Automatic Service Indicator in two wheelers for improper combustion of engine

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Abstract – This paper aims at providing a new mechanism for indicating two wheeler user about improper combustion of the engine and loss of the energy produced in engine. Our proposed model consist of a series of gas sensors used to determine content of exhaust gas, a micro-controller (Nodemcu Esp8266) to monitor all functions, a LCD display to indicate service date, loss of energy compared to the money, number of days left for service and additionally the data collected from controller and transferred through built-in Wi-Fi module of controller which in case alerts the user in their mobile phone. There is no other system prevailing for service indication for two wheelers.

I. INTRODUCTION

Nowadays, two wheelers usage grows more and more day by day. But two wheelers are never maintained after the initial periodical services. Due to improper maintenance, two wheelers starts to emit toxic and incompletely combusted gas consist of Carbon monoxide(CO), hydrocarbons, nitrogen oxides (NOx) and particulate matter. This is the starting stage of failure of two wheeler engine and if left unnoticed, it ends up in exchange of the whole system or irreplaceable. On the other side, this is one of the cause for major air pollution problem which is left unnoticed. Even though modern vehicle system insist on pollution free vehicles, every vehicle finally ends up in this stage. So we came up with this solution of service indication system for both existing and newly produced vehicles. This will change the above seen problems in the vehicles.

II. SOLUTION PROPOSED

Due to the incomplete combustion of the fuel, the engines starts to release toxic gas which is the main objective of our proposed solution. As we all know complete and incomplete combustion releases different gases, such as carbon monoxide (CO) from incomplete combustion, hydrocarbons from unburnt fuel, nitrogen oxides (NOx) from excessive combustion temperatures, and particulate matter. Using a series of gas sensors, the presence and level of the contaminants of the exhaust gas can be monitored. With preset limitations of the amount of the contaminants, we can notice whenever the amount exceeds. The amount and all other functions are controlled using a suitable microcontroller. Here we are using NodeMcu Esp8266 for further application of transmitting data. It receives the amount of the contaminants from the sensors and the other calculation for service date, number of days left for service and loss of money with respect to the loss of energy is done and displayed to the LCD display. Additionally the data is transferred to webserver whenever the system is gets connected to a known network and it notifies the user through his/her mobile. This is one other for remainder of data of two wheeler to the user.

III. SYSTEM AND ARCHIETECTURE
1) Flowchart

- ➤ The whole system runs with 5v DC source available from two wheeler battery. So the system turn on whenever bike is turned on.
- ➤ After that, a small flow of exhaust gas is routed towards the sensors through some pipe or hose.
- ➤ Here the gas is absorbed by the sensors and the amount of the contaminants is determined. This process is runs continuously until the engine goes off.
- ➤ Then the controller makes further calculation of the data received from sensor. If the amount exceeds preset value of vehicle, the controller responds according to that and the respective values for the service date, number of days left and loss of money with respect to the energy loss is calculated.
- ➤ The Wi-Fi module can be programmed with the known network and whenever it's around

the network, the data is updated in the web server. This portal also monitors individually the values and it indicates to the users phone directly.
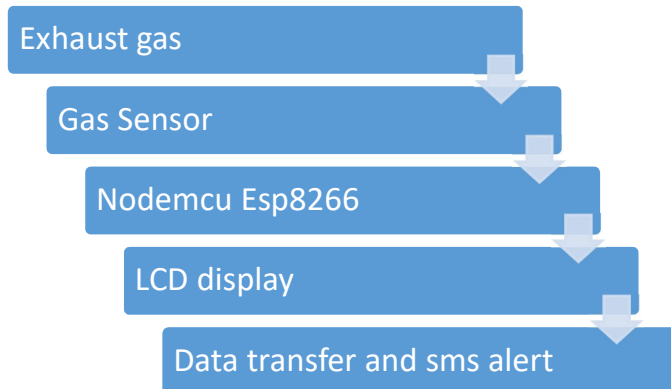
2) Components and Circuit
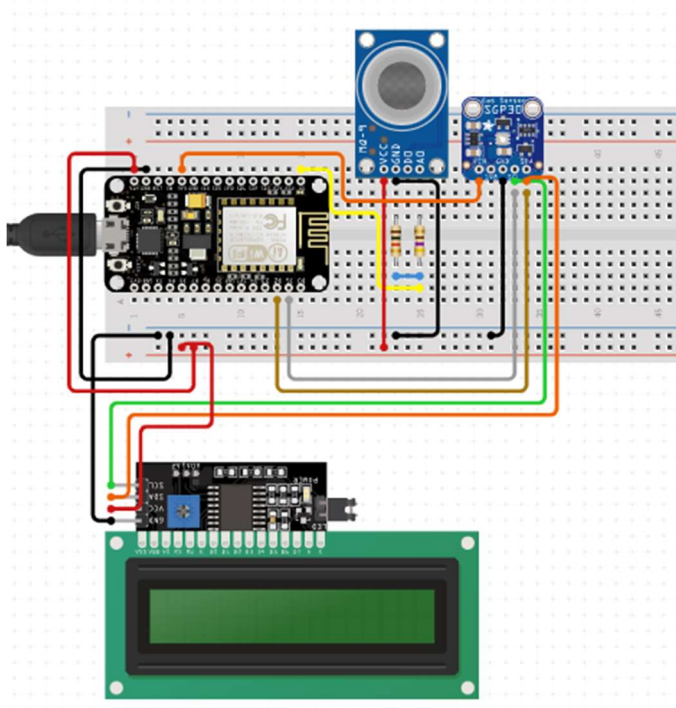
➢ **Gas Sensor**
Carbon monoxide sensor - This Carbon Monoxide (CO) gas sensor detects the concentrations of CO in the air and output's its reading as an analog voltage. The sensor can measure concentrations of 10 to 10,000 ppm. The sensor can operate at temperatures from -10to 50°C .

Nitrogen Oxide sensor - The nitrogen dioxide sensor module works on the electrochemical principle. It works based on the diffusion of NO2 gas into the sensor which results in the production of an electrical signal proportional to the NO2 concentration. It allows accurate and reliable measurement despite low concentrations of Nitrogen dioxide.

➢ Control Unit

Here we are using NodeMcu Esp8266. It is an open-source firmware uses the Lua scripting language. Now it can be programmed with Arduino ide easily. The required instruction for the sensor monitoring, displaying of the data in LCD display and transferring of data through Wi-Fi module is fed through ide platform.

➢ LCD display
It is used to display the data of service date, number of days left and loss of money information received from the controller.