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REVIEW OF MICROCONTROLLER MANAGED MODULE FOR AUTOMATIC VENTILATION OF VEHICLE INTERIOR AND FIRE CONTROL

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Abstract*:* Generally temperature inside the parked car can rise up to 30° C more than the outside temperature, thus during summer it can seriously affect the child or pet which had left inside the parked car. Even entering into such heated car is difficult exercise. Thus various systems were developed to provide proper ventilation for parked vehicles. These systems re-circulate the air once the interior temperature rises against the outside temperature. This paper review some of the current developed systems and tries to find is there scope for another efficient system. Review of different systems shows that there is scope for another simple, low cost system which will help to achieve proper ventilation system. The proposed system uses microcontroller and various sensors to achieve the objective. Sensors will provide the atmospheric conditions to controller then controller checks for uneasy condition inside the vehicle and if find so then will lower the windows for proper supply of air. Thus system can help to re-circulates air when needed.
Keywords: Vehicle, Ventilation, Microcontroller, fire sensor, temperature sensor;

I. INTRODUCTION

A closed park vehicle has two problems. One, interior temperature of car can shoot up to 30° C higher than the outside temperature [5]. It is really dangerous in summer if we left child or any pet during summer season. Second, entering a parked car is difficult exercise because of the increased temperature. The main reason for increased temperature is due to conduction, convection and radiation [2]. However radiation is considered to be the main factor in such type of heating [3]. This variation in temperature depends on the thermal radiation exchanged between environment and body of the car [4].

One solution is to leave car's window partially open so that air can circulate. But, keeping window open without human presence is unreliable and unsafe. So it is desirable to develop a system which will automatically lower the window if the interior temperature exceeds the reference set of temperature. Also if any person comes near vehicle then system should shut the ventilation. A microcontroller based system is proposed which takes the input from temperature sensor and different other sensors like motion, infra red etc to process the interior condition of the vehicle. If the temperature inside the car is greater than the reference temperature then controller will lower the window so as to circulate the air inside the vehicle. That will help to maintain the interior of vehicle. Basic block diagram for system is as shown if fig. 1

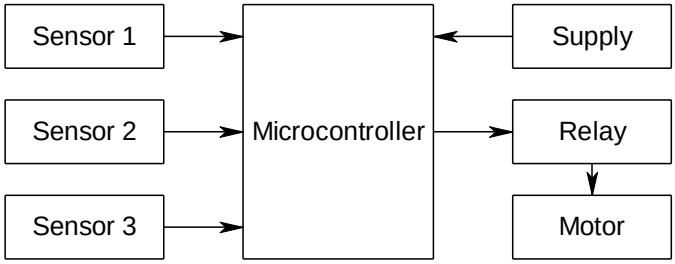

Fig 1: Basic block diagram

Organization of this paper is as follow: Section 1 has given the basic introduction about the system, need and theme of the system. Next section discusses various develop system for automatic ventilation inside the vehicle. Section III has the proposed block diagram and some information about the system.

II. DIFFERENT DEVELOPED SYSTEM FOR AUTOMATIC VENTILATION

Automatic ventilation is required for the vehicles. So different researchers have developed various systems to meet the objective. Here is brief discussion over the developed system.

A system was implemented using atmega microcontroller and series of different sensors to provide sufficient data so as to perform the process of ventilation. It is performed by opening window of vehicle slightly which enables the air to circulate. Temperature as well as some other important parameters like movement near the vehicle is also used as the input to controller. Only prototype of the system was developed which actual practice was the remaining objective of the system [1].

The above system was replicated with the help of new microcontroller ARM. ARM is favorite when it comes to industry application. Rajesh Reddy et. Al. had developed a automatic system which will sense the environmental condition and operate windows for proper ventilation. System uses ARM microcontroller for more effective and reliable operation. Again the drawback associated with the system is that it is also a prototype [6].

More feature were added to [6] system like humidity measurement and ultra sonic sensor. These sensors were used for the advancement of vehicles. As soon as higher temperature is detected using temperature sensor then system with ARM processor will turn on the air conditioner. Also temperature sensor is well supported by the humidity sensor. Ultrasonic sensors are used to avoid the theft of vehicle. These sensors will respond when an intruder comes near the vehicle. The proposed system could reduce the theft [7].

To save electricity and make use of air conditioner less, a system called Intelligent Ventilation System (IVS) was developed. An IVS is an electronic instrument that records data from the environmental conditions and take decision how the room temperature should be controlled. This research work deals with the design and construction of a ventilation system using the PIC16F877A which includes 10 bit Analog to Digital Converter (ADC) for data conditioning and a 256 byte EEPROM for data storing. Here we use a 4X20 line Liquid Cristal Display (LCD) for display section as well. This system is really nice to have an idea about ventilations in the vehicles [8].

The objective of developed system is to control four chambers simultaneously on different temperatures which were taken directly from sensors and showed on screen while providing sufficient cooling/heating. All four chambers contained smoke sensors to detect and monitor smoke effect. The cooling/heating in a chamber was circulated by a fan. Comfort application for different structure building types is relatively dissimilar and is designed according to the need of process applications and the need of the buildings and with the aim to provide a suitable environment for the people and things conceded out, despite of inner temperature and humidity loads and external climate situation [9].

With discussing various systems for automatic ventilation for vehicles and homes, it is observed that there is a central controller which would direct the motion of window based on the inputs from different sensors. Many proto types were prepared but the actual implementation was lagging. So we want to develop a new system will help people to automate their ventilation process. Next section will give the idea of the system.

III. PROPOSED SYSTEM

So after review different developed system, we wwill try to developed our system which will take care of ventilation problem. We will provide the additional feature of fire detection. System consists of different types of sensors like temperature, fire, motion detector etc. Inputs of these sensors are provided to the microcontroller, which will analysed the input and compared it with the reference set. If it is find to be over heated then controller will command the motor through relay to lower the window of vehicle. Because of this, there will be proper recirculation of air inside the vehicle. As soon as fire is detected inside the vehicle then system will again operate the motor. Datailed block diagram of system is as shown in fig 2.

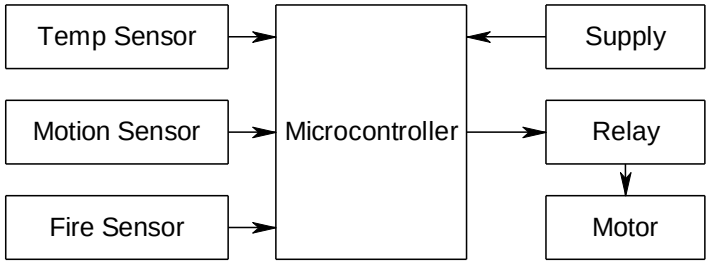

Fig 2: Block diagram for automatic ventilation system

IV. CONCLUSION

Ventilation is the major problem during summer for parked vehicles. Because there is significant rise in the temperature inside the vehicle. So to automate the ventilation process, different researchers have developed system based on the microcontroller for vehicles and for homes. But after reviewing those systems it is found that there is scope another system. Thus we have given the block diagram to solve the above problem.

REFERENCES

1. Boris Raic, Aleksander Radovan, " Microcontroller managed module for automatic ventilation of vehicle interior", IEEE transaction on Information and communication technology, pp. 1-6, 2014.
2. http://home.d47.org/drwise/files/2013/08/conduction_convection_radiation_reading.pdf
3. Ibrahim Almanjahie, "Temperature Variation in a Parked Car", 2008.
4. R. Saidur, H. H. Masjuki and M. Hasanuzzaman, "Performance of an Improved Solar Car Ventilator", International Journal of Mechanical and Materials Engineering (IJMME), Vol. 4 (2009), No. 1, 24 -34.
5. Gaurav Kumar Jaiswal, Mohit Gandhi, Sanket Phalgaonkar, Harshal Upadhyay, Ankit Agrawal , Vasudevan Rajamohan, K.Ganesan, "Design of A Smart Automotive Ventilation System For A Parked Car", International Journal on Theoretical and Applied Research in Mechanical Engineering, pp. 83-88, 2012.
6. N Rajesh Reddy, K Venkatramana Reddy, "Automatic Ventilation of Vehicle Interior Using ARM7", International Journal & Magazine of Engineering, Technology, Management and Research, pp. 230-234, 2015.
7. K. Supriya and S. Ramkumar, "High Secured Vehicle With Interior Ventilation Control And Perimeter Monitoring System", International Journal of Engineering Science & Advanced Technology, pp. 269-275, 2015.
8. Sadeque Reza Khan, Ahmed Al Mansur, S.M. Ferdous, "Implementation of a Controller Unit for an Intelligent Ventilation System (IVS) for a BTS Room", International Journal of Computer Applications, pp. 1-6, 2012.
9. Zain Anwar Ali1, M.Shafiq2, M.Aamir3, M.Faraz uddin4, Kunwer Hessan5, "Heating, Ventilation and Air Conditioning System Using RASPBERRY PI and Interfacing Touch Screen", International Research Journal of Engineering and Technology, pp. 147-153, 2015.
10. Gaurav Kumar Jaiswal, Mohit Gandhi, Sanket Phalgaonkar, Harshal Upadhyay, Ankit Agrawal , Vasudevan Rajamohan, K.Ganesan, "Design of A Smart Automotive Ventilation System For A Parked Car", International Journal on Theoretical and Applied Research in Mechanical Engineering, pp. 83-88, 2012.
11. Leo Budin, Microcomputers and microcontrollers, Element, 2004.
12. Slobodan Ribarić, Advanced microprocessor architectures, Element, 1999.
13. AntunŠarčević, Electronic components and analog circuits, Technical school of RuđerBošković, 1996.
14. Aleksandar Szabo, Impulse and digital electronics – part 1, Technical school of RuđerBošković, 2000
15. Aleksandar Szabo, Industrial electronics, Technical school of RuđerBošković, 1996.
16. Atmel Corp., AVR AT mega 32(L), datasheet, 2011.
17. Hans Bürklin, The whole electronics – Main catalog ,,92, datasheet, 1991.

