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Environmental Parameter Measuring and Video Streaming Vehicle

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ABSTRACT: Our project is to introduce a vehicle to reach out to disaster hit areas, where human entry is restricted. It is also intended to help miners and to understand the environmental conditions of any remote area. This vehicle can be controlled from a remote place and the environmental parameters can be shown or updated on the webpage, detection of poisonous gas is also included to make sure human beings are safe under that environmental conditions. The live video streaming gives visual information and is useful for rescue operations in disaster hit areas.

KEYWORDS: I^2C, Rasbian

I. INTRODUCTION

The vehicle mainly aims to measure various environmental parameters such as pressure, temperature, humidity and carbon monoxide using respective sensors. The used sensors can be either analog or digital. The measured values are processed by a microcontroller .The sensors interact with the microcontroller and, the calibrations and monitoring are controlled by the microcontroller. The measured values are uploaded on a webpage. The webpage is created using HTML codes. The movement of the vehicles can be controlled using the webpage. The advanced application of this project is achieved by integrating video streaming attached to the vehicle. Thus it helps to obtain information of the surroundings where human entry is not possible.

The vehicle with various sensors can be used in agricultural field to measure environmental parameters to ensure the growth of selected cultivations .By adding the video streaming the vehicle find its applications also in mines, factories to aid and ensure safety of workers. The application of this project can be done by adding more sensors for measuring other parameters.

II. BLOCK DIAGRAM

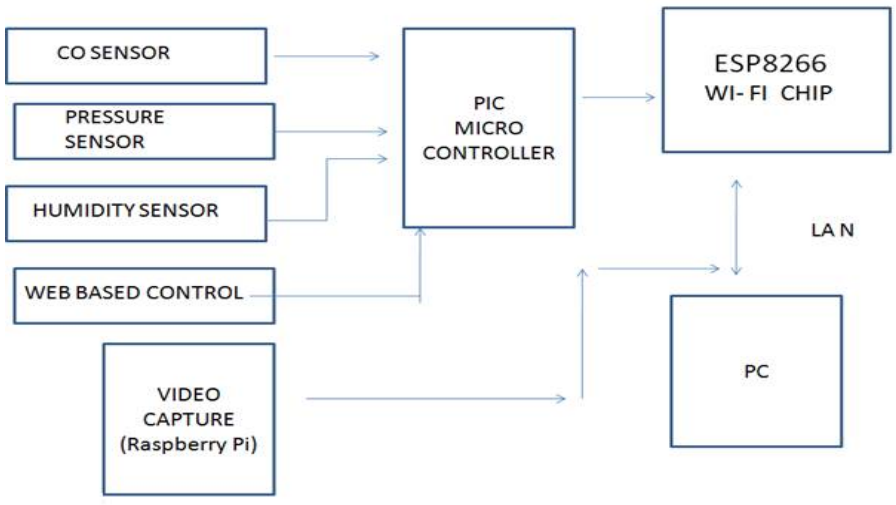

Fig. 1: Block diagram of the system

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The block diagram shows humidity sensor, pressure sensor, CO sensor interfaced with the microcontroller. Web based control signals are also received by the controller. These data received is shared to the Wi-Fi network using ESP8266 Wi-Fi chip. Video streaming is done separately using a Raspberry Pi, which is in turn connected with a video camera. These video signals are processed and shared through the network using UART module.
The electronics section consist of regulators and connectors, as the system consist of Raspberry Pi, servo motors and PIC microcontroller it needs power for working but the three systems needs three variant of power.

III. SYSTEM HARDWARE COMPONENTS

The heart of our project is a DSPIC3F2010 microcontroller, to which sensors are interconnected in order to measure the various environmental parameters. The sensors pick up information regarding temperature, pressure, humidity from the surroundings. The CO sensor included in the system checks for dangerous CO levels[1]. A web based control options are also provided in the webpage, to ensure remote monitoring and control, movements of the vehicle. The vehicle consist of a Raspberry PI for live video streaming of its surroundings
The sensors interact with the microcontroller through the I^2Cprotocol [4].The information obtained from the humidity and pressure sensors are digital and the calibrated data is further received by the microcontroller. Temperature is obtained from the humidity sensor directly. The microcontroller if necessary process the data received and stores in its internal memory. The CO sensor used is an analog sensor and ADC converts it to required digital data. These data are then shared using a Wi-Fi network and is uploaded in the webpage.
Movement of the vehicle is controlled with the help of control buttons provided in the webpage. These control signals are received by the microcontroller and is decoded. These decoded signals are then used to drive the driver IC to which the wheels of the vehicle is connected. The speed of the vehicle can also be controlled with the help of PWM, present in the microcontroller.
The data which the microcontroller holds is shared using a Wi-Fi connection and is uploaded on the webpage. Microcontroller can be connected to an available network with the help of a special, low cost Wi-Fi chip namely ESP8266.It is initiated using AT command sets and act as a UART in between the microcontroller and the device to which data is transmitted.
Video streaming is done with the help of Raspberry Pi which stands independent to the system. Raspberry Pi is connected with a camera and Raspberry Pi is programmed to process the video signals received. These video signals are further transmitted through a Wi-Fi connection and is uploaded on the website [3]. A UART module is used to connect the Raspberry Pi to the available network, which the vehicle can access.

IV. SOFTWARE COMPONENTS

The software section is used to program the pic microcontroller and the Raspberry Pi .To interface the sensors and the other chip to the microcontroller, it is programmed using embedded C .The Raspberry Pi is also programmed in C language. Raspberry Pi is initiated using an available operating system Rasbian. Network is enabled in the vehicle using ESP8266 which is coded with AT command sets. The webpage is created using HTML codes.

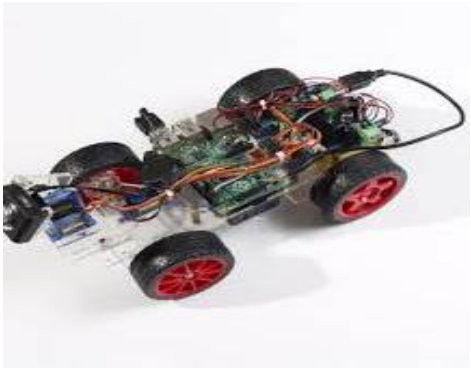

Fig. 2: Working model

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V.CONCLUSION

Thus the project is all about a smart vehicle, whose movement can be controlled from a remote area. The vehicle finds information regarding temperature, humidity, level of Carbon Monoxide and uploads live data to a website. The vehicle also provides live video streaming .The smart vehicle thus help miners and rescue operations in disaster hit areas

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