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Energy Efficient Vehicle with Antitheft and Accident Control System

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Abstract: Security, especially the security of vehicle has become a matter of concern. An efficient automotive security system is proposed for anti-theft using an embedded system integrated containing face recognition system with Global Positioning System (GPS) and Global System for Mobile Communication (GSM). This proposed work is an attempt to design and develop a smart anti-theft system that uses face recognition system to prevent theft and to determine the exact location of the vehicle using GPS. GSM system is also installed in the vehicle for sending the information to the owner because GPS system can only receive the vehicle location information from satellites. The owner can lock or unlock his vehicle with the help of SMS. There is also accident control system which will control speed and not allow the car to dash on the car or obstacle in front. The minimum distance is maintained between the cars by matching their speeds. By maintaining the distance vehicle collision can be avoided. Also, the gasses from the exhaust are wasted so the motion of waste gasses from the exhaust pipe is used to generate power to give battery backup for system inside the vehicle.

Keywords: Face Detection, Power Generation, Speed Control, GSM, and GPS.

I. INTRODUCTION

These day's vehicle robbery cases are increasing at a great rate than any other time. There is need to have some reliable antitheft system for a vehicle. It is a vehicle security system that offers fantastic insurance to your vehicle. The principle point of the present work is to create a strong security framework for vehicles that can prevent robbery and give data on miss chances. Antitheft system based on face recognition is very reliable and accurate system. If an unauthorized person is identified then the framework sends the SMS to the vehicle holder. After that vehicle owner sends the SMS to GSM modem attached to the controller, issue the important signs to stop the robbery. GPS is commonly used as a global navigation system to locate the vehicles and also to stop the vehicle if stolen. The location information is sent in the form of a message containing latitude and longitude information to the owner of the vehicle. There is also keypad for a password for alternate entry into the vehicle in case there is an emergency and there is no coverage range on GSM. Today there is an increase in traffic anywhere you go. So there is an increase in a number of accidents, and also due to this increase in traffic vehicles run very close to each other. This results in dashing the vehicle or obstacle in front of the car. To avoid this there is a solution provided by this project which will control the car from washing the car or obstacle in front. The car will maintain safe distance which is set and match the speed of the car in front of it. If the car reaches the set distance the speed will not increase even if you try to accelerate, this will prevent an accident. Also, there is lots of energy wasted in form of exhaust. This energy is converted to electricity which will charge the battery and provide battery backup to the whole system in the car. The charging will start as soon as the car gets started, this will give an indication on the LCD display. For more comfort of the user and to maintain the battery backup this system is developed. Whenever the car starts it consumes a certain amount of voltage and creates a voltage drop. This leads to discharge of the battery and then the battery needs to be charged. This battery is charged by the alternator but if use the internal accessories of the car like radio, music, lights, AC, screen, mobile charger etc. for a prolonged time there will be a large amount of voltage drop. The battery will require more charging. This will increase the number of charging and discharging times. As the number of charging and discharging times increases the battery life decreases, hence the cost of maintenance increases in return. So energy from the exhaust pipe is converted to electricity which will charge the battery and provide battery backup to the whole system in the car. The internal accessories can operate on second battery and this will minimize the load on the main battery.

II. AIM

To develop an antitheft system based on face recognition, accident control system based on speed control and efficiently utilizes the energy from the exhaust pipe to provide battery backup.

III. OBJECTIVES

- To provide an antitheft system based on face recognition for more reliability and accuracy.
- To prevent an accident by controlling the speed of the car.
- To generate power from the gasses which are released from exhaust pipe for battery backup.

IV. PROBLEM STATEMENT

- Today there are many cases of car theft around us and the vehicle owner is not aware of this, so there must be an antitheft system which will inform the owner. The antitheft system based on passwords, for example, is not so reliable.
- There is a huge increase in traffic nowadays which gives an invitation to road accidents, so there is need to control road accidents. The accident control systems only inform the driver about the accident by an alarm system and report it.
- Also, lots of energy is wasted from the exhaust pipe of the car in form of waste gasses. This energy is not utilized in any way so it must be utilized in an effective way.

V. BLOCK DIAGRAM

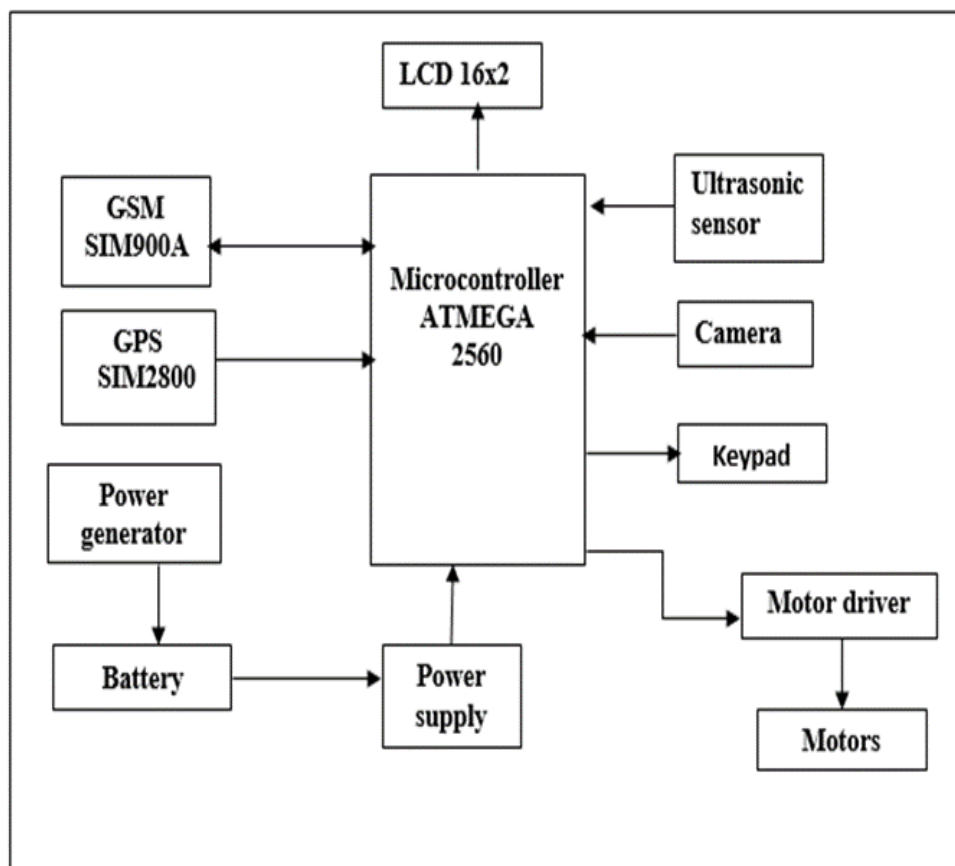


Fig. 1 Block diagram of antitheft, speed control and power generation system

VI. METHODOLOGY AND FLOWCHART

A. The case of Theft Action:

The antitheft system is based on face recognition. It uses the concept of Principle Component Analysis. The aim of PCA is to reduce the large dimensionality of the data space to the smaller intrinsic dimensionality of feature space, which is needed to describe the data economically. The main intention of using PCA for face recognition is to express the large 1-Dimensional vector of pixels constructed from the 2-Dimensional facial image into the compact principal components of the feature space. This is called Eigen space projection. Eigen space is determined by identifying the Eigen vectors of the covariance matrix derived from a set of facial images which are called vectors. PCA computes the basis of a space which is represented by its training vectors. These basis vectors, actually Eigen vectors, computed by PCA are in the direction of the largest variance of the training vectors.

We call them Eigen faces. Each Eigen face can be seen as a feature. When a particular face is projected onto the face space, its vector into the face space shows the importance of each of those features in the face. The face is expressed in the face space by its Eigen face coefficients. We can handle a large input vector, facial image, only by taking its small weight vector in the face space.

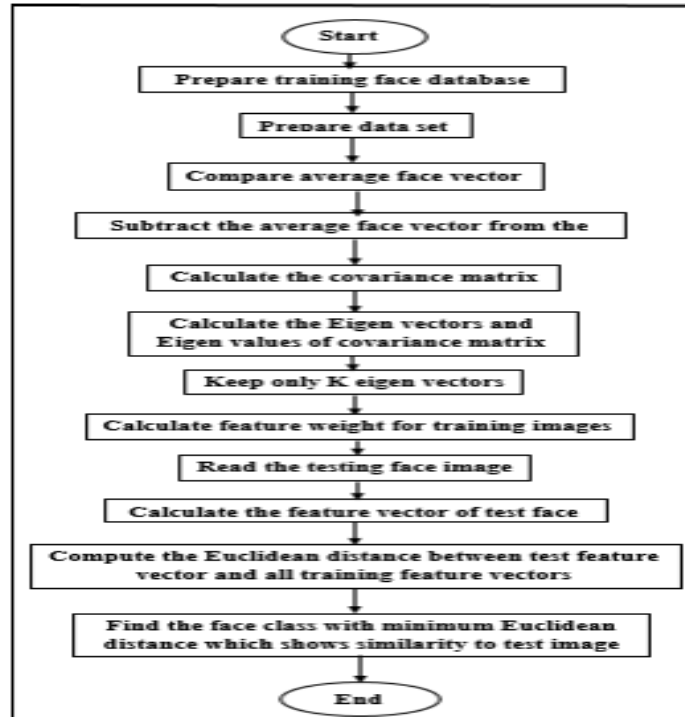


Fig. 2 Flow chart of face recognition

B. The case of Prevention of an Accident:

To prevent accidents there is speed control system which will maintain the same distance between the cars in front all the way by adjusting the speed of the car according to the car in front. This will always prevent dashing of car. This speed control is prototyped by controlling the speed of DC motor. Whenever the car reaches close to other car or obstacle it will reduce and match speed to maintain a safe distance.

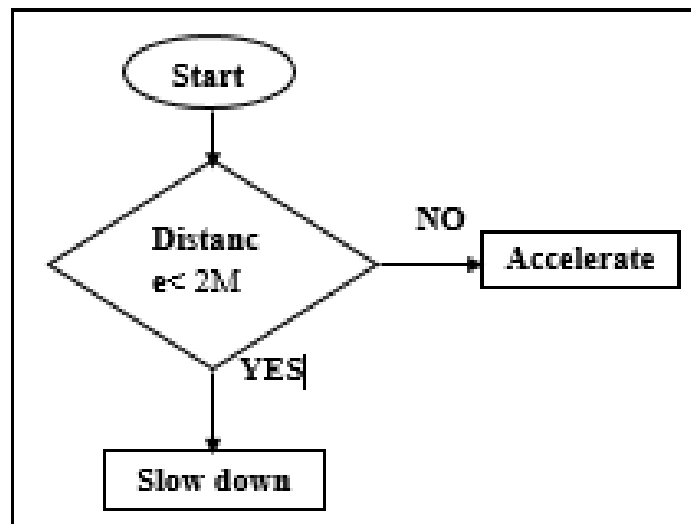


Fig. 3 Flow chart for accident control

C. The case of Power Generation:

For power generation, the motion of the gasses from the exhaust will produce a current which will charge the battery of the car. Whenever the car starts the charging will start. It consists of blades or fan, shaft, and DC motor or electricity generator. Whenever there is a flow of gasses from exhaust pipe the motion of gasses will rotate the blades of the fan. This will create more blade pressure and the blades will move faster with more amounts of gasses realizing out. Due to this, the shaft will rotate and the mechanical energy will be converted into electricity by electricity generator or DC motor and supply to the battery to charge it.

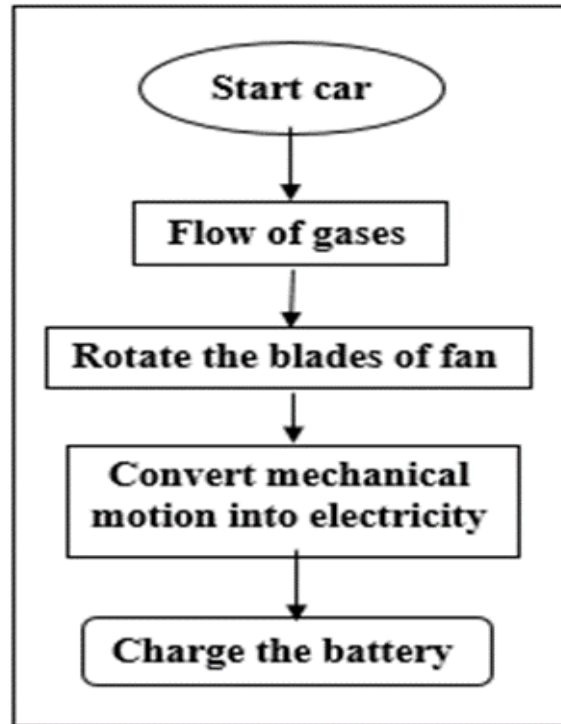


Fig. 4 Flow chart of power generation

ADVANTAGES

- Vehicle theft actions will reduce.
- The motion of the waste gasses is used to generate power and charge battery.
- Speed control helps to prevent accidents as much as possible.

APPLICATIONS

- It can be implemented in any four wheeler or heavy vehicles.

CONCLUSION

This project helps to develop a user-friendly vehicle for the current and next generation. All the aspects such as power generation, accident prevention, and antitheft systems are well developed. Antitheft system based on face recognition is accurate and reliable. The project will help to efficiently use the waste power to generate energy. Speed control system is very useful to prevent the accidents on highways where vehicles travel at great speed.

ACKNOWLEDGEMENT

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