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## SMART ELECTRIC VEHICLE

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**Abstract:** In order to provide more security to the vehicle and make better communication between vehicle and owners, we transfer the normal EVs to smart EVs. The normal E- Vehicles are like a long haul. So our aim is to make smart E-Vehicle. For making the smart E-Vehicles we use some sensors. Nowadays the vehicles theft is increasing so prevent the vehicles from the theft we use GPS. The use of a GPS is finding the E-vehicle's location. The second thing is also the safety ness of the vehicle's that is to prevent the vehicle from unauthorized person for this we use finger print sensor. The use of the sensor is the authorized person only can operate the vehicle. Suppose when unauthorized person touches the vehicle means safety alarm will be ringing. And the next thing is saving the battery for better utilizing of battery level we use LDR. Its wellbeing and effective administration has been given significantly more consideration that is the reason we utilize these sensors This savvy is help to improve the capacity of dealing with ongoing keen security viably by utilizing cutting edge implies.

**Keywords:** EVs(Electric Vehicles), GPS(Global Positioning System), GSM(Global System for Mobile), LDR(Light Dependent Resistor), Biometric sensor, Arduino.

**Introduction:** In the world of emerging technologies, automobile manufacturers all over the world are currently developing new vehicles with much security and exchange of information about the vehicle through internet. Most of the automobile manufacturers are now stepping into the production of the Electric Vehicles (EV), In order to improve drive line efficiency and to provide for the use of energy other than petroleum for road transportation. E- Vehicles draw more

thought because of its clean and environmentally sincere feature. A choice to meet fundamental transportation needs. Circled time of new imperativeness headway will be raised in an indirect manner as a result of the broad size of accessible essentialness accumulating which upgrades the power quality.

**Existing System:** Already we are having some types of EVs like solar EVs and hybrid EVs. These all types of EVs mainly used for saving non-conventional energy sources and also prevent environment from pollutions. These existing EV has motor ,battery. Larger part vehicles out and about today use gas or diesel as their essential fuel source. Gas consuming vehicles use Internal Combustion Engine (ICE). This kind of intensity plant is well known all through the world and can be found in both business and private use. Frosts have ceaselessly gotten increasingly effective and have filled in as an extension among half and halves and completely electric vehicles. All electric vehicles have a motor instead of ICE. The major differentiating factor from traditional fuel vehicles is that no fuel is burned in electric motor. The Electric bicycle depends on drive framework. No inner ignition motor is utilized. All the power depends on electric power as the vitality source. The fundamental preferred position is the high effectiveness in control change through its recommendation arrangement of electric engine. There are many categories under EVs. One among them is Hybrid Electric Vehicle (HEV). It is a sort of half breed vehicle that joins a regular Internal Combustion Engine (ICE) framework with an electric impetus framework (cross breed electric drivetrain). The nearness of the electric powertrain is planned to accomplish the better execution of the vehicle. The most well-known type of HEV is the half and half electric vehicle, despite the fact that trucks (pickups

and tractors) and transports additionally exists. It works on the principle that the electromotive force of an A.C motor which receives electrical energy stored in D.C battery is converted with the help of DC to AC convertor. 8 In this project lithium ion battery is used. Lithium-particle batteries have higher vitality thickness, longer life expectancy and higher power thickness than most other down to earth batteries. Lithium particle batteries' expense is always diminishing, along these lines making electric vehicles progressively moderate and alluring available. The transportation segment is presently the biggest wellspring of carbon dioxide discharges in India the proceeded with mix of EVs will help lessen this effect since they produce 54 percent less carbon dioxide emanations per mile than an ordinary vehicle. A usage of electric vehicle is portrayed in an application note for a 200W, 24V BLDC engine. E-bicycles require high starting torque and along these lines models that utilization brushless engine regularly have corridor sensor correspondence for speed and point estimation. An electronic controller gives help as a component of the sensor input, the vehicle and the necessary power.

**Proposed System:** Additionally, we include some sensors with this existing EV. This project focus on the security of the electric vehicles by authenticating the driver and tracking the location of it. This project uses GPS and GSM for the traction and biometric sensor for the initial security of the EV. From the Fig.1 the proposed system of our project is illustrated. Vehicle traction the establishment of an electronic gadget in a vehicle or armada of vehicle to empower the proprietor or outsider to follow the vehicle's area and gathering information all the while. Vehicle traction is a system used to determine the area of a vehicle utilizing strategy like Global Positioning System (GPS) and working framework through satellites and gadget. GSM and GPS based vehicle area and following framework gives compelling, constant mapping-based vehicle area following. Vehicle tracking system also can be used as a theft prevention and retrieval device. The area and time data anyplace on earth is given by utilizing GPS innovation. By using the GPS, it is anything but difficult to compute and get the precise area of the vehicle. For remote information transmission, GSM and SMS innovation are generally utilized. The SMS innovation through GSM system and GSM modem furnish a client with vehicle area data. Usage of SMS innovation has become well known on the grounds that it doesn't require a lot of cost. It is advantageous and open method for moving and accepting information with high dependability. Biometric advancements have incredible potential in different specialized fields, for example, organize security, open security, and money related industry frameworks. Biometrics has developed into an autonomous industry, whose institutionalization is gaining fast ground with an

enormous number of norms. In this project fingerprint sensor is used for the authentication of the driver. 2 Unique mark acknowledgment innovation has numerous conspicuous favourable circumstances, for example, high catholicity, high uniqueness, high steadiness, high achievability and minimal effort. There are many unique finger impression sensor advancements for example optical, capacitive, warm, RF, ultrasonic, piezo-electric, piezo resistive, MEMS. The unique mark of Vehicle's driver is taken by this gadget before the beginning of vehicle utilizing unique mark sensor. When a person wants to drive the vehicle his/her fingerprint is compared with recently enlisted picture for checking verification. Finally we use LDR sensor for light density. These devices are used where there is a need to identify the closeness and nonattendance of light is significant. These resistors are used as light sensors and the uses of LDR for the most part consolidate alert locks, street lights, light force meters, criminal alarm circuits. By utilizing this sensors we can use the battery productively. The Arduino Uno is a microcontroller board subject to the ATmega328. It has 20 modernized info/yield pins (of which 6 can be used as PWM yields and 6 can be used as straightforward information sources), a 16 MHz resonator, a USB affiliation, a force jack, an in-circuit system programming (ICSP) header,



Fig.1-Block Diagram

**Designing of Smart EV:** GPS: The Global Positioning System in vehicle following frameworks is normally used to furnish clients with data, for example, the area facilitates, speed, time, etc, anyplace on Earth. GPS frameworks depend on remotely transmitted radio recurrence sign to figure the area of an accepting receiving wire mounted on the vehicle. In the GPS route framework, the transmitters are situated on circling satellites. Time and area data of the satellites in addition to the Doppler move of the radio recurrence signal got from the satellite is



Fig.2.GPS module

used to calculate the location of the receiver. GPS recipient gets messages from satellites and that is used to choose the satellite positions and time sent. GPS satellites circle the Earth two times per day in an exact circle. Each satellite transmits a one of a kind sign and orbital parameters that permit GPS gadgets to disentangle and process the exact area of the satellite. GPS collectors utilize this data and trilateration to ascertain a client's accurate area. Basically, the GPS recipient gauges the separation to each satellite by the measure of time it takes to get a transmitted sign. With separation estimations from a couple of more satellites, the recipient can decide a client's position and show it. Fig.2 shows the GPS module used. Fig.4.3shows the GPS interface with Arduino.

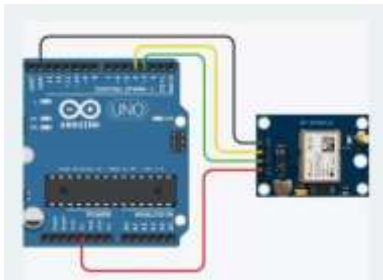


Fig.3.GPS6MV2 interface with Arduino UNO

**Finger Print:** Unique mark Sensor Module or Finger Print Scanner is a module which catches finger impression picture and afterward changes over it into the proportionate format and spares them into its memory on chose ID (area) by Arduino. Here all the procedure is told by Arduino like taking a picture of unique mark, convert it into layouts and putting away area and so forth. Fig.4 is the Fingerprint (R307) scanner. Fingerprint scanners for access control often come with supporting software. Supporting software installed on a designated computer can communicate with fingerprint scanner to import data. They just scan the fingerprint and send it to the app, and then the app can perform further processing

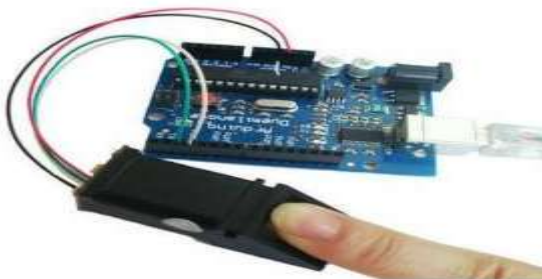


Fig.4.Fingerprint Sensor

**GSM:** It is an abbreviation that represents Global System for Mobile Communications. It is additionally once in a while alluded to as 2G, as it is a second-age cell organize. GSM bolsters active and approaching voice calls, Simple Message System (SMS or content informing), and information correspondence. GPRS or General Packet Radio Service is an extension of the GSM Network. GPRS

is a coordinated piece of the GSM Network which gives a proficient method to move information with indistinguishable assets from GSM Network. Initially, the information administrations (like web, mixed media informing and so forth.) in the GSM Network utilized a circuit – exchanged association. In this sort, the entrance time for the system are long and the charges for the information depended on the association time.

Fig.5 GSM Module

Likewise, this kind of association isn't appropriate for transmitting eruptions of information. With the combination of GPRS, a parcel – exchanging based information administration, in to the GSM Network, the location of information administrations has changes. In GPRS based parcel – exchanging systems, the client gadget doesn't hold the assets for a nonstop time however



productively utilizes a typical pool. Additionally, the charges for information depend on the use and not on the association time. A GSM/GPRS Module is a gadget or chip that is really answerable for the remote correspondence with the GSM Network. A GSM/GPRS MODEM is gadget that balances and demodulates the sign from the Wireless Network and permits web availability. A GSM MODEM by and large comprises of a GSM Module alongside some different parts like a SIM Card, a gadget to balance and demodulate the sign and power supply. A System resembles a cell phone for instance, is a finished gadget that has a GSM Module (may be coordinated in the processor), a GSM MODEM (even this may be incorporated) and different parts like processor, screen, keypad, speakers, mouthpiece and so on. There are many varieties of GSM modules available such as SIM900, SIM800, SIM900A. The GSM modem used in this project SIM900 shown in Fig.5 This is a GSM/GPR . Perfect Quad-band remote, which manages a repeat of 850/900/1800/1900MHz and which can be used not solely to find a workable pace, yet moreover for oral correspondence (gave that it is related with a collector and a little boisterous speaker) and for SMSs. Remotely, no doubt a significant group (0.94 inches x 0.94 inches x 0.12 inches) with L-17 formed contacts on four sides so they can be fixed both as an idea in retrospect and at the base. Inside, the module is directed by an AMR926EJ-S processor, which controls phone correspondence, data correspondence (through a consolidated TCP/IP stack), and (through a UART and a TTL successive interface) the correspondence with the circuit interfaced with the cell phone itself. The processor is also answerable for a SIM card (3 or 1.8 V) which ought to be added to the outside mass of the module. In addition, the GSM900 contraption arranges a straightforward interface, an A/D converter, a RTC, a SPI transport, an I<sup>2</sup>C, and a PWM module. The radio territory is GSM organize 2/2+ great and is either class 4 (2 W) at 850/900 MHz or class (1 W) at 1800/1900 MHz . The TTL successive interface is in

charge not simply of giving all of the data relative with the SMS recently got and those that come in during TCP/IP sessions in GPRS (the data rate is directed by GPRS class 10: max. 85,6 kbps), yet also of getting the circuit bearings (for our circumstance, beginning from the PIC regulating the remote control) that can be either AT standard or AT-improved SIMCom type.

**LDR:** A light reliant resistor chips away at the standard of photograph conductivity. Photograph conductivity is an optical marvel where the materials conductivity is expanded when light is consumed by the material. At the point when light falls for example at the point when the photons fall on the gadget, the electrons in the valence band of the semiconductor material are eager to the conduction band. These photons in the episode light ought to have vitality more noteworthy than the band hole of the semiconductor material to make the electrons hop from the valence band to the conduction band. Consequently when light having enough vitality strikes on the gadget, an ever increasing number of electrons are eager to the conduction band which results in

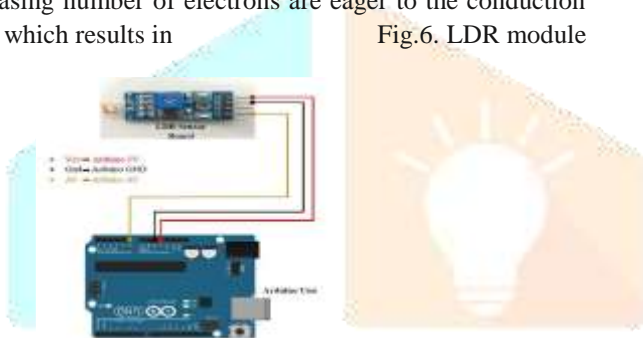


Fig.6. LDR module

interface with Arduino

large number of charge carriers. The consequence of this procedure is an ever increasing number of current beginnings coursing through the gadget when the circuit is shut and thus it is said that the opposition of the gadget has been diminished. This is the most widely recognized working guideline of LDR. LDR sensor module shown in Fig.6 is utilized to identify the power of light. It is related with both simple yield pin and computerized yield pin marked as AO and DO individually on the board. When there is light, the opposition of LDR will turn out to be low as indicated by the force of light. The more prominent the power of light, the lower the opposition of LDR. The sensor has a potentiometer handle that can be acclimated to change the affectability of LDR towards light. The connections are pretty easy, see the image below with the breadboard circuit schematic. The sensor will give an analog output or digital, according to the amount of visible light received. You could use this for a light follower robot, detect sunlight or rotate according to the sun position. Fig.6 shows the LDR interface with Arduino.

**Sensors:** For advance technology smartness use Arduino UNO is used, herewith GPS module, GSM module, biometric sensor and LDR are included. The GPS uses to track the current location of the vehicle. Likewise, the GSM module uses to send message of the vehicle's location to the authorized person.

**Result:** Extent, Phase and Spectrum for 0.3 GMSK Modulated Random Signal shows the greatness, stage and range of the GMSK adjusted information. The focal recurrence is 935.2 MHz. Fig.7 shows the reenactment chart of GSM Spectrum of the 0.3GMSK Modulated All-Zero Signal shows the range of the tweaked sign when sources of info are each of the zero. We can see that the middle recurrence is 67.7 kHz up move from the inside recurrence 935.2 MHz, which is steady with the GSM particular.

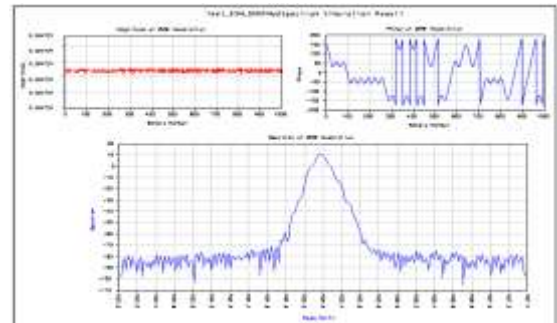


Fig.7. Simulation of GSM

Hardware platform: Pentium Pro 200 MHz, 96 MB memory  
Software platform: Windows NT 4.0 Workstation, Advanced Design System 1.1

Data points: 6000 frames

Simulation time: approximately 30 seconds

**Conclusion:** The vehicle battery lasts long even with less charging, so it does not require frequent charging. The durability and convenience to consumer can be improved by using this type of vehicle, so the project helps to conserve the energy. It also reduce the pollution. Arduino has simple and accessible user experience and the software is easy-to-use for beginners. Not only for beginners, it is also flexible for advanced users like designers and architect and also as it have advantages like inexpensive, cross-platform nature, simple and clear programming environment, this project makes the use of Arduino UNO board. The usage of GPS, GSM, LDR, biometric sensor make this project very secured and Hi-tech.

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