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Vehicle Ignition over Ride System Using Breath Analyzers for Preventing Drunken Driving

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Abstract: The Embedded Technology is at its peak and acting as a game changer in many industries. Embedded technology plays a major in a wide spread of industries, because of key feature called integration. It brings different sources of departments in single umbrella. This increase productivity and quality of product with less human interference. This project is a first step to put an important aspect in lime light, the in-built intelligence. This intelligence include many lifesaving aspects like unexpected device failure, high accuracy diagnosis; this can be achieved by implementing online health monitoring system. Vibration technology can be used in fault detection. Alcohol sensor is already playing a vital role in fetching details about alcohol consumption of drivers. When the driver drugs the alcohol, hence it can be easily detected with the alcohol sensor. Lifesaving vibration sensors are used to detect the accidents. Thus alcohol sensor and vibration sensors are integrated and input is converted to digital form and is given to the microcontroller.

Key words: KEIL COMPLIER, EMBEDDED C, MQ-3

INTRODUCTION

Drunk driver can be prevented from starting a car at initial stage itself by using a simple alcohol sensor. This will mandate the driver to blow into a device with collects breath sample of the driver to process further to determine the output signal [1, 7]. The car alcohol sensing device will have a threshold to allow the drive to start the car. The driver can start car only when he consumes alcohol lower than the threshold level. Ignition interlock systems which meets federal standards requires test on engine start and also require a test every few minutes while driving [2, 5]. This is going to be a simple fool proof system which does not allow a drunk driver to start his car, until his alcohol consumption level goes below the threshold. Threshold should be adjustable, in case government changes the permissible lever, ultimately threshold could also be changed.

The success of the is device is critically bonded with the type of sensor we are choosing and the place where the device is mounted in vehicle. Sensors which does not meet the standard will give raise to serious problems and the purpose of this device will not be met.

Circuit Diagram:

Hardware Requirements:

- MICROCONTROLLER UNIT
- ADC
- ALCOHOL SENSOR
- GSM
- MOTOR
- RELAY
- VIBRATION SENSOR
- 4X4 KEYPAD

Software Requirements:

- KEIL COMPILER
- EMBEDDED C

Alcohol Sensor: Alcohol Gas Sensor MQ-3

Description: This device just like any other common breath analyser, will sense the level of alcohol in your breath. Sensitivity and response time is fast. Based on alcohol concentration and analogy output will be delivered. The driver circuit comprises of just on resister.

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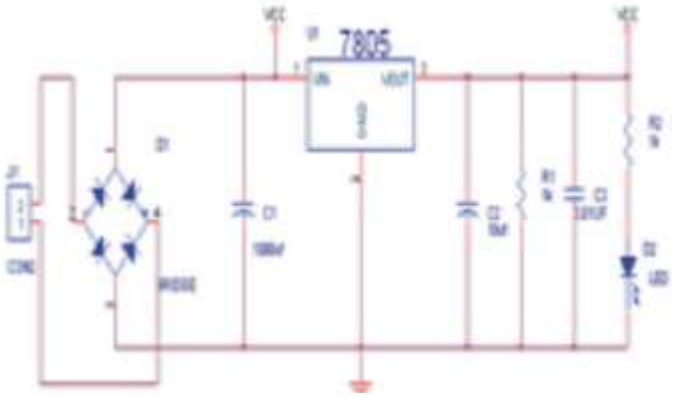

Fig. 1:

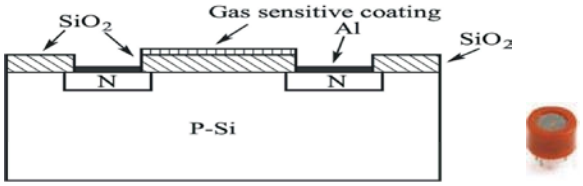

Fig. 2:

Fig. 3:

A interface could be a 0-3.3Volt ADC. MQ-3 gas sensor which consists of micro AL2O3 ceramic tube, Tin Dioxide (SnO2) sensitive layer and it has measuring electrode, heater are fixed into a crust and it has to be made with plastic and stainless steel net [3, 4]. The purpose of heater it to provide proper temperature / environment for sensors to work. The enveloped MQ-3 have 6 pin, 4 for fetching signals and 2 for providing heating current.

Vibration Sensor

Description: For measuring pressure piezoelectric sensors are used, anything like acceleration, Strain, Force will be converted to electrical current. Piezoelectric sensors are very useful in measuring pressure related sensitivity. These sensors are used by an array of industries for different applications. Some of the more famous application pressure sensor touch pad for mobiles, aerospace, nuclear instrumentation. piezoelectric elements

Fig. 4:

are used in combustion while developing internal combustion engines, this is a major usage of such sensors in automotive industries [5, 11]. These can either be directly mounted with the help of holes in cylinders head or the spark/glow plug is equipped with a built in miniature piezoelectric sensor. This makes piezoelectric sensor very much rugged and accurate in measuring.

Piezoelectric sensors can be used in harsh condition, because it's ineffective to electromagnetic radiations. Some materials used have an extreme stability even at high temperature, enabling sensors to work at very high temperature. But they can't be used in purely static measurements [6, 10]. A static force will give raise to a fixed amount of charges on the piezoelectric material. On situations like working in conventional readout electronics, insulating materials which are not perfect and internal sensor resistance reduction will generate constant loss of electrons and provide decreasing signal. Increased temperature will reduce internal resistance and sensitivity.In piezoelectric effect, due to twin-formation, increasing pressure loads and temperature will reduce sensitivity. Its mandate for quartz sensor to cool at measurements if temperature goes beyond 300°C,

special types of crystals like GaPO4 gallium phosphate do not show any twin formation up to the melting point of the material itself. However, it is not true that piezoelectric sensors can only be used for very fast processes or at ambient conditions. In fact, there are numerous applications that show quasi-static measurements, while there are other applications with temperatures higher than 500°C.

Sensing Materials: Two main groups of materials are used for piezoelectric sensors: piezoelectric ceramics and single crystal materials. The ceramic materials (such as PZT ceramic) have a piezoelectric constant / sensitivity that isroughly two orders of magnitude higher than those of single crystal materials and can be produced by inexpensive sintering processes [7]. The piezoelectric effect in piezoceramics is "trained", so unfortunately their high sensitivity degrades over time. The degradation is highly correlated with temperature. The less sensitive crystal materials (gallium phosphate, quartz and tourmaline) have a much higher-when carefully handled, almost infinie-lon g term stability.

Common Vibration Sensors: Critical to vibration monitoring and analysis is the machine mounted sensor.

Choosing An Industrial Sensor: When selecting a piezoelectric industrial vibration sensor (acceleration, velocity, or displacement), many factors should be considered so that the best sensor is chosen for the application. The user who addresses application specific questions will become more familiar with sensor requirements.

Primary Sensor Considerations: Two of the main parameters of a piezoelectric sensor are the sensitivity and thefrequency range [8]. In general, most high frequency sensors have low sensitivities and conversely, most high sensitivity sensors have low frequency ranges. It is therefore necessary to compromise between the sensitivity and the frequency response.

The Sensitivity Range: The sensitivity of industrial accelerometers typically ranges between 10 and 100mV/g; higher and lower sensitivities are also available. To choose the correct sensitivity for an application, it is necessary to understand the range of vibration amplitude levels to which the sensor will be exposed during measurements. As a rule of thumb, if the machine produces high amplitude vibrations (greater than 10 grams) at the measurement point, a low sensitivity (10 mV/g) sensor ispreferable. If the vibration is less than 10 grams, a 100 mV/g sensor should generally be used.

The Frequency Range: In order to select the frequency range of a piezoelectric sensor, it is necessary todetermine the frequency requirements of the application. The required frequency range is already known from vibration data collected from similar systems or applications. The plant engineer may have enough information on the machinery to calculate the frequencies of interest. Sometimes the best method to determine the frequency content of a machine is to place a test sensor at various locations on the machine and evaluate the data collected. The high frequency range of the sensor is constrained by its increase in sensitivity as it approaches resonance. The low frequency range is constrained by the amplifier roll-off filter, as shown in Figure 2. Many sensor amplifiers also filter the high end of the frequency range in order to attenuate the resonance amplitude. This extends the operating range and reduces electronic distortion. Most vibrations of industrial machinery contain frequencies below 1000 Hz (60,000 rpm), but signal components of interest often exist at higher frequencies. For example, if the running speed of a rotating shaft is known, the highest frequency of interest may be a harmonic of the product of the running speed and the number of bearings supporting the shaft.

The user should determine the high frequency requirement of the application and choose a sensor with an adequate frequency range while also meeting sensitivity and amplitude range requirements.

Keypad:

Description: A keypad is a set of buttons arranged in a block or "pad" which usually bear digits,symbols and usually a complete set of alphabetical letters. If it mostly contains numbers then it can also be called a numeric keypad.

Keypads are found on many alphanumeric keypads and on other devices such as calculators, push-button telephones, combination locks and digital door locks, which require mainly numeric input. A computer keypad usually has a small numeric keypad on the side, in addition to the other number keys on the top, but with a calculator-style arrangement of buttons that allow more efficient entry of numerical data. This number pad (commonly abbreviated to "numpad") is usually

positioned on the right side of the keypad because most people are right-handed. Many laptop computers have special function keys which turn part of the alphabetical keypad into a numerical keypad as there is insufficient space to allow a separate keypad to be built into the laptop's chassis. Separate external plug-in keypads can be purchased. As a general rule, the keys on calculator-style keypads are arranged such that is on the bottom row. Whereas, in a telephone keypad, either in a home or mobile phone, there will be the 123-keys at the top. A phone key-pad also has the special buttons labelled * (star) and # (octothorpe, number sign, "pound" or "hash") on either side of the zero key. Most of the keys on a telephone also bear letters which have had several auxiliary uses, such as remembering area codes or whole telephone numbers.

The keypad of a calculator contains the digits 0 through 9, from bottom upwards, together with the four arithmetic operations, the decimal point and other more advanced mathematical functions. The reason that the keypad of keypads and calculators are different is that the first security key codes had been invented before the touchtone telephone and did not require the extra + - % / keys and so the touch tone adopted this 1, 2, 3 at the top rather than 1, 2, 3 at the bottom as it too only required 12 keys. Keypads are a part of mobile phones that are replaceable and sit on a sensor board of the phone. Some multimedia mobile phones have a small joystick which has a cap to match the keypad. Keypads are also a feature of some combination locks. This type of lock is often used on doors, such as that found at the main entrance to some offices.

Software Interface: The keypad switches are arranged in a matrix of rows and columns. To show how a scan code can be generated using a software interface we shall take, as an example, the hexadecimal keypad.

CONCLUSION

State laws, such as those in Missouri, are becoming harsher regarding DUI and DWI offenses and are more likely to require in car Breathalyzer or ignition interlock system, particularly for second offenders. Breathalyser's for vehicles can also be used for personal and business purposes. Many parents, employers, or even school districts may be benefit from private breathalyser's that only enable a vehicle to run once the breathalyser receives a sample with alcohol content below that set in the machine.

There is much greater flexibility in the type of breathalyzer available for parents, private companies, or government agencies that are thinking of using in car breathalyzers. And, with a greater variety of models available comes a greater difference in prices. Auto breathalyzers range from a few hundred dollars to over $1000. There will also be instillation fees and the cost of providing replacement mouth pieces. You'll also want to consider what alcohol limit, if programmable, that will disallow the ignition system. In most states it is illegal to drive with a blood alcohol content of over.08. However, many in car breathalyzers are set at a much lower level. It is important to also remember that a test on a private breathalyzer will not get you out of a DUI or DWI based on its reading. Other features to consider are access to any recordings the breathalyzer may produce, the ease of maintenance and whether any alarms are set off when the breathalyzer test is failed.

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