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Spy Electric Vehicle Driven by Solar Energy

K.Abinithyashree, C.K.Pavithra, M.Meenakshi devi, Dr.S.Harikrishnan,

UG Student, Department of EEE, Kalasalingam Institute of Technology, Krishnankoil, Tamilnadu, India

UG Student, Department of EEE, Kalasalingam Institute of Technology, Krishnankoil, Tamilnadu, India

Assistant Professor, Department of EEE, Kalasalingam Institute of Technology, Krishnankoil, Tamilnadu, India

Principal, Department of EEE, Kalasalingam Institute of Technology, Krishnankoil, Tamilnadu, India

ABSTRACT: The main objective of the proposed module is, to design a spy vehicle which is charged by Solar energy. In transportation greenhouse gas emission is the major problem which leads to several environmental issues. This trouble will be resolved by the proposed system, by means of utilizing the renewable energy as the source to run the Electric Vehicle(EV). The principle of the work is to use this vehicle for surveillance and commercial purposes. In this, for monitoring purpose a camera unit is implemented. The movements of this electric vehicle can be controlled by using DTMF(Dual Tone Multi-Frequency) technique. The resolution of the camera unit is high. Because of that surveillance can be achieved effectively by this proposed module.

KEYWORDS: DTMF (Dual Tone Multi-Frequency) decoder, Electric vehicle(EV),Solar panel, voltage regulator, Motor and camera unit.

I. INTRODUCTION

The renewable energy is vital for today's World. In future, the non-renewable sources that used are going to get exhausted. The solar vehicle is a step in to saving these non-renewable sources of energy. The basic principle of the solar vehicle is utilizing the energy which is stored in a battery during and after charging it from a solar panel. The charged batteries are used to drive the motor which serves here as an engine and moves the vehicle in reverse or forward direction. The electrical tapping rheostat is provided so as to control the motor speed. This avoids excess flow of current when the vehicle is supposed to be stopped suddenly as it is in normal vehicle with regards to fuel. This idea, in future, may help to protect our fuels from getting extinguished.

An electric vehicle (EV) is defined as any mobile device that is controlled by a means that does not restrict its motion with an origin external to the device. This is often a radio control device, cable between control and vehicle, or an infrared controller. An EV is always controlled by a human and takes no positive action autonomously. One of the key technologies which underpin this field is that of remote vehicle control. It is vital that a vehicle should be capable of proceeding accurately to a target area maneuvering within that area to fulfill its mission and returning equally accurately and safely to base. This project includes a EV consisting of a cell phone as a receiver, DTMF decoder and microcontroller. The transmitter is a handheld mobile phone.

The authors Manivannan.S and Kaleeswaran discuss about the technical consideration to implement Solar electric vehicle. In which the drawback of the existing system or module is in that surveillance was not possible, It can be rectified by the proposed module which can performs the monitoring operation effectively.

The authors Vishveshwar Ramanathan and Subramanian discuss about the application of dual tone multi frequency technology. Utilize the knowledge to cause the movement of our EV.

II. PROPOSED FRAMEWORK

A. SYSTEM DESIGN

Figure 1.1 shows the block diagram of spy electric vehicle driven by solar energy.

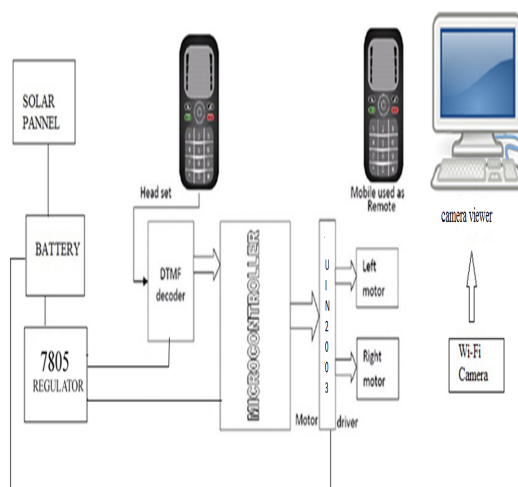


Figure 1.1 Block diagram of spy electric vehicle driven by solar energy

In this proposed system the solar energy is used to charge the vehicle. DTMF Technology has been used for wireless transmission, which is used to drive the vehicle. wireless camera unit is also attached to it. It can act as a spy which capture the situations happening around the particular distance.

B. SPECIFICATIONS

i) Solar pv panel:

12V/5W photovoltaic panel which is used to collect the solar rays and convert them into electrical energy, that is in the form of direct current.

ii) Battery source:

A storage device, in which the generated dc energy is stored. From this required energy to drive the EV was obtained. Lithium ion battery is used. which is 12 volt and 7 AH. By using lithium ion battery 75% of the power is usable.

iii) PIC Microcontroller:

PIC stands for peripheral interface controller. In this proposed work pic 16f877a microcontroller is used .In which the embedded c program is embedded in the microcontroller, to perform the electric vehicle control operation.PIC Microcontroller is used because of the operating speed.

iv) DTMF decoder:

Which is used to convert the pressed key frequency signals into digital signals, to identify the corresponding pressed key. Based on this the assigned operation to be performed was executed successfully. DTMF Decoder require +5V DC supply to operate.

v) Transmitter and receiver:

The control signals to the EV was transmitted via a handset device and received by another handset or receiver equipment which is placed in the EV module.

vi) Motor :

DC Motor is used to run the vehicle. which is in the rating of 12 V .In which the DC gear motor is used.



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vii) Camera unit:

A wireless monitoring device was implemented to provide the visual captures from the covering areas during the operating time of the EV. It covers around 15 meter distances.

III. METHODOLOGY

DTMF stands for Dual Tone Multi Frequency. The DTMF is a signaling system for recognizing the keys or on the dialed number of a push button or DTMF keypad. It is the basis for your telephone system. DTMF is actually the generic term for Touch-tone. Handset is technically a DTMF generator that produces DTMF tones as you press the button.

In the dual tone multi-frequency, if any key pressed on your phone, then it generates two tones of specific frequencies, the first specific frequency is a high frequency of tone and the second one is a low frequency of the tone. The figure 1.2 shows the signals that sends from the phone or handset when any key pressed, different frequencies are generated for the pressed key.

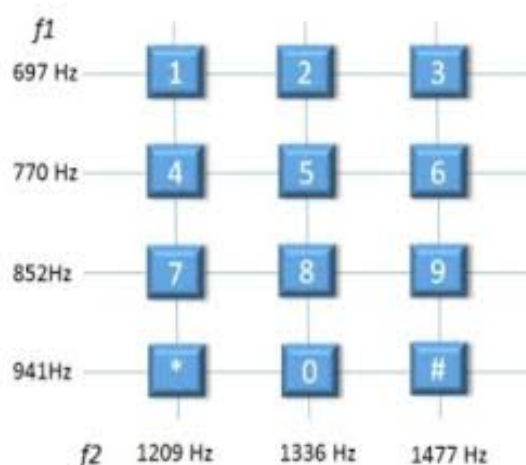


Figure1.2 DTMF Keypad frequencies

The dual tone multi-frequency uses eight frequency signals which are transmitted in a pair to produce the sixteen numbers with the symbols & letters. If any key pressed, it will produce the highest and a low tone for each of two frequencies. By using the DTMF Decoder IC, digital counting technique these two tones are decoded to determine the key which should be pressed.

By using this process, the DTMF decoder can decode the 16 different types of key tones in the 16 different types of key tones are converted into 4-bit binary decoded form. This 4-bit binary output is given as an input to the PIC Microcontroller, to perform the vehicle movement control action.

IV. WORKING

The required energy to drive the EV can be obtained from a 12v solar panel in which the solar energy is absorbed and that heat energy is converted into electrical energy. A signal transmitting technique named DTMF. Which is used to provide the control signals corresponds to EV operation. To Perform the respective actions a pair of motor drive along with relay has to be attached in the EV module. The generated frequency of pressed key is transmitted as an input to the DTMF decoder whose output is a digital signal. A hardware module which is developed can be provided with surveillance system for the purpose of confidential applications.

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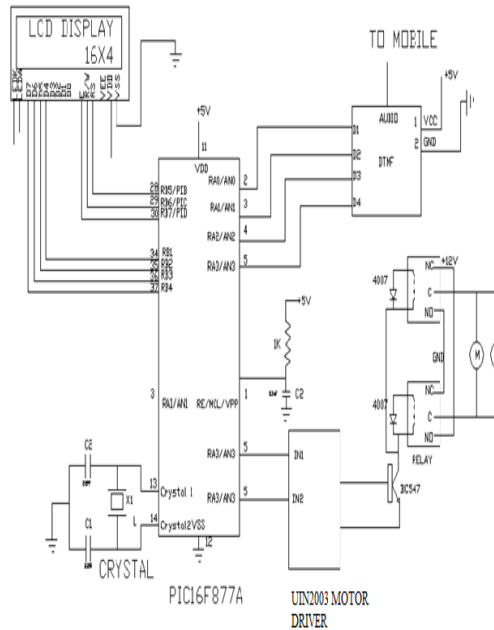


Figure 1.3 Circuit diagram of the spy electric vehicle driven by solar energy

The above figure 1.3 shows the Circuit diagram of spy electric vehicle driven by solar energy.

V. RESULT

The expected performance was obtained corresponding to the pressed key as well as the surrounding surveillance also captured efficiently. During sunny days with direct sun light (approximately 5 hours) the following results were obtained.

CHARGING TIME:

SOLAR PANEL	BATTERY	CHARGING TIME
12V/5 WATTS	12V/7AH	9.6 HRS



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OPERATING TIME:

BATTERY	MOTOR	OPERATING TIME
12V/7AH	12V/2.6 AMP	2.6 HRS

Table 1.4 Charging time of battery and operating time of EV module

Table 1.4 shows the results regarding with charging time of battery and operating time of EV module.

VI. CONCLUSION

Hence the desired motive was achieved through a Spy Electric Vehicle Driven By Solar Energy. All the functioning is appropriately working according to the user command and also every part of the module is working properly. Its operating range is very large due to the use of DTMF technology while the camera range is quite a short. But as it is a prototype model it is bearable.

In future if it may needed for the organization, It is possible to made the required changes. because it is a proto type module. Utilization of solar energy is achieved efficiently by the proposed module.

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