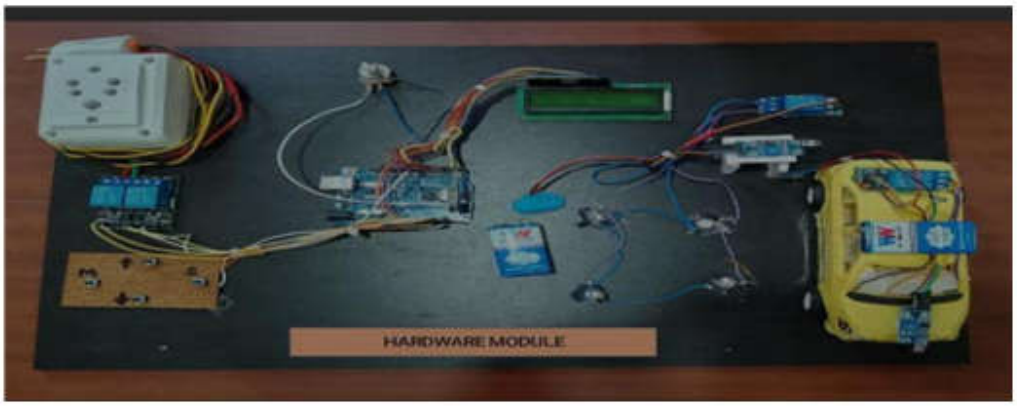
The majority of night time accidents happen as a result of excessive light hitting the car. It results in accident-causing glare and Troxlerfading. The amount of light hitting the other car should automatically dim in order to solve this issue. The light intensity can be manually adjusted, however in some circumstances it can be challenging. This paper describes the automatic lighting adjustment that isrequired to solve this issue. The amount of light falling on the car is measured using LDR. Themicroprocessor lowers the amount of light intensity in the car when the LDR detects a significant amount of intensity of light falling on it.The first factor is a lack of street lighting, specifically on rural and one- way roads with only one lane. When there is no nearby source of light, we utilise high beam head lights to give the driver a clear view.In India,74% of automobiles utilize high beams,which causes terrible accidents. Although using high beams is forbidden within city borders, because of a lack of awareness and a lack of equipment to rigourously monitor the infraction, drivers continue to end anger other people's lives.



1= No Injury, 2= Possible Injury, 3= Non-Incapacitating, 4= Incapacitating, 5= Fatal, 6= Unknown

According to the ministry of road transport, more than 30% of accidents that occur at night are caused by head light glare from oncoming traffic. In 2020, there were 226 thousand road accidents across rural India caused by high beam glare from oncoming vehicles. Vehicle traffic on our highways is increasing daily. This in turn compelled practically all car manufacturers to consider adding extra safety equipment and electronic controls to their vehicles in order to provide consumers with a level of safety that is derived fromall road conditions through heavy traffic.

HARDWARE MODULE



LITERATURE SURVEY

A study has determined the effect of glare produced from an oncoming vehicle on visibility at night.It states that as the lateral separation between the driver and the glare producing vehicle decreases, the effects get intensified. More discomfort begins to be experienced by the driver with narrowing lateral as well as longitudinal separation. This can be directly related to the effect of visual angle on visibility. As the lateral separation decreases, the visual angle gets smaller and glare causes more discomfort tothe eyes. Not only that, even if the separation increases, the after-effects continue to remain till about3000ft[8].

$$lateral\ separation \overset{prop}{\Longrightarrow} visual\ angle \overset{prop}{\Longrightarrow} 1/_{glareintensity}$$

A recent work on light detection has been done where they have used camera for visual detection of headlights that will be followed by subsequent dipping. A robust method has been proposed by the students where the camera takes a live video of a vehicle with high beam or low beam and they will successively send a signal to an electronic circuit that will automatically dip the light. The only problem is that it requires a complex setup and image processing can be time consuming and image will lose its clarity so it might not prevent accidents [9]. In another survey, a system has been developed where analog to digital converter(ADC) and switching relay circuits have been used.The ADC will read and convert the analog values to digital values and it will accordingly control the relay circuits to switch the head lamp to high or low beam. The only problem with this prototype is that it works with in a particular vehicle and controls the beam of the vehicle the driver himself is in. As such, it can't warn the other vehicle which is causing a trouble to the driver or which might be the cause of the accident even afterdipping the beam as the vehicle causing the glare has not been warned [10]. Another survey shows a smart alerting system which helps the driver parking the vehicle during day and night time not to collide with any other obstacle. IR sensors have been used for detection of objects followed by an arm controller for controlling and Zigbee module for data transfer[11].

CONCLUSION:

The work that has been done to establish a conceptual system to aid and manage the charging process for electrical vehicles(EVs) is described in this paper.This proposed Smart EV Charging System make suse of Vehicle-to-Grid (V2G) technology to link Smart Grids to renewable energy sources as well as Electric Vehicles. (SG). This developed system also investigates the new Electrical Markets (EM)paradigm, with de regulation of electricity generation and use, in order to optimize the costs of selling or purchasing electrical energy to or from the electrical network. Mobile apps will make it easier for users to interact with the proposed Smart EV Charging System's connectivity. With data mining techniques, the Central Information Repository may be utilized to programme and support smart EV charging while taking into account the electrical network distribution restriction. This smart charging process benefits from the use of a simulation tool,which can also be used to mimic behavior and operational circumstances under various as sumptions aswell as discover over loaded electrical distribution lines. All vehicles must be equipped with the automatic beam controller, which is a cheap and effective system for detecting bright lights at night and automatically sending signals to the

offending vehicle to control thebeam and make travel for passengers safer and less stressful. Aside from that, everyone of us needs to be well-versed in road safety, ensure that we abide by all safety regulations, and simplify things for both ourselves and other road users.Life will be come much simpler and easier for all people if we uphold the norms of road safety and practise discipline at all times. In addition, one of the crucial factors indetermining how much discomfort glare could cause is the geometry of the roads. The geometry of road ways and, consequently, the position of the vehicle are intimately tied to the impacts of visual angle,lateral and longitudinal separation,and their effects on light intensity.The driver's health is a major

concern, so steps must be done to develop a health tracking system and reduce hazardous glare by using high-quality head lights.

FUTURE SCOPE

The agency says that, “smart charging for EVs minimizes their load impact and unlocks the flexibility to use more solar and wind power”. By maximizing the use of renewable energy sources, the environmental positive impacts of EVs are amplified.At Versinetic,we are aware that supplying the appropriate amount of efficient charging infrastructure in order to meet demand is one of the obstacles to EV adoption. Government support is required for EV charging growth, but it can come from programs and technological advancements like load balancing and smart connectivity. Infrastructure for collecting payments can be effective, simple to use and administer, and even give rise to a brand-new service sector. Our engineers, through parent company Byte Snap Design, have developed smart charging EV technology. We built the first completely integrated system of its kind in the UK in collaboration withpartners like Aston University and other collaborators for vehicle-tobuilding (V2B) and vehicle-to-grid(V2G) systems. Electric vehicles that are parked could use V2G technology to send electricity back tothe grid. This provides energy grid resilience and canal sore ward EV owners and drivers. Renewableenergy flows, such as solar and wind power, can be variable sometimes - supplying too much energy at once and other times too little.As a result, EVs can act as battery cells, storing excess energy and releasing it when needed and when parked. Additionally, Byte Snap is working on auxiliary projects like contactless EV charging payments. Driving at night is very dangerous because of car headlights. In themajority of cases, nighttime transportation involves using a high, bright beam. The individual travelingin the opposing direction feels uncomfortable as a result, and for a brief moment, they are subjected toan abrupt glare. This is brought on by the other car's very intense lighting beam approaching from theother side. When an approaching vehicle was detected using an IR sensor from the opposite side, the system device could instantly switch the headlight to low beam.An observation was made regarding the headlight's greatest spread angle. Temperature based fan speed controller is useful for cooling theprocessor in the laptops and personal computers “more efficiently”. Generally fan in laptop comes withonly two or three possible speeds. So it results in more power consumption. We can monitor moreparameters like humidity, light and at the same time control them. We can send this data to a remotelocationusing mobile orinternet.

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