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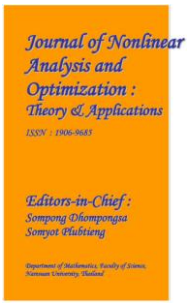

PRECISE SPEED CONTROL FOR ELECTRIC VEHICLES

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ABSTRACT:
Safety is concerned to reduce the occurrence of accidents through worldwide it minimizes the loss of property and life of a person. An accident near the restricted zones have increased tremendously, mainly reasons for accidents are of because to reach the targeted place soon. As far as automobiles are concerned, safety is very important to reduce the occurrence of accidents. Inorder to avoid these accidents weimplemented a project prototype named as "Accurate Speed control of Electric car."This prototype is powered by Raspberry Pi (PICO), which is a controller. Through commands i,e Voice modulation we are controlling the vehicle speed. Here attaching one vibration sensor for the stop the vehicle when the accident occurs.

Keywords: Speed Controler, Hydrogen (Fuel), Oxidant, And Oxygen

I INTRODUCTION

INTRODUCTION TO FUEL CELLS & PROJECT:

Fuel cells (FCs) are devices that convert chemical energy directly and continuously into electrical energy. The elements of the reaction are pure hydrogen (fuel), oxidant, and oxygen, whereas water, heat and electricity are the products of the reaction. Principally, FCs are direct single stage energy conversion devices that relatively provide high electrical energy conversion efficiency. FCs systems, offer a clean alternative for energy production and are considered one of the most promising technologies to be used in the near future as power supply sources, in various portable applications. The FCs have characteristic features, such as high efficiency, zero/low pollutant emissions and fuel flexibility, which makes it an extremely desirable option for future power generation. There are many types of fuel cells; e.g., proton exchange membrane (PEM), solid oxide (SO) and molten carbonate (MC).

II LITERATURE SURVEY

Reif K et all Automotive Mechatronics Springer 2019 Proposed a computer controlled automotive systems for driving stability in detailed information

Bradley D and Russell D W Mechatronics et all in Action Springer 2019 Enhanced the performance through the transfer of functionality from the mechanical domain to electronics & software

Dumitriu L Electronica pentru et all automobile Editura Fides 2018 Proposed a real time project that enablesFace recognition.

III INTRODUCTION OF EMBEDDED SYSTEM:

3.1 INTRODUCTION OF EMBEDDED SYSTEM

An embedded system is a combination of software and hardware to perform a dedicated task. Some of the main devices used in embedded products are Microprocessors and Microcontrollers.

3.2 OVERVIEW OF EMBEDDED SYSTEM:

Every embedded system consists of custom-built hardware built around a Central Processing Unit (CPU). This hardware also contains memory chips onto which the software is loaded. The software residing on the memory chip is also called the 'firmware'.

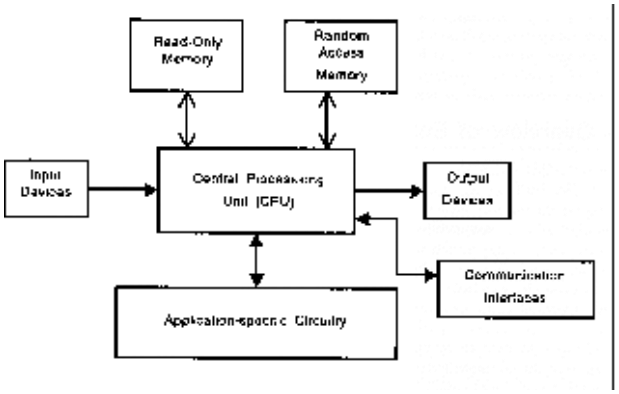

Fig: 3.1 Building blocks of the hardware of an embedded system

3.2.1 CENTRAL PROCESSING UNIT (CPU):

The Central Processing Unit (processor, in short) can be any of the following: microcontroller, microprocessor or Digital Signal Processor (DSP). A micro-controller is a low-cost processor. Its main attraction is that on the chip itself, there will be many other components such as memory, serial communication interface, analog-to digital converter etc.

3.2.2 MEMORY:

The memory is categorized as Random Access 11emory (RAM) and Read Only Memory (ROM). The contents of the RAM will be erased if power is switched off to the chip, whereas ROM retains the contents even if the power is switched off. So, the firmware is stored in the ROM. When power is switched on, the processor reads the ROM; the program is program is executed.

3.3.3 COMMUNICATION INTERFACES:

The embedded systems may need to, interact with other embedded systems at they may have to transmit data to a desktop. To facilitate this, the embedded systems are provided with one or a few communication interfaces such as RS232, RS422, RS485, Universal Serial Bus (USB), IEEE 1394, Ethernet etc.

3.3.4 APPLICATION-SPECIFIC CIRCUITRY:

Sensors, transducers, special processing and control circuitry may be required fat an embedded system, depending on its application. This circuitry interacts with the processor to carry out the necessary work. The entire hardware has to be given power supply either through the 230 volts main supply or through a battery. The hardware has to design in such a way that the power consumption is minimized.

8 × Programmable I/O (PIO) state machines for custom peripheral support.

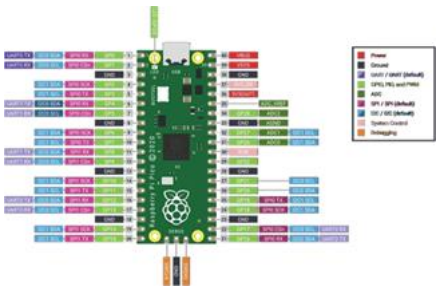

Figure 4.1: Raspberry Pi Pico

POWER SUPPLY:

: Lithium-ion Batteries

Lithium-ion (Li-ion) batteries are rechargeable batteries that are commonly used in portable electronics, electric vehicles, and many other applications. They are known for their high energy density, low self- discharge rate, and long cycle life, which make them an ideal choice for projects that require a lightweight and reliable power source.

LCD:

A model described here is for its low price and great possibilities most frequently used in practice. It is basedon the HD44780 microcontroller (Hitachi) and can display messages in two lines with 16 characters each. It displays all the alphabets, Greek letters, punctuation marks, mathematical symbols etc. In addition, it is possible to display symbols that user makes up on its own. Automatic shifting message on display (shift leftand right), appearance of the pointer, backlight etc. are considered as useful characteristics.

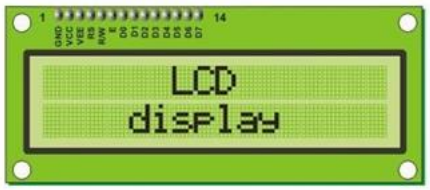

Fig: 4.3 LCD

BLUETOOTH (HC-05)

The HC-05 Bluetooth module is a popular Bluetooth serial communication module that can be used to establish wireless communication between two devices. It is a compact and easy- to-use module that is widely used in DIY projects, robotics, and industrial automation applications. The HC-05 module is based on the Bluetooth 2.0 standard and uses the Serial Port Profile (SPP) to communicate with other Bluetooth devices. It operates in the 2.4GHz frequency band and has a maximum range of around 10 meters (30 feet) in open air.

Figure 4.4: HC-05 Bluetooth

MOTOR DRIVER IC (L293D)

The L293D is a popular 16-Pin Motor Driver IC. As the name suggests it is mainly used to drive motors. A single L293D IC is capable of running two DC Motors at the same time; also the direction of these two motorscan be controlled independently.

Figure 4.5: L293D IC

3.3.5 Electromechanical Relay:

An electromechanical relay is a switch that is controlled by an electrical signal. It consists of a coil and a setof contacts. When an electrical current is passed through the coil, it generates a

Electromechanical relays are widely used in various applications because of their robustness, durability, and versatility. They can handle high currents and voltages, making them ideal for applications where high-power switching is required. They are also simple to use and require no external power source.

3.3.6 MERCURY VIBRATION SENSOR

A mercury vibration sensor, also known as a mercury switch or tilt switch, is a type of sensor that detects changes in orientation or movement. It consists of a small glass bulb containing a drop of liquid mercury andtwo or more electrical contacts.

Figure 4.7 Mercury Vibration Sensor

IV. DESIGN OF SOFTWARE

5.1 How to Set Up the Raspberry Pi Pico / Pico W

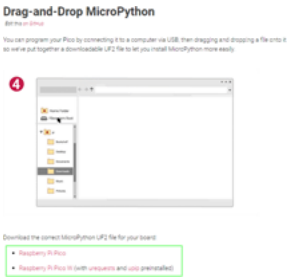

Fig: 5.1.1 Download the Micro Python UF2 File

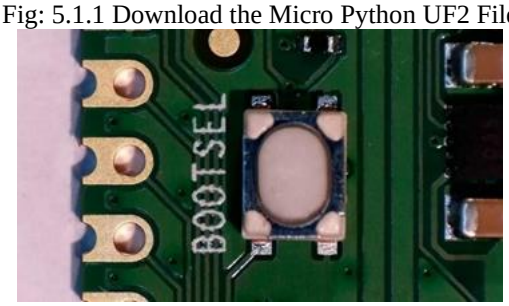

Fig: 5.1.2 Push and hold the BOOTSEL button

Drag and drop the UF2 file on to the RPI-RP2 drive. The Raspberry Pi Pico will reboot and will now runMicroPython.

4.1 PROJECT DESCRIPTION

This chapter deals with working and circuits of “”. It can be simply understood by its block diagram &circuitdiagram.

Block diagram

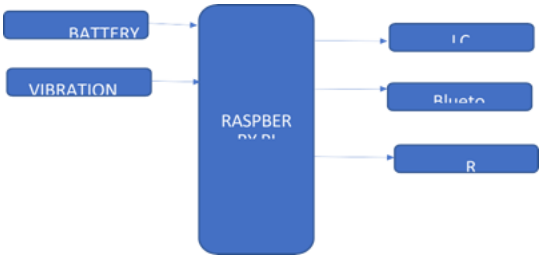

Fig: 6.0 Block diagram of Accurate Speed Control of Electric Car

Working: During the last decades, the automotive industry knew a huge development of innovative design and an increase of the functionalities to assure the safety in traffic and the comfort for the passengers. This assertion was possible due to the mechatronics technologies boom. The mechanic technology started to be controlled by the hardware and software systems, creating the concept of autonomous driving.

V. RESULTS:

Our project is "Automatic speed controlling of vehicle ". So, it has a great importance in termination and reduction to a large extent of an accidents and causalities in cramped areas. This system can be applied to any kind of vehicles. If driver want to reduce the speed then with his/her voice commands like front, back, high-speed, low-speed, back, within seconds our system will be take over the control automatically and reduce the speed of vehicle

Fig: .1 Experimental Result

VI. CONCLUSION:

Using the power saving system as a base , this system can be implemented in various type of electric vehicles including electric bikes, hybrid vehicles, electric trucks, and even for conventional fuel based vehicles for both decreasing the difficulties faced by the vehicle users when the respective fuel (battery power or fuel) is critically low and increasing the electric vehicle users. I kept the connections to the designed model according to the instructions which is given by me successfully. Finally, this designed model can move the several directions and also it can move the robot car from one place to another place. I have tested this designed model many times and many places it performing tasks according to our requirements without any problems.I have designed this model to control user in long-distance with the help of Bluetooth.

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