

A Novel Approach of GSM Based Eco-Friendly Low Energy Consumption Smart Train with Enhanced Features

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Abstract: A Novel approach towards railway system growth, safety and improvisation of the railway coaches by suitable technological feature implementation to meet the needs of the passengers in a more efficient, effective and reliable manner. Railways have always provided the cheapest and convenient mode of passenger transport and there is a dire need to bring about suitable changes in the present facilities provided by the railway system. A Novel approach of GSM based eco-friendly low energy consumption smart train with enhanced features is proposed to introduce the five new features along with some additional features to the existing system using the existing technology. The implementation of solar panels on the railway coaches to make use of solar power which is a renewable source of energy for reduced energy consumption, the Peltier device replacing an air conditioner to provide a cool healthy environment for the passengers especially concerning their health issues, the panic button and ambulance button using GSM based system concerning the safety and well-being of the passengers in emergency cases, the dustbin facility for clean environment by proper garbage disposal along with the additional feature of fuse blown-off condition with the indication of fuse, voltage and temperature status on LCD display have been proposed and implemented. All these features provided not only contribute to cost-effective and an efficient system but also an eco-friendly and clean environment which help in the further growth of Indian economy and the Railway system.

Keywords: GSM, Peltier Device, PIC16F877

I. INTRODUCTION

Transportation is the means to carry people and goods from one place to another. This has become very important in each stage of human civilization. The transportation has contributed much to the development of economic, social, political and cultural fields and uplifting their conditions. Rail transport is commonly used mode of long distance transport in India. Railways were first introduced to India in 1853 from Mumbai to Thane. Presently Indian Railways is the world's seventh largest commercial or utility employer. Indian Railway is an Indian state owned enterprise and operated by government of India through the ministry of railways. The Indian Railways contribution to national integration has been unparalleled. It has knit India together by connecting all the regions and almost all the states, in a single transport network.

II. LITERATURE REVIEW

In the present scenario the biggest problem is energy crisis and this energy can be conserved by enhancing productivity of systems. Locomotives used to operate passenger trains are equipped with an auxiliary alternator, which provides power for lighting, air conditioning etc. When the train is running the fans, lights and ac in each compartment work on the power driven by the alternator.

This in turn increases the load on the engine, which decreases the efficiency of engine working and train speed. Currently the chain pulling system exists in the railway coaches for the emergency purpose which results in train delays and revenue losses. Also most of the delays in the trains are caused when the chains are pulled by the passengers not because of emergency but for personal reasons like stopping the train where they want. The air conditioners are used in ac coaches consume a lot of electricity and the other pollutants. This is one of the major disadvantages. In addition spending too much time in an air conditioned environment can contribute to health problems such as asthma, tightness in the chest and other respiratory ailment. In the present railway system there is no proper facility for the garbage disposal. In order to maintain an eco-friendly and clean environment, a dustbin facility must be provided inside every railway compartment of the train.

III. METHODOLOGY

Fig.1 shows the proposed block diagram of our project. It consists of solar panel, battery, LM35 temperature sensor, fuse, PIC 16F877 microcontroller, LCD, keypad, relay, Peltier device, MAX232 level connector, SIM 900 GSM, H-bridge.

The output can be controlled by sending a SMS to the system. In every 10th second the system will check if a new SMS is received. Three simple commands are implemented. This is the last four digits of the phone number ‘PRI’ read when then system initialized. When the system is powered up, the input will be enabled as default and the output will be off. If you disable the inputs the LED will reverse its function: Staying ON most of the time and going OFF when the SMS is checked or an SMS is sent.

whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. The LM35 does not require any external calibration or trimming to provide typical accuracy .The temperature range is –55 to +150°C. The MAX 232 is an integrated circuit that converts signals from an RS-232 serial port to signals suitable for use in TTL compatible digital logic circuits. The MAX232 is a dual driver/receiver and typically converts the RX, TX, CTS and RTS signals. The hardware capabilities of PIC devices range from 8-pin Dip chips up to 100-pin SMD chips, with discrete I/O pins, ADC and DAC modules, and communications ports such as UART, I2C, CAN, and even USB. Low-power and high-speed variations exist for many types.

V. RESULT

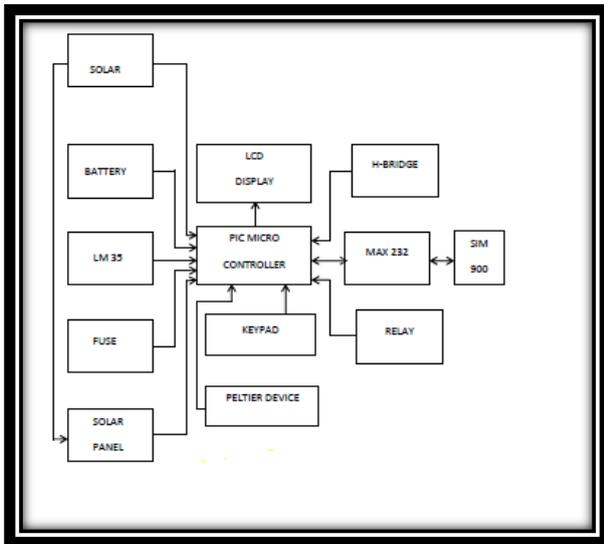


Fig. 1 Block Diagram of Proposed Method

IV. HARDWARE IMPLEMENTATION

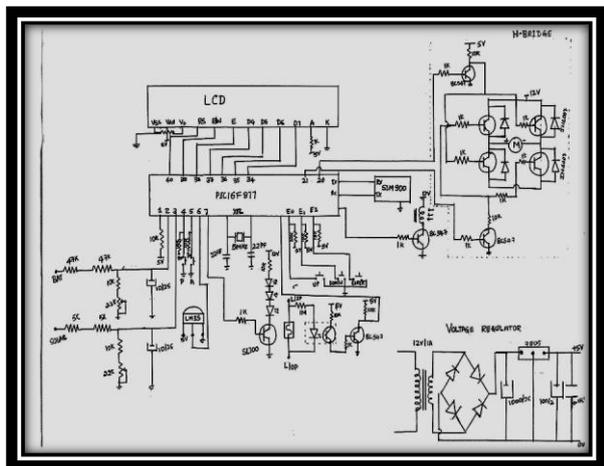


Fig. 2 Circuit Diagram of Proposed Method

Fig.2 Shows the Circuit diagram of GSM based eco-friendly low energy consumption smart train.Solar panel of small size and capacity of 12V, 300mA and 3.6W is been used in this project. It is fixed onto the roof of the compartment. The power from the solar panel is directly connected to the 12V battery through which the battery is charged during the availability of solar power. The LM35 series are precision integrated-circuit temperature sensors,

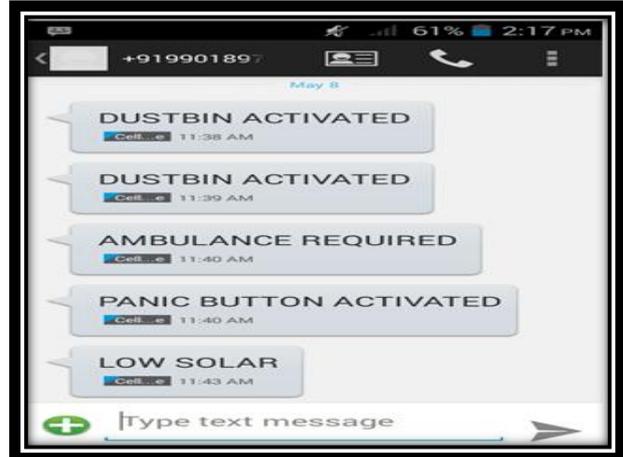
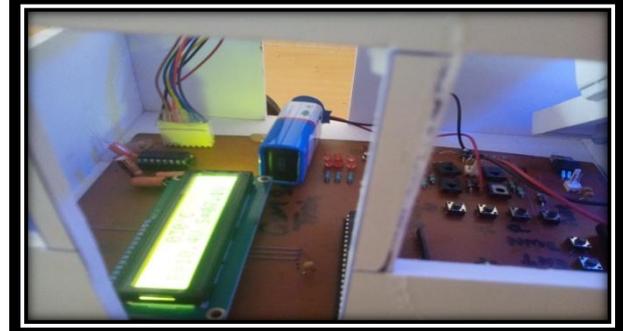


Fig. 3 Hardware Model of Proposed Method

Fig.3 shows hardware model and result of GSM based eco-friendly low energy consumption smart train with enhanced features.

VI. CONCLUSION

A PIC microcontroller and GSM based features are implemented in the proposed method. The smart features like solar panels on the railway coaches, Peltier device, panic button and ambulance button along with fuse blown-off condition status are devised and implemented. Some of the future works to be taken up are electrifying the train using solar power, iron body of the train is replaced by stainless steel and adjusting the temperature of the Peltier device in real time. In addition to this, a dustbin can be provided in the alternative direction for each compartment controlled by the engine driver.

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REFERENCES

- [1] I.Rajani kumari , G Krishna kishore ,A new method to prevent accidents in railways using microcontroller based on GSM & GPS technology,volume 4,issue 4,july –august 2013
- [2] Pijush Kanti Bhatta charjee ,Solar –rains –wind lightening energy source power generation system , vol 2, april 2010
- [3] Sandep Kumar,Vijay Kumar Garg,A hybrid model of solar wind over generation system.volume 2 ,issue 8,august 2013.

BIOGRAPHIES



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