DRIVER'S HEART MONITORING SYSTEM

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Abstract:The project, focus on the safety of the driver and commuters in case of an emergency situation where the driver loses the control after succumbing to variation in his heart performance. Here, the entire project can be done in a cost effective way using a simple implementation process. Three sensors *ECG Sensors*, *Heart Beat Sensors* and *Pulse Rate Sensors* are used in the system.The sensors sense and give the input to microcontroller which process it. When the input data is given continuously to the microcontroller, it compares with the pre-defined normal heart rate, and if a mismatch occurs, the car is switched to autonomous mode which stops the car.

I. INTRODUCTION

With the campaigns like "DIGITAL INDIA", it is evident that the developing countries are dependent on technology for their advancement. But technology or the technological boom is not just creating an impact on the world as a whole but is also touching each and every individual. A statement that motivated us to develop this project is *"DRIVER DIES AFTER HEART ATTACK AT WHEELS CRASHING ON TO OTHER VEHICLES*". As these incidents are happening on a regular basis, it causes danger to passengers, pedestrians, and the driver himself.

Health and Technology are two sides of a coin, loose one face and the the coin has no value. A lot of advancement has been made in the medical field using technology, but if we take a step back and look at the scenario in a broad way, we can understand that a lot can still be made to make life safer. Through this project, we try to make a small contribution to the Safety and Health of people using technology.

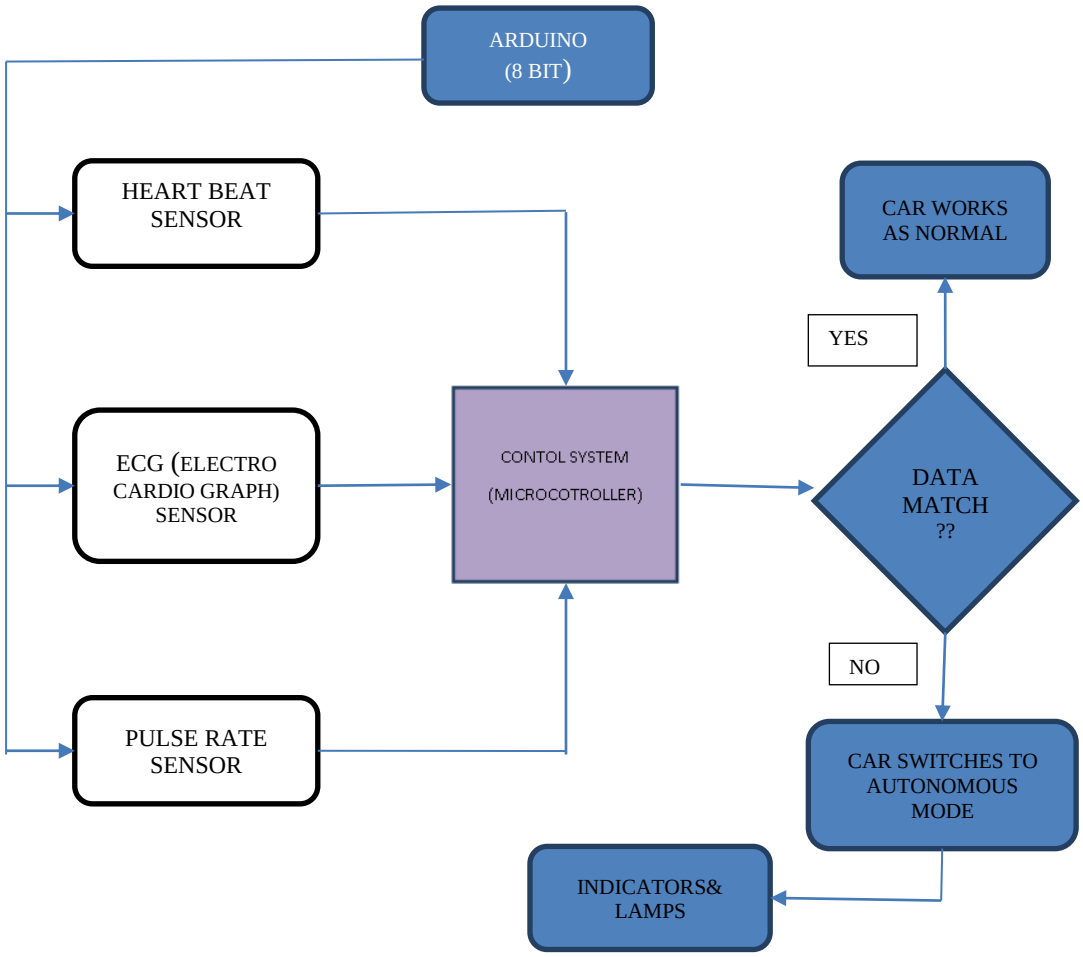

FIG. 1
BLOCK DIAGRAM

II. BLOCK DIAGRAM

The block diagram shown in fig. 1 has all the necessary components/ sensors that are required for the project and their functionality. The block diagram also shows how they are interfaced /interlinked with the microcontroller and other parameters. They have been explained below and they are as follows.

A) HEART BEAT SENSOR -This sensor is attached on to the seat belt in such a way that it can take the number of Heart beats per minute. The number of heart beats is received by the sensor constantly and are compared with the pre-determined value, which is set into the microcontroller. The heart sensor that can be used here is, *GARMIN- a premium heart rate monitor*.

B) ECG (Electro Cardio Graph) SENSOR - The ECG sensor is typically a three lead kept on the seat in such a way that it can take the voltage of the Depolarisation of Atria, Depolarisation of Ventricles and also the Repolarisation of Ventricles. The sensors are placed on to the surface of the backrest and compares with the pre-determined value, which is set into the microcontroller. The ECG sensors that can be used here is *HEAL FORCE* which are connected using cables.

C) PULSE RATE SENSORS – The pulse sensors are attached on to the steering and is used to take the pulse variations as the driver take on the wheels. It again compares with the pre-determined values which is set in to the microcontroller. The pulse rate sensor that is used here is, *XEN-11574*. It can work with the voltage rangingfrom 3v to 5v and current up to 4mA and can be controlled using Arduino board.

D) CONTROL SYSTEM (MICROCONTROLLER) - The Microcontrollers that we use here is Arduino(8bits) and Raspberry Pi(32bits). The sensors are controlled by Aurdino and all the outputs from the sensors are fed to Raspberry Pi. The control system is basically the programming part which is executed using the inputs fed from the sensors. The control system has a pre-allocated memory to save a list of pre-defined data. The database is a very important part, as all the values fed to the microcontroller are being compared with these data to make the decision on the driver's health condition. The pre-defined data includes the normal heart rate, ECG levels and pulse levels depending on the age of the person. The microcontroller that is to be used here are readily available in the electronic market.

E) AUTONOMOUS MODE (MECHANICAL PART) – This part is completely dependent on the results of microcontroller. The variation in the input data of the microcontroller with the pre-defined data (Driver is not in a situation to drive) switches the car onto autonomous mode. The normal brake pipeline can be bypassed using a valve to pass the braking fluid into the braking chamber, which in turn compress the high-tension spring, hence stopping the car.

III. WORKING METHODOLOGY

We will consider a seat belt on which aheartbeat sensor is placed, Seat backrest where an ECG sensor is placed and the steering where the pulse rate sensor is placed. The Arduino, initiates power that is required for the functioning of three sensors and from all the three sensors, the data is drawn continuously and is fed directly into the microcontroller (Raspberry Pi), and processing on these data will be done, and the processed data is matched with the data base. The data base has the predetermined or stored values of ideal heartbeat, pulse rate and ECG values of persons of different age groups. Then a decision is taken after comparing the real time values and the data base values. During the normal course driving, in case, ifthere is a mismatch in any one of the above sensors, a command is initiated from the micro-controller to provide a warning and the car goes into autonomous mode along with other output warnings (Indicators and Lamps).

IV. CONCLUSION

One who has mastered technology has mastered the generation, one who has health has mastered life. Through this project, we try to make a small contribution for the Safety and Health of people using this technology. In this project, we consider all the parameters that affect the driver's heath, which in turn keeps an eye on the safety of pedestrians and passengers.

V. REFERENCE

Information & availability of sensors are referred from the sites below:

1) Heart rate Sensors –
https://www.ec.europa.eu.com

https://www.technologyreview.co

2) Pulse rate Sensors –
https://www.sparkfun.com

https://www.kickstarter.com

3) ECG Sensors **–**
https://www.dh4gate.com

https://www.glneurotech.com