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Balancer for Energy Management System

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ABSTRACT: Many standard distribution networks are unbalanced due to unequal uploads in each of the three categories and unmodified lines. In this project, models and methods that can deal with the inequalities of the three phases are developed. The authors introduced a novel three-phase home power management system to control both active and active energy to provide efficient performance. The simplified single-phase algorithms are not sufficient to capture all the complexities brought by the balance system. Distributed generators such as photovoltaic systems, wind generators, and loads such as indoor electricity and thermal power connected to these networks are directly dependent on external factors such as weather, ambient temperatures, and radiation. And they are time-dependent, consisting of daily, weekly, and seasonal cycles. Economic efficiency and segmentation of such generators and loads are critical to promoting energy efficiency and maximizing profits while respecting consumer needs. As homes and buildings are expected to consume much of the country's electricity supply, they are eligible candidates to help solve these problems. The improved approach will include standardized production, luggage, and various smart home models built using real-life models representing typical Austrian homes. Provided a control system that uses a control model to predict a quadratic system with multi-purpose objectives to maximize self-use, user comfort, and grid support.

KEYWORDS: - Advanced Meter Infrastructure, Power consumption patterns, Smart Meters, Arduino Mega 2560, Electric vehicle charging station.

I. INTRODUCTION

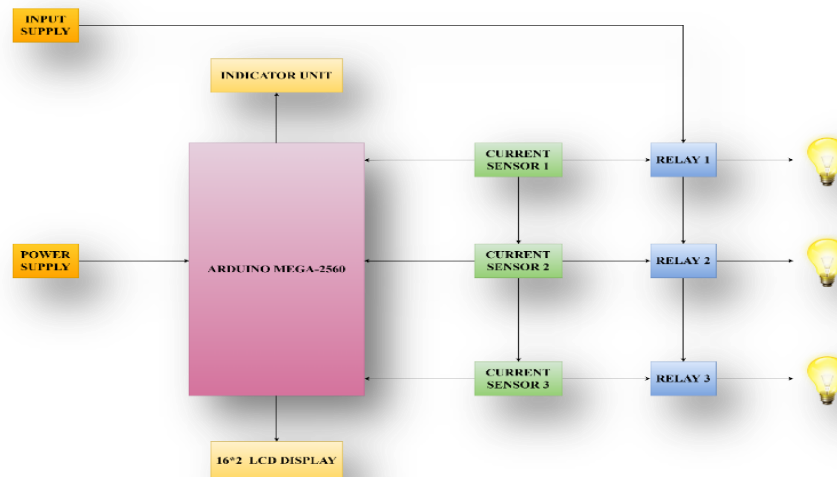
The development of electric vehicles (EVs) has become a hot topic recently. The global EV market will reach 2.6 million units by 2015. Carbon emissions due to EV charging raise significant environmental concerns. Apart from environmental and economic reasons, the most important power in the EV market is a strong policy, which includes rules, benefits, and rebates from various governments. Regardless of the method used, the rapid growth of electric vehicles increases the demand for energy. It has been reported that the need for an additional power for EVs could increase the demand and cause congestion in the distribution circuit [1-5]. More importantly, it was suggested that EV hype could reduce CO₂ emissions if the appropriatedemand-side management strategy (DSM) was adopted. In [1], it was highlighted that the U.S. electricity infrastructure is designed to meet the high demandfor energy, which only occurs a few hundred hours a year (at least 5% of the time). About 95% of the time, the electric grid is used seriously, so a large amount of raw gas is produced unnecessarily. Unfortunately, the U.S. power grid is not a special case. Most developed areas have adopted a similar approach tostabilizing electricity supply.

II. RELATED WORK

Haw Wang and Arish Balasubramani, in the year 2018 published the paper titled “*Optimal Planning of Renewable Generations for Electric vehicle Charging Station*”. This paper has reviewed that electric vehicles (EVs) have grown rapidly and are widely deployed to enable a sustainable transportation system. One of the key challenges is how to optimize the sizing and operation of the charging stations to meet the ever-increasing EV demands. Renewable energy resources from solar and wind can provide clean power to meet the EV charging demand. The proposed framework can determine the optimal capacity of renewable energy generation, and the optimal scheduling for power supply, in two stages. The arrival patterns and demand profiles of EVs using real-world data to facilitate a practical EV request model. Numerical results demonstrate the optimal planning for a renewable-powered EV charging station.

Kartik S Mishra, Shubham V. Gadhave, and S. B. Barve, in the year 2016 published the paper titled “*Design and Development of Solar vehicle*” and reviewed that a solar bicycle is an electric vehicle that provides that alternative by harnessing solar energy to charge the battery and thus provide required voltage to run the motor.

III. METHODOLOGY



The Arduino Mega 2560 is a 16-bit microcontroller, this is the brain of our project. In this project, we use three current & three Voltage Sensor sensors, current sensor & Voltage Sensor is an analog sensors. The current sensor detects the current sensor and the Voltage Sensor detects the voltage and both sensors send data to the controller. the controller calculates the current and voltage and converts this to a watt (W). display this value 20 * 4 Lcd display. We are using this project for three meters of electricity. 16 * 2 indicator use of Power Distribution Index. In a project, we use only two devices at the same time, and one shut-off module, which is used for the shutdown. For our project, we use 5 v. The reference unit shows the charging area of the electric vehicle using the LED.

Arduino Mega 2560 is a microcontroller board based on ATmega2560. It has 54 digital input/output pins (15 of which can be used as PWM output), 16 analog input, 4 UART (hardware serial ports), 16 MHz crystal oscillator, USB connection, a power jack, ICSP header, and reset button. It contains everything needed to support a microcontroller; just connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started. The Mega 2560 board comes with a number of shields designed for Uno and the front boards Duemilanove or Diecimila.

Arduino Mega 2560 can be programmed using Arduino Software called IDE which supports C programming. The code you make on the software is called sketch which is burned in the software and then transferred to the board through a USB cable. This board comes with a built-in bootloader which rules out the usage of an external burner for burning the code into the board. The bootloader communicates using the STK500 protocol. Once you compile and burn the program on the board, you can unplug the USB cable which eventually removes the power from the board. When you intend to incorporate the board into your project, you can power it up using a power jack or Vin of the board.

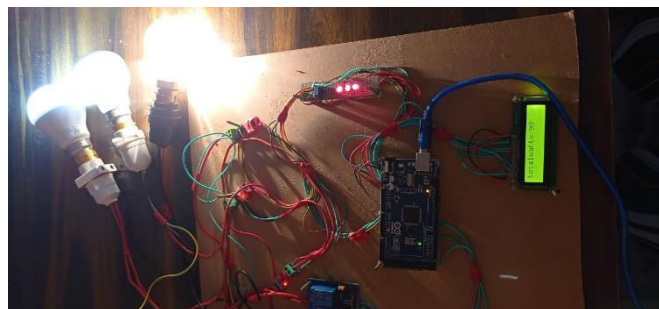
IV. EXPERIMENTAL RESULTS

This model started with low training accuracy as expected due to a vast number of classes but as the model trained itself, the accuracy started to increase. The training was carried out on a computer running the 64-bit Windows 10 operating system and equipped with an Intel® Core™ i5-8265U CPU running at 1.60GHz and 8 GB of RAM. Python 3.7 is being used as the application development language. The model was developed and trained using Keras as the backend and the Tensor-flow platform. To generate mask detector model input dataset and fine-tune MobileNetV2 is accepted using the training python script. Implementation of face mask detection in Raspberry Pi can be done using the mask detector model.

TABLE1:RESULTS

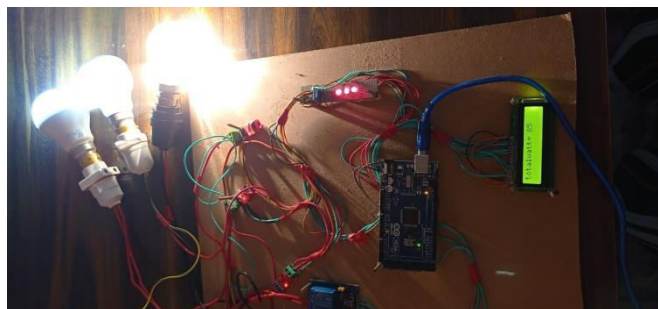
CONDITION 1:-

WATT 1	=	50W
WATT 2	=	30 W
WATT 3	=	19 W
TOTAL WATT	=	99 W



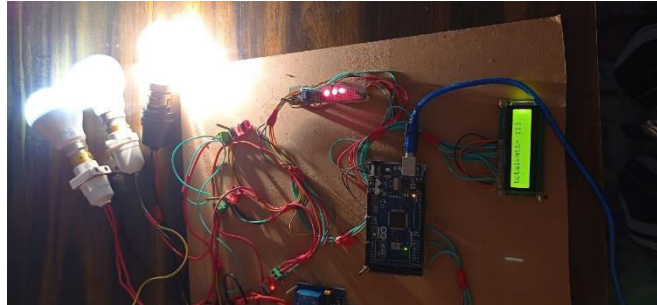
CONDITION 2:-

WATT 1	=	48 W
WATT 2	=	37 W
WATT 3	=	0 W
TOTAL WATT	=	85 W



CONDITION 3:-

WATT 1	=	113 W
WATT 2	=	0 W
WATT 3	=	0 W
TOTAL WATT	=	113 W



IV. CONCLUSION

Our project detects the empty slots for electric vehicle charging space. It helps to find charging station space. The average waiting time of the user for parking their vehicle is effectively reduced in this system. Our project increases the battery life and reduces the management cost and minimizes energy loss. A smart meter for residential applications has been presented in detail, in addition to the communication architecture between the smart meter and the aggregator via a cloud database, including a set of rules for a read/write procedure, useful for sending commands from the aggregator to the smart meter and receiving the respective replies. Smart charging is a service managed by the aggregator and carried out by the smart meter via the local electric vehicle supply equipment.

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