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AUTOMATIC VEHICLE ACCIDENT DETECTION AND MESSAGING SYSTEM

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Abstract - *The main purpose of this system is to develop a prototype of Telemetric Box for vehicle diagnosis that can be installed into any vehicle. It plays a key role in vehicle crash investigations. This epitome may be designed with minimum variety of circuits. This can contribute to construct safer vehicles, rising the treatment for crash victims, serving to insurance corporations with their vehicle crash investigations, and enhancing road standing so as to decrease the death rate. The prototype provides complete information about the car along with Navigation system in collaboration with Google Map. The prototype can provide Artificial Intelligence Support by having a communication channel between the user and the car or Bike.*

Keywords: *Black Box; Google Map ;Artificial Intelligence; Navigation system; Global Positioning Society.*

1. INTRODUCTION

Have you ever wondered what really goes on under the hood of your car? Do you wish you could peek inside the engine-management system and read values from it? Are you annoyed that your dashboard displays a cryptic “check engine” light but gives absolutely no explanation what the problem might be? You don’t need a $10,000 specialist diagnostic console or even a laptop computer to get access to useful data from your car. According to the planet Health Organization, more than a million people in the world die each year because of transportation-related accidents. In order to react to the current scenario, the black box system draws the first step to solve problem. This system can now play a key role in motor vehicle crash investigations. A significant variety of vehicles presently on the roads contain electronic systems that record within the event of a crash. That is why it is so important to have recorders that objectively track what goes on in vehicles before, during and after a crash as a complement to the was used.

Subjective input that's taken typically from victims, eye witnesses and police reports. This system is mainly committed to three section. The first one is a way to find and collect the data from the vehicle. The second is approach to a way to} gift the info to the user in a very simplified way.

The most important is the third one, where the information related to abruptness and rashness in the driving skills of the driver are transmitted from one vehicle to another using Radio Frequency and suitable Transceivers. To measure the inclination of vehicle as well as measuring the tilting and analysing the speed of the vehicle, basically a Vehicle Dynamics Control Unit there are sensors used in the vehicle which are connected to the microcontroller.

The applications include:

1. Better crash analysis that will turn out improved driver teaching programs, safer road styles and improve route safety.
2. Collision information for analysis, information to boost vehicle style internally and outwardly.
3. To not solely record the relevant knowledge, however conjointly try to stop a attainable collision by limiting the speed of the vehicle in inclined areas.
4. Wireless communication by transmission of alert message in the event of a collision along with the time and location co-ordinates through GSM.

2. FUNCTION AND DESIGN OF THE PROPOSED PROTOTYPE

The earlier system consisted diagnostics elements like Microphone and Camera for detection of any failure in the vehicle.

The upgraded version has sensor based activation with the programmable board along with the Diagnostics Cable put inside a single box allowing the user to configure and detect the malfunctioning in the vehicle system and navigate through roads and paths by tracking through a mass platform Google Earth.

The newer version of Telemetric Box offers a user friendly program with safe navigation by letting the driver know the details of the vehicle approaching the driver by communication through Transceivers which are sending and receiving the signals as soon as a threshold is crossed. This ensures safety to the user.

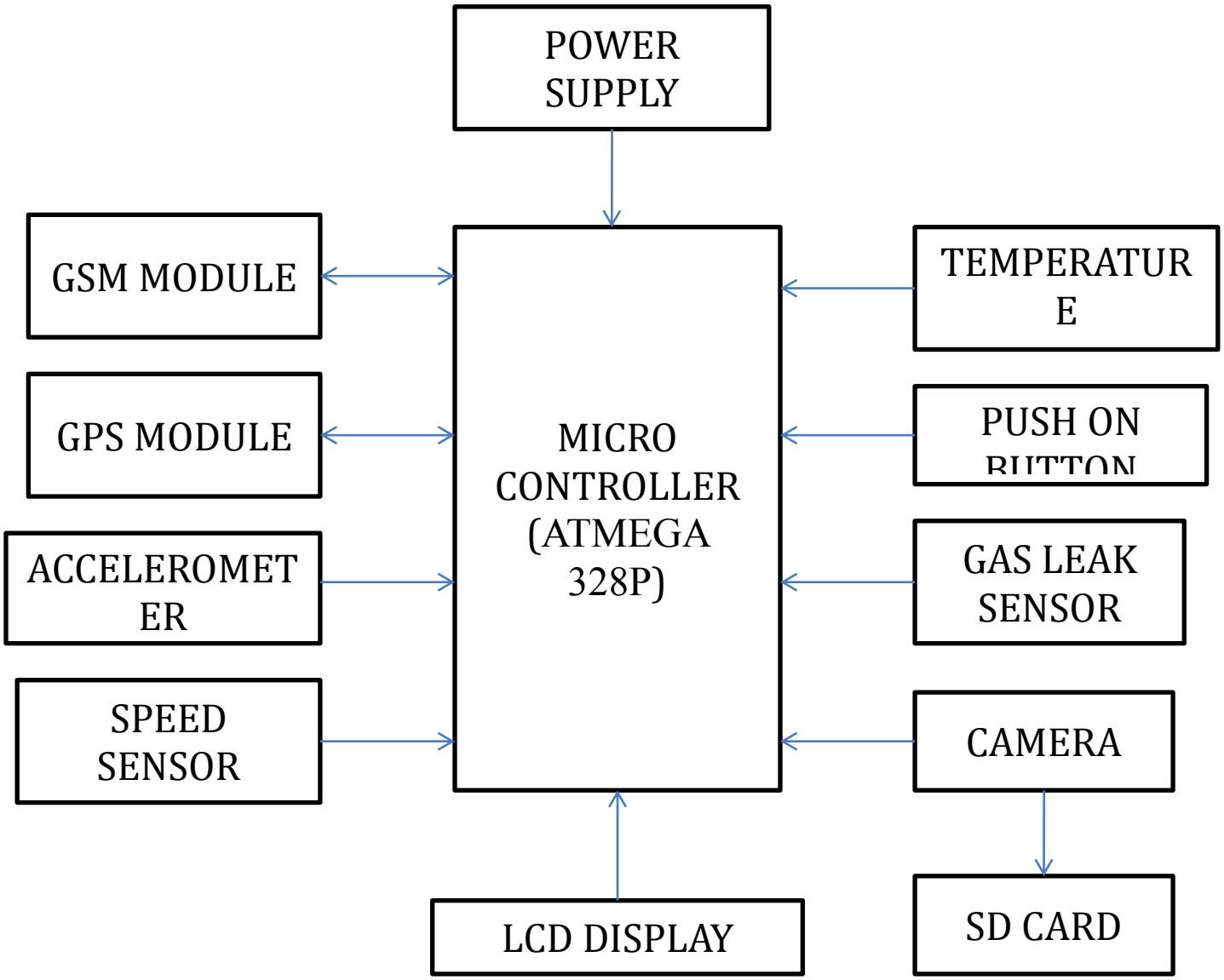

Fig 1: Block diagram of proposed system

The basic and main purpose of this system is to provide complete data analysis along with fleet management to the user by giving detailed list of the parts working within the automobile and the functions in a simplified non-technical language where the driver can identify and diagnose the wrong doings in the vehicle without him having the need to go to a mechanic where he is charged a huge amount for a simple malfunctioning.

3. ATMEGA328P

MICROCONTROLLER

The high performance very little chip 8-bit AVR reduced instruction set computing based mostly microcontroller combines 32KB ISP memory with read-while-write capabilities,1KB EEPROM,2KBSRAM twenty three general purpose I/O lines,32 general purpose in operation registers ,three flexible timer/counter with compare modes ,internal and external

interrupts, serial programmable USART, a computer memory unit minded 2-wire serial interface SPI interface ,6channel 10-bit A/D converter(8-channels in TQFP and QFN/MLF packages) ,programmable watchdog timer with internal generator ,and 5 computer code selectable power saving modes .the device operates between one.8-5.5 volts. The Atmega328 has 28 pins. It has fourteen digital I/O pins, of that vi are often used as PWM outputs and vi analog input pins. These I/O pins account for twenty of the pin. As expressed before, 20 of the pins function as I/O ports. This means they will operate as associate input to the circuit or as output. Whether they are input or output is ready within the code. 14 of the pins are digital pins, of which 6 can function to give PWM output. 6 of the pins ar for analog input/output.2 of the pins are for the crystal oscillator. This is to produce a clock pulse for the ATMEGA chip. A clock pulse is required for synchronization in order that communication will occur in synchronicity between the ATMEGA chip and a tool that it's connected.

The chip needs power so 2 of the pins, VCC and GND, provide it power so that it can operate. The Atmega328 is a low-power chip, so it only 1.8-5.5V of power to operate.

The Atmega328 chip has associate degree analog-to digital convertor (ADC) inside it. This should be instead the Atmega328 would not be capable of decoding analog signals. Because there's associate degree ADC, the chip can interpret analog input, which is why the chip has 6 pins for analog input. The ADC has three pins put aside for it to function- AVCC, AREF, and GND. AVCC is that the power provide, positive voltage, that for the ADC. The ADC desires its own power provide so as to figure. GND is the power supply ground. AREF is that the reference voltage that the ADC uses to convert associate degree analog signal to its corresponding digital price.

Analog voltages higher than the reference voltage will be assigned to a digital value of 1, while analog voltages below the reference voltage will be assigned the digital value of 0. Since the ADC for the Atmega328 is a 10-bit ADC, meaning it produces a Since the ADC for the Atmega328 is a 10-bit ADC, meaning it produces a 10-bit digital price, it converts an analog signal to its digital value, with the AREF value being a reference for which digital values are high or low.

Thus, a portrait of associate degree analog signal is shown by this digital value; therefore, it is its digital correspondent value. The last pin is the RESET pin. This allows a program to be rerun and begin over. And this sums up the pin out of associate degree Atmega328 chip.

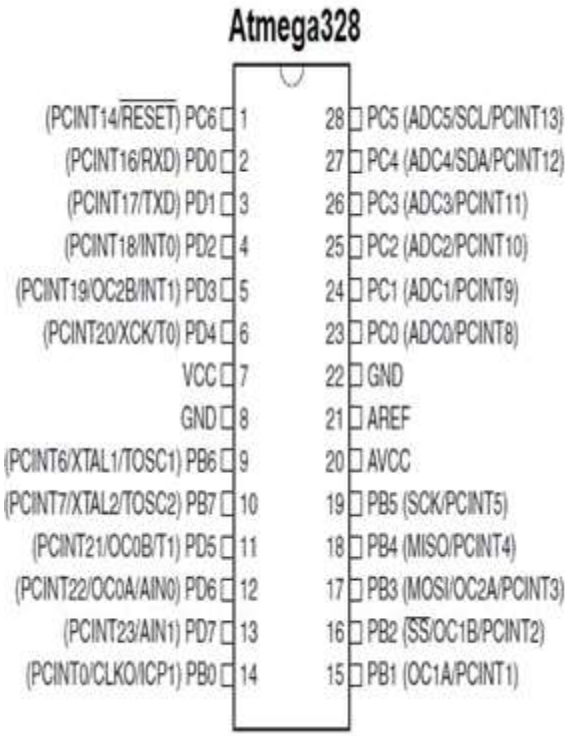

Fig 2: Pin diagram of Atmega328P

4. GSM- Global System for Mobile Communication

GSM is an open, digital cellular technology used for transmitting mobile voice and data services. The GSM system is the most widely used cellular technology in use in the world today. It has been a particularly successful cellular phone technology for a variety of reasons including the ability to roam worldwide with the certainty of being able to operate on GSM networks. It is also highly economic and less expensive.

The Modem is designed with 3V3 and 5V DC TTL interfacing circuitry, which allows User to directly interface with 5V microcontrollers (PIC, AVR, 8051, etc.) as well as 3V3 Microcontrollers (ARM, ARM Cortex XX, etc.). The baud rate can be configurable from 9600-115200 bps through AT (Attention) commands. This GSM/GPRS TTL Modem has internal TCP/IP stack to enable User to connect with internet through GPRS feature. It is suitable for SMS as well as DATA transfer application in mobile phone to mobile phone interface. The modem can be interfaced with a Microcontroller using USART (Universal Synchronous Asynchronous Receiver and Transmitter) feature.

5. GPS- Global Positioning System

The Global Positioning System GPS could be a satellite-based navigation system created from a network of twenty four satellites placed into orbit by the U.S. Department of Defense. GPS was originally meant for military applications, however within the Eighties, the govt. created the system accessible for civilian use. GPS is used to determine the ground position of an object.

The electronic equipment is meant with 3V3 and 5V DC TTL interfacing electronic equipment, that permits User to directly interface with 5V microcontrollers (PIC, AVR, 8051, etc.) likewise as 3V3 Microcontrollers (ARM, ARM Cortex XX, etc.). This is a system that provides geo location and time information to a GPS receiver anywhere on or near the Earth. Here GPS is used for both tracking and navigation. This enables a base station to keep track of the vehicles and navigation system helps the driver to reach the destination.

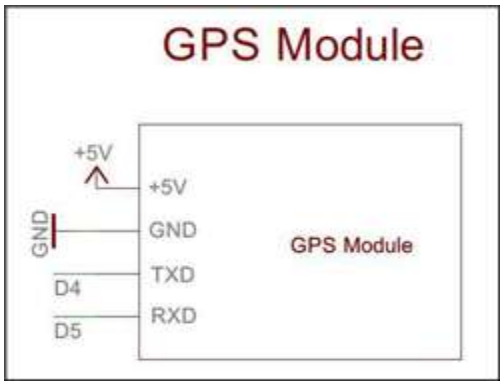

Fig 3: GSM module

Fig 4: GPS Module

6. HARDWARE DESCRIPTION

ACCELERATOR

Accelerometer in this system is used to measure the acceleration angle of the car during accident. At the time of accident, it sends a signal to the micro controller so that it sends a message through GSM. The EVAL-ADXL335Z is a simple evaluation board that allows quick evaluation of the performance of the ADXL335 three-axis accelerometer. The EVAL-ADXL335Z has a 6-pin, 0.1 inch spaced header for access to all power and signal lines that the user can attach to a prototyping board (breadboard) or wire using a standard plug. Four holes are provided for mechanical attachment of the EVAL-ADXL335Z to the application.

TEMPERATURE SENSOR

The LM35 temperature sensing element is employed to find precise centigrade temperature. The output of this sensing element changes describes the one-dimensionality. The output voltage of this IC sensor is linearly comparative to the Celsius temperature. The operational voltage vary of this LM35 ranges from-55˚ to +150˚C and it's low-self heating.

GAS LEAK SENSOR

A gas leak sensor is used to detect the presence of CO gases in an area, often as part of a safety system. This type of apparatus is employed to notice a gas leak or different emissions and may interface with an effect system. Gas notices will be accustomed detect flammable, combustible and cyanogen gases and atomic number 8 depletion.

SPEED SENSOR

This IR speed module detector with the comparator LM393, we will calculate the speed of rotation of the wheels of our automaton. If we tend to place a hoop gear that rotates hooked up to our wheel. It might even be used as Associate in Nursing optical switch. The basic operation of this detector is as follows; if something is passed between the detector slot, it creates a digital pulse on the D0 pin. This pulse goes from 0V to 5V and could be a digital TTL signal.

PUSH ON BUTTON

If it is a small or manageable accident , the user can push the button so that the signal won't be sent. If it is a severe or unmanageable accident , the signal will be automatically sent to the control unit because the user can't able to push the button.

LCD DISPLAY

The liquid crystal {display|LCD|digital display|alphanumeric display} screen is employed to display the manual and standing of the output.

CAMERA

Camera in this system is used to capture the image during the time of accident. It will be useful at the time of investigation.

7. CONCLUSION

This paper has presented a new vision for the automobile industry. The use of Telemetric Box system for vehicle diagnosis is a pitch capable to revolutionaries the way a layman visualizes his particular vehicle. Full and careful description was created for each a part of this technique. This paper also offers a user friendly embedded program to analyze the data of the accident. This system built can be implemented in any vehicle. As soon as the driver runs the motor, this system will begin saving the events and displaying the required details on the LCD screen of the corresponding vehicle. In case of an accident, an additional 10 seconds of events before and after this accident will be saved for complete analysis of the scene. The data saved is retrieved solely once the accident for privacy functions. In addition, a detailed report will be given to the user containing the recorded data in the memory through the txt. File. The highlight of the prototype is the ability to communicate with another vehicle approaching it by transmitting the values of speed and RPM of the automobile for safety purposes and alarming the user for abruptness in the driving system of the approaching vehicle.

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