Wireless Digitized Speedometer for Two Wheelers

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***Abstract*— Ensuring proper speed measurement is one of the key factor for calculating speed in two wheelers. In the existing works , wired digital speedometer using speed sensor is utilized. However, a few demerits over the sensor results in improper speed measurement due to loose connection in wiring and a huge variation in speed is encountered. The main objective of this system is to develop highly efficient digital wireless speedometer.In this prototype , a wireless speedometer is designed and the values are compared with analog readings and a better solution is obtained. Instead of using speed sensing device , reed switch is used. This proposed system comprises of separate transmitter and receiver part which in turn is interfaced with Arduino Uno processor. The speed in km/hr is displayed via LCD display.**

Keywords—:Arduino Uno, RF transmitter and RF receiver, 16x2 LCD

I. EXISTING SYSTEM

During the period of 1990's, digital speedometers had a great scope in the market. Most of the two wheelers and four wheelers prefer the usage of digital speedometer during those days. At the end of 2000, usage of digital speedometer has drastically reduced because of two demerits. [1] usage of wired connections leads to improper functioning , [2]inappropriate functioning of speed sensors. Speedometer is quit important when people tries to drive the vehicle at a higher speed. For example, If the person tries to drive a vehicle at a rate of 100km/hr but due to some problem if it shows 90km/hr then that person tries to increase the speed further and this leads to the occurrence of mishap.

II. PROPOSED SYSTEM

To overcome these defects, a system with better accuracy and high efficiency. This wireless digital speedometer uses just a magnet and reed switch to produce a pulse which is converted into speed with help of Arduino Uno and it is displayed in LCD. The proposed system comprises of transmitter part and receiver part. The overall layout of this system is shown in fig1.

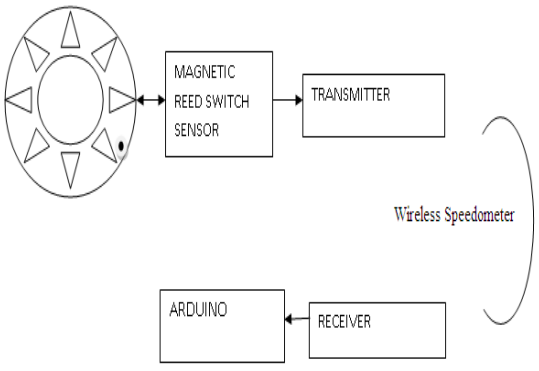
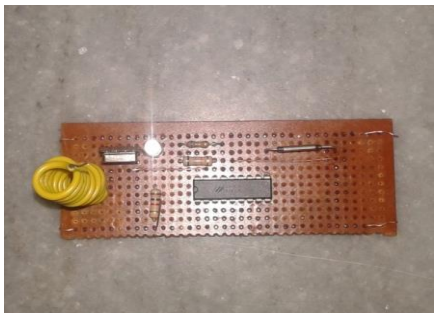


Fig1: Realistic schematic figure of speedometer.

A. RF Transmitter:

An RF transmitter comprise of transmitter and encoder IC. It is operated at a frequency of 433MHz on the basis of Amplitude frequency modulation technique. A reed switch is used for speed measurements. Reed switch is mounted on the fork tube whereas magnet is mounted on one of the wheel fork. This sensor generates square pulses as a output when magnet crosses switch. Either falling or raising edge is taken for calculation of speed. The output pulses from this sensor is moved to the Arduino processor via receive which provides wireless connectivity.

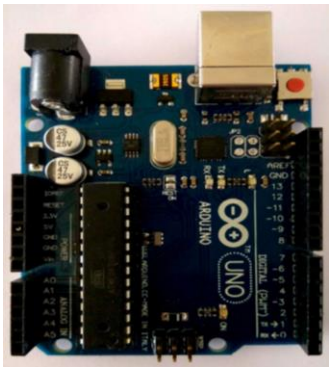


B. RF Receiver:

An RF receiver comprises of receiver and decodes IC. It is operated at a frequency of 433 MHz on the basis of Amplitude frequency modulation technique. Receiver part uses decoder for the conversion of received information into digital coded output.

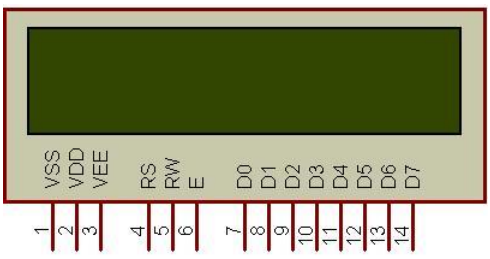
C. Arduino Uno

Arduino is an open-source prototyping platform based on easy-to-use hardware and software. On the whole it has 6 analog input pins and 16 digital pins which includes both GND and AREF pins. It is basically an Analog to Digital converter (ADC) which is done using an IC ATmega328p-PU. Input power given to this board varies from 3.3v to 5v i.e., it works under even in 3.3v and also 5v. LED is denoted by L and glows when Arduino gets the proper supply. The LED L is basically configured to the digital pin 13. To know the data flow in and out of the Arduino, there are 2 LEDs, TX and RX are being used.



D. LCD

The most commonly used Character based LCDs are based on Hitachi's HD44780 controller or other which are compatible with HD44580. Most LCDs with 1 controller has 14 Pins and LCDs with 2 controller has 16 Pins (two pins are extra in both for back-light LED connections).In this design, 16x2 LCD is used for displaying speed.



III. EXPERIMENTAL SETUP:

The following stage of operation are mentioned below,

i. Fix reed switch in the bike fork tube and magnet in the wheel fork.

ii. When the magnet on the wheel moves over the switch, the signal is sent from RF transmitter.

iii. RF receiver, receives the transmitted signal and gives output as pulses to the Arduino Uno processor.

iv. With the help of pulse input , the speed can be calculated by calculating the frequency of input pulse. This frequency is multiplied by the distance travel by wheel in one rotation. The calculations based on the formula as showed below:

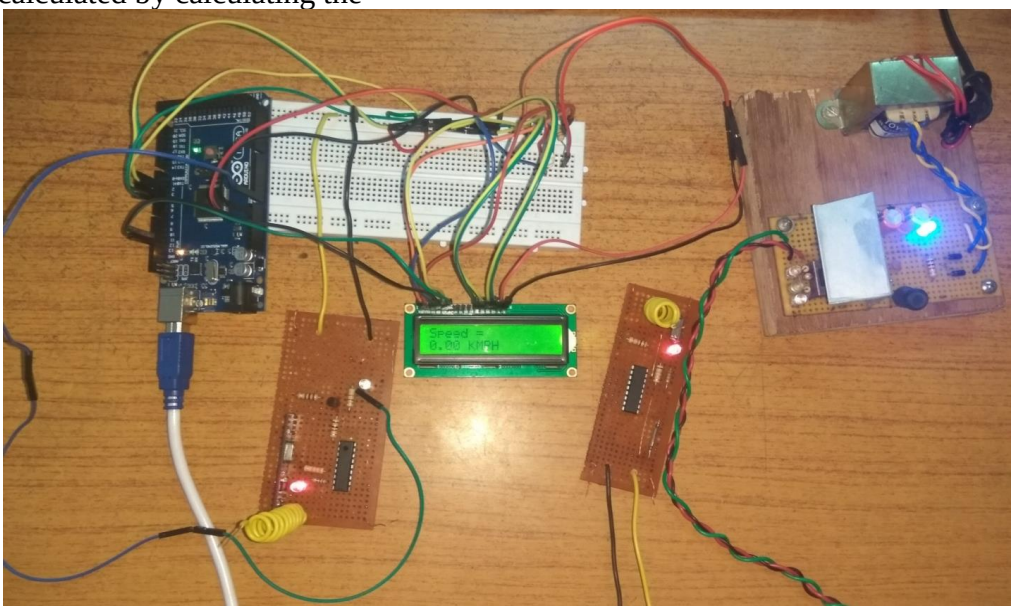
Circumference of the wheel= $2\pi r$ (where 'r' is in cm)

$= 2 \times 3.14 \times 30$

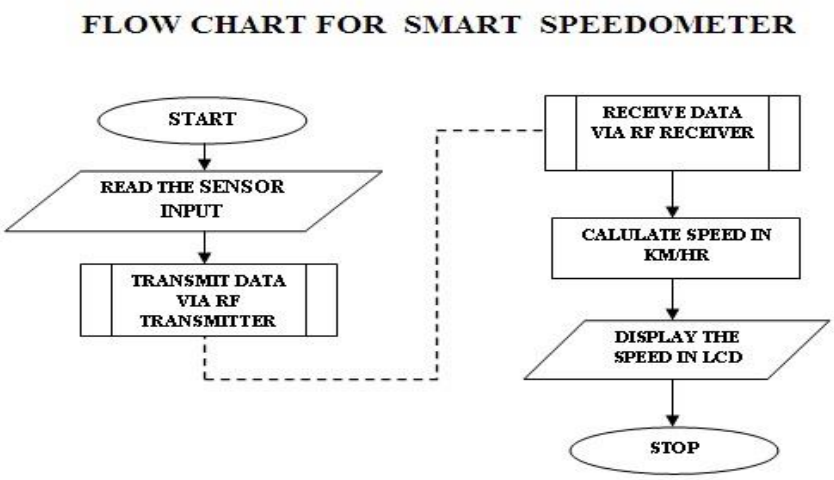
$= 188.4$ cm or 1.884 meters

The resultant output in km/hr is displayed via 16x2 LCD display.

The entire setup is showed below in fig 2.



The flowchart is displayed below:



IV. CONCLUSION:

By this digital speedometer, the over speed of vehicle can be controlled and also fuel consumption has been reduced by the continuous observation. This prototype would be one of the cost effective and high beneficiary product and can be bought by any individual at low cost.

V. REFERENCES:

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