



IOT BASED SMART SOLAR POOJA LAMP AND ADAPTIVE MANTRA CHANTING MODEL

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Abstract: This paper presents an “IOT Based SMART SOLAR POOJA LAMP AND ADAPTIVE MANTRA CHANTING MODEL” that focuses on power conservation, energy efficiency, automation and intelligence. The main consideration in the present field technologies is automation, power consumption and cost-effectiveness. Automation is intended to reduce man power with the help of intelligent systems. The use of renewable source of energy is crucial because sources of energy are limited whereas energy consumption has increased. By use of solar energy, massive energy savings are envisioned and also it can facilitate higher power demand. The project aims to describe a method for modifying the costume of lighting diya by using minimum electrical energy consumption. Specially the system is a standalone solar PV system which is self-powered. It automatically switches the pooja lamp and adaptive mantra chanting model ON and OFF utilizing the real time data via RTC (DS1307) module. Arduino Uno serves as the brain of the system also LED strips are used for lighting. Solar panel of 40w or 20w will be used to supply the power to the project model. Pooja lamp is lit based on the timings (Morning 5:30am to 7 am & also evening 6 pm to 8 pm). Real time is used by the Arduino. The required real time is read by the RTC chip and the lamp is controlled by the Arduino programming. Devotional songs and chanting mantras are stored in SD card which is interfaced with Arduino UNO. The Arduino UNO will read the devotional songs and chanting mantras and play using TMRpcm player and speaker. The user has to store the required songs in the memory card. These songs are played automatically in the morning and evening hours.

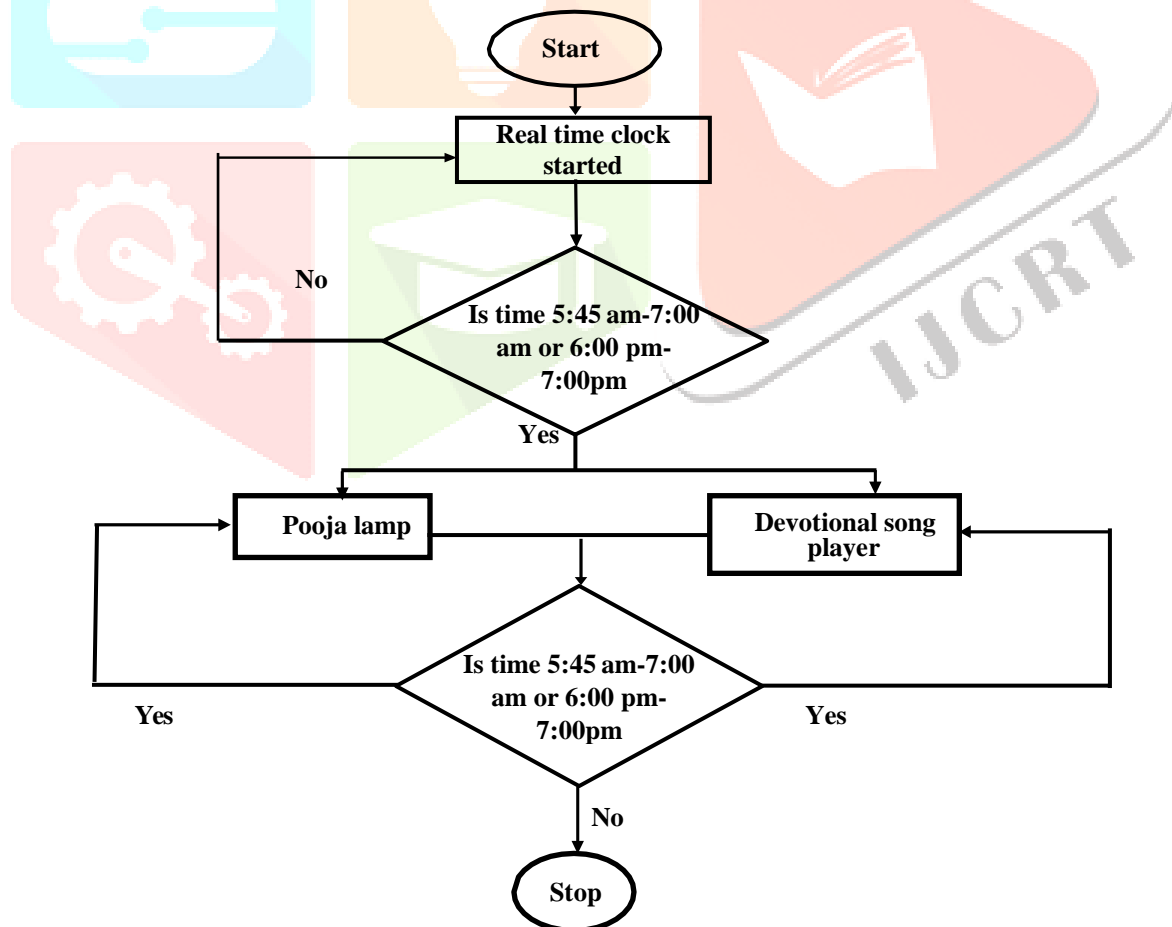
Index Terms – Solar Energy, Solar Panel, Arduino Uno, RTC, NodeMCU.

Diya symbolizes goodness and purity, and lighting them denotes dispelling darkness and going into light. Lighting diya is an auspicious and integral part of Indian culture. Everyday diya is lighted and sacred chants are recited in Indian homes as it is considered to bring good luck and also denotes dispelling anger, greed and other vices as part of tradition in the early sunrise and sunset. On a huge scale, millions of rupees are spent each day on the resources for lighting. Normally pooja lamp in every home is non electronic. Solar powered household lighting can replace other light sources like candles or kerosene lamps. Solar lamps have a lower operating cost than kerosene lamps because renewable energy from the sun is free, unlike. In addition, solar lamp produces no indoor air pollution unlike kerosene lamps. However, solar lamps generally have a higher initial cost, and are weather dependent. In this project renewable energy solar is used to supply is used to supplying DC power to the entire project setup to that electricity power is saved. The project will be done using Arduino board and RTC chip. Daily life pooja lamp turned on in morning some hours and evening some hours. So, by using RTC chip and Arduino programming we can achieve the required goal of their formed both hardware and software design, where the hardware part include several circuits, such as DC to DC converter circuit, the main circuit connects to the PV Panel.

I. LITERATURE SURVEY

1. Comparison of CFL based and LED based solar lantern by A K Mukerjee, Indian Institute of Technology, Delhi: In this journal, author has focused on use of LED lamps which is one of the solar power devices. Solar (PV)_ photovoltaic home lighting system can be used for portable lantern lighting, street lighting and home /community house lighting applications. The comparison of CFL and LED is done under this study and it was found that LEDs are more penetrating with its downsizing of the lamp size, low power requirement has compared to conventional lighting system.
2. Electricity generation using solar energy by Arvizu and Balaya (2012): The study says that of all renewable source of energy if used in best of its potential will impact the environment. it is stated that if direct solar energy is the most abundant of all and also provide opportunities for positive social impact over the last 30 years, there has been cost reduction in solar technology and hence potential deployment scenario for solar energy to become one of the major sources of energy supply by 2050.
3. India renewable energy status by Arora Etal (2010): Author discusses about the significance of renewable energy on the growth of Indian economy. Indian needs to focus on the energy challenge which will impact all citizens and across all sectors. currently, the quality of electricity supply is impeding and issues like voltage fluctuations, blackouts and various other descriptions impacts all electricity supply is impeding and issues like voltage commercial and residential consumer. addition of grid -tied renewable consumer. Addition of grid – tied renewable energy can bridge this gap. It provides buffer again energy security concerns and can bring edge against fossil fuels and price hikes. Also, it will support climate change goals.
4. Design and Implementation of solar street light for campus environment, Res. J. Engineering sci., Volume 7, issue (11), Pages 13- 19, December,26 (2018): This paper has presented design as implementation of solar street light for campus environment. It is desired to develop streetlight system that is powered by solar energy and that should automatically provide light without requiring manual (ONE AND OFF) operation for campus environment. In order to realize the objective of the paper, designed analyses was performed and components purchased.

II. METHODOLOGY



Here is the flowchart of “IOT BASED SOLAR POOJA LAMP AND ADAPTIVE MANTRA CHANTING MODEL”.

Step 1: Start.

Step 2: Rtc is started.

Step 3: Check whether the Rtc time is equal to the allotted time 5:45 am-7:00 am to 6:00 pm to 7:00 pm.

Step 4: If yes continue the process else if No return and keep checking with the Rtc.

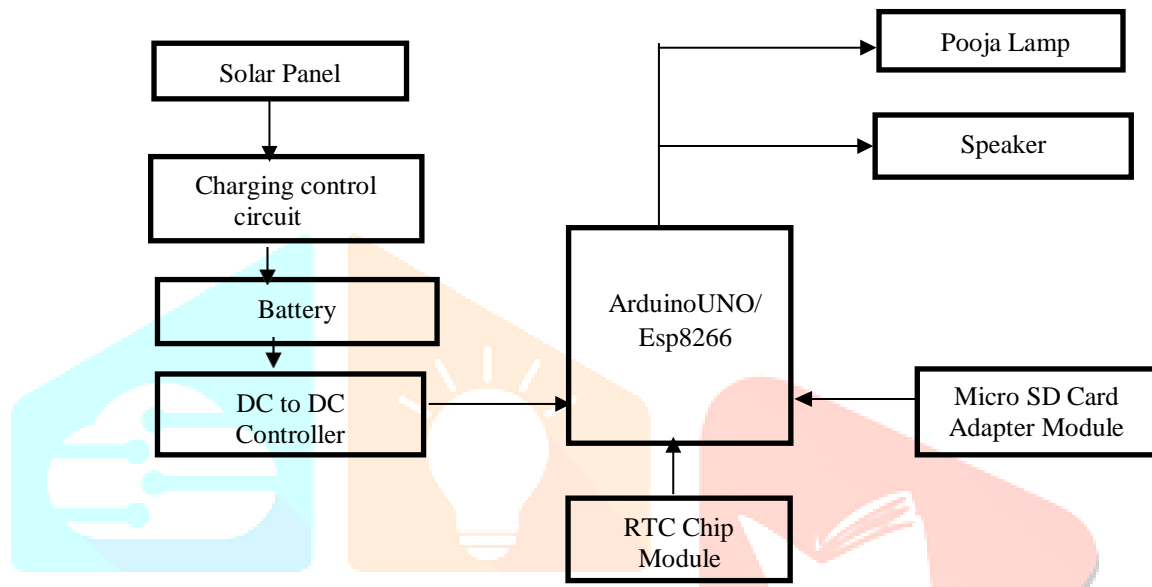
Step 5: During the Yes condition, device is turned on i.e., Pooja lamp is lit with playing devotional songs from the devotional song player.

Step 6: Check again whether the Rtc time is equal to the allotted time 5:45 am-7:00 am and 6:00 pm -7:00 pm.

Step 7: If Yes, the device remains turned ON until the allotted time mismatches with the RTC time and if NO continue the process.

Step 8: Stop.

III. BLOCK DIAGRAM



Solar panel is also known as photovoltaic panel. Solar panel collects clean renewable energy source in the form of sunlight that converts into electricity. Solar panel is connected to charging control circuit module, charging control circuit prevents against overcharging and may protect against over voltage. Charging control circuit module is connected to lithium 12V battery. Battery is connected to dc-to-dc converter. Dc to Dc converter is connected to the Arduino uno. We are converting from 12V DC to 5V DC. DC to DC converter on level of DC voltage to another level. RTC chip gives precise time and date. RTC chip connected to the Arduino and dc to dc converter circuit. We are writing the program in Arduino IDE Software, to glow the led in the morning from 6 AM to 7 AM and evening 6 PM to 7PM, with the help of Real Time Clock (RTC). Then Arduino is connected to the LED pooja lamp and SD card adaptor module which is then connected to loudspeaker. Arduino pins A5, A4, 5V, GND is connected to SCL, SDA, VCC, GND pins of RTC module respectively also Arduino pins 13, 12, 11, 4, 5V, GND is connected to SCK, MISO, MOSI, CS, VCC, GND pins of Micro SD card adaptor module respectively whereas Arduino pins 9, GND, is connected to base pin and emitter pin of BD139 transistor. Arduino pin 3.3v is connected to '+' pin of loudspeaker and collector pin of BD139 transistor is connected to '-' pin of loudspeaker. RTC module provides precise time and date for the diya to be lit and to play songs to the Arduino. The songs are stored in .wav format in the SD card module. Arduino uses the data provided and the results are obtained as expected.

IV. ADVANTAGES AND DISADVANTAGES

5.1 Advantages

- ❖ Zero energy cost(renewable).
- ❖ Low maintenance.
- ❖ Environment friendly.
- ❖ Technology development.
- ❖ Diverse applications.

5.2 Disadvantages

- ❖ Installation cost is high.
- ❖ Weather dependent.
- ❖ Energy storage is expensive.

V. RESULT

The project “IOT Based Smart Solar Pooja Lamp and Adaptive Mantra Chanting Model” has been fabricated and testing has been done using real world scenarios. In the testing mode, we first set the ON and OFF time for LED lamp and music player, and we found that both lamp and music player is working perfectly for the time we had allotted. For example, we had set the ON time as 5:45 AM and OFF time as 7:00 AM in the program using RTC chip. We observed that LED lamp is lit at 5:45 AM and continues to be lit till 7:00 AM along with playing chanting mantras from the music player and it goes off at 7:00 AM. Similarly, we also found the similar result for 6:00 PM ON time and 7:00 PM OFF time. The design model works perfectly in the Offline mode.

VI. REFERENCES

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