

## 4 Stroke Engine Quality Detector

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**Abstract**— Today, transportation technology which includes two wheelers and 4 wheelers growth fast, but many peoples do not know how to work for their vehicles. Fault Detection is not an easy for inexperienced mechanic or driver because it is needed a lot of knowledge for finding the fault. They extremely depend on expert mechanic. Looking into this, the system is proposed to detect the fault in an incipient stage to avoid the inconvenience. The manual approaches are limited for checking of some measurable output variables because they do not give a deeper insight and usually do not allow a fault diagnosis. Model-based method of fault detection is developed by using input and output signals. Faults can be excessive vibration made by the engine, it can be excessive emissions of the gas such as CO<sub>2</sub>, NO and the engine getting over heated due to increase in combustion temperature. So, our project aims in creating a module or a device which will detect, determine and display all the measurable faults which will help the mechanics, car owners to rightly diagnose the faults and repair the engine to make it more efficient. In proposed project, quality will be determined by sensing engine parameters such as vibration, emission & temperature and comparing it with set of standard values.

**Key words:** ASWAP, Wormhole Attack Prevention

### I. INTRODUCTION

We are checking the quality of engine by having the noise of engine manually any other automated system for assuming engine performance is not available. To buy old vehicles, one must check for the quality of engine. In this project the main aim is to determine quality of engine by sensing engine parameter such as temperature, emission and vibration and comparing it with set of standard values if the obtained value are within or up to the standard value then the system under working condition without any problem otherwise its having some fault. The parameters like vibration, CO and temperature are sensed with the help of respective sensors. These sensed signals sent to Microcontroller. Microprocessor displays the parameters on LCD and also sends it to PC via UART. The UART is connected to PC with the help of ds-pl2303. All parameters are sent to PC and stored in a memory location. The parameters are displayed on the PC with the help of MATLAB software. On the MATLAB software the parameters are compared with a normal & problem free engine. The graph of all parameter are displayed on MATLAB software and compared it. After comparison, a message will be displayed on the screen to accept or reject the 4 stroke engine.

### II. PROPOSED SYSTEM

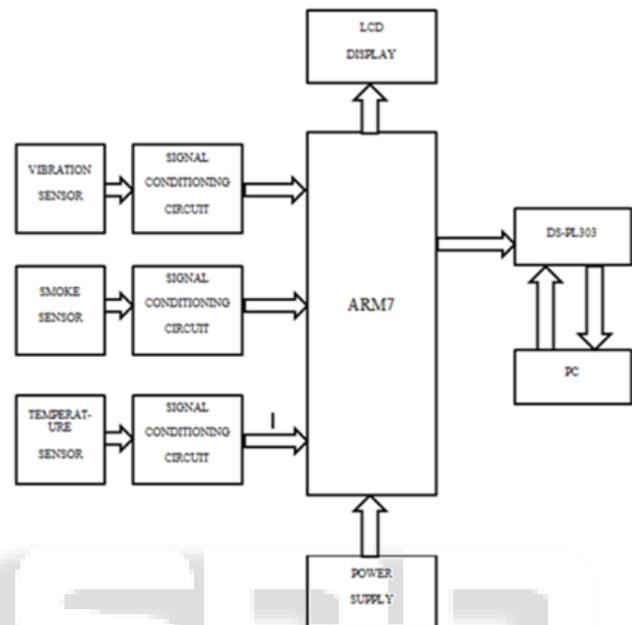


Fig. 1: Block Diagram of 4 Stroke Engine Quality Detectors

#### A. Vibration Sensors:

With the proper sensor to supply the critical operating information. The machine operates in a safer condition for both the machine as well as the personnel operating the machine.

#### B. Smoke Sensor:

In this project we are selecting MQ7 series gas sensor. It has more or high sensitivity for carbon monoxide that's we are going to use MQ7 series smoke sensor other one more benefit is it has long life or more stable.

$$RS(RL=((VC-VRL)/VRL))$$

The above equation shows that, RS is the surface resistance of the sensor. The RS is obtained through effect of output voltage signal of output load resistance. It is gas detecting component such as CO<sub>2</sub>, NO. It can be used in industrial application, we are using this sensor in cars for 4 stroke engine to detect gas at surrounded area of engine. The output of smoke sensor is analog signal and can be read by processors analog input.

#### C. Temperature Sensor:

LM35 is an integrated circuit sensor it used to check temperature with an electrical output proportional to temperature. The LM35 gets more perfect output as compared to other temperature sensors like thermistor. One more advantage LM35 has high output voltage than thermocouple and they do not necessary to amplify output voltage. Its scale factor is 0.1V/°C. The operating

temperature range is from  $-55^{\circ}\text{C}$  to  $150^{\circ}\text{C}$ . In this project LM35 sensor is used to sense the temperature of the engine Output.

#### D. Signal Processing:

The processor will collect the signals from the sensors. These signals will be containing some amount of noise in them. The signal preprocessing consists of calibration, a moving average filter, a high-pass filter, and normalization. First, the vibrations are calibrated to remove drift errors and offsets from the raw signals. The second step of the signal preprocessing is to use a average filter to reduce the high-frequency noise of the calibrated vibrations. The third step include smoothening of sensed signal and then passing it to ARM7 processor.

### III. HARDWARE

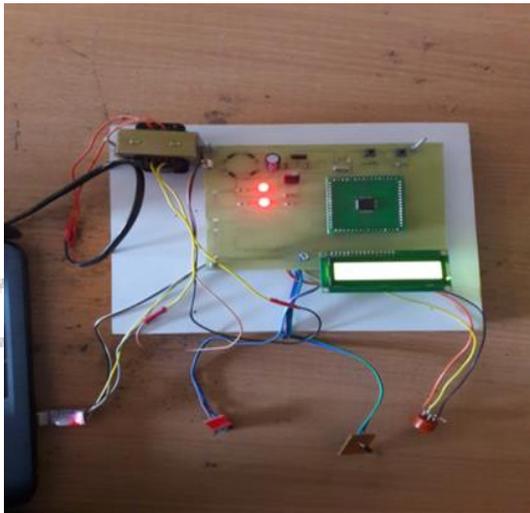


Fig. 2: Complete hardware of 4 stroke engine quality detector.

### IV. APPLICATION

- 1) These projects are used for engine test and find out the faults at an incipient stage.
- 2) This system increase productivity and reliability of an automobile.
- 3) It improves knowledge of driver in diagnosing fault.
- 4) Multipurpose sensor system can be used to check various faults at a single place.
- 5) This project are used for industrial purpose.

### V. HARDWARE RESULT



Fig. 3: Real time parameters of all sensors are displayed on LCD

### VI. SOFTWARE RESULT

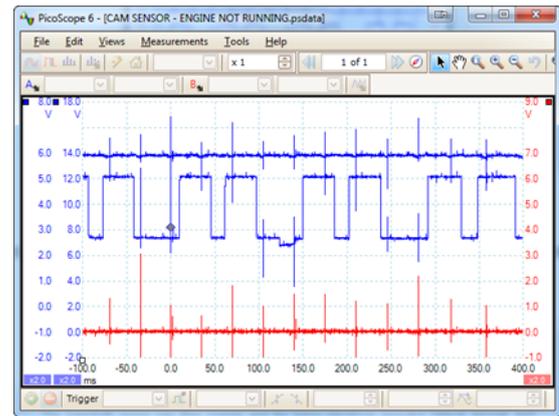


Fig. 4: the mapping of all sensors.

### VII. CONCLUSION

We observe all real time parameters such as temperature, vibrations and emission of the engine. All this parameters are first we displayed on LCD then compare with the actual or desired parameters and plot the graph of all compared values on MATLAB window using MATLAB software.

Thus we successfully have done the 4 stroke engine quality detector device.

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