DEVELOPMENT OF A REAL TIME ENERGY DATA LOGGER USING RASBERRY PI FOR MONITORING THE BUILDING'S ENERGY CONSUMPTION

MOHAMAD AZRUL SHAFIQ BIN SULAIMAN

SCHOOL OF OCEAN ENGINEERING
UNIVERSITI MALAYSIA TERENGGANU
2018

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Lihat Sebelah

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By
MOHAMAD AZRUL SHAFIQ BIN SULAIMAN

Thesis submitted in partial fulfilment of the
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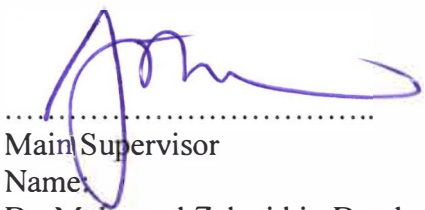
THESIS CONFIRMATION AND APPROVAL

This is acknowledged and confirmed that thesis entitled: Development of a real time energy data logger using Raspberry Pi for monitoring the building's energy consumption by Mohamad Azrul Shafiq Bin Sulaimn. Matric No.: S40600 have been checked and all the suggested corrections have been done. The thesis is submitted to School of Ocean Engineering, Universiti Malaysia Terengganu in partial fulfillment of the requirements for the award of the degree of Bachelor of Applied Science (Electronics and Instrumentation Physics).

Authorized by:



..... Date: 07/06/18

Main Supervisor
Name:
Dr. Muhamad Zalani bin Daud
Official Stamp:

DR. MUHAMAD ZALANI BIN DAUD
Pensyarah
Pusat Pengajian Kejuruteraan Kelautan
Universiti Malaysia Terengganu

..... Date: .....

Co-Supervisor (If any)
Name:

Official Stamp:

..... Date: 10/6/18

PITA Coordinator
Bachelor of Applied Science (Electronics and Instrumentation Physics)
Name:
Prof. Madya Dr Mohammad Bin Ismail
Official Stamp:

DR. MOHAMMAD BIN ISMAIL
Lecturer
School of Ocean Engineering
Universiti Malaysia Terengganu

DECLARATION

I hereby declare that this thesis is the result of my own research except as cited in the references.

Signature :.....
Name : Mohamad Azrul Shafiq Bin Sulaiman
Matric No. : S40600
Date : 07/06/2018

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ABSTRACT

Waste of energy is a problem of practical significance that occurs in most conventional buildings. The world energy consumption is expected to increase up to 50% by 2030. One of the effective ways to increase the awareness of the building's energy consumption among the occupants is through monitoring the energy continuously. This project proposed the development of a real time energy monitoring data logger using Raspberry Pi for monitoring the building's energy consumption. The project started from designing the system infrastucture with all the components are gathered and setup with Raspberry Pi 3. The connecting process between the Raspberry Pi and all of the component is completed if there is no problem on the components and Raspberry Pi. Then, the development of coding through python script is completed when there is no syntax and logic error. Lastly, final testing on the project is carried out. If there is any problem occurred, then overall testing and troubleshoot will be repeated on the problem until the problem is solved.The main system comprises of an SCT-013-000 Current Transformer (CT) sensor, RPICT3T1 CT sensor adaptor and a Raspberry-Pi as a central processing unit. Other related components used are buzzer, LED indicator and speaker works as an alert device, whereas hard disk used for storage of logged data. An alert system can send E-mail and text messaging to notify the user about their daily consumption that exceeded the limit. From the testing of the final complete system, it shows that energy can be saved significantly through controlled usage of loads. This is because the system continuously monitoring the energy usage data and send the alert to the user when their usage exceeded the limit specified.

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ABSTRAK

Sisa tenaga adalah masalah kepentingan praktikal yang berlaku di kebanyakan bangunan konvensional. Penggunaan tenaga dunia dijangka meningkat sehingga 50% pada tahun 2030. Salah satu cara yang berkesan untuk meningkatkan kesedaran mengenai penggunaan tenaga bangunan di kalangan penghuninya ialah melalui pemantauan tenaga secara berterusan. Projek ini mencadangkan pemantauan data tenaga menggunakan Raspberry Pi untuk memantau penggunaan tenaga bangunan. Projek ini dimulakan dengan merancang infrastruktur sistem kemudian semua komponen dikumpulkan dan disusun dengan Raspberry Pi 3. Proses pengabungan antara Raspberry Pi dan semua komponen diselesaikan jika tidak ada masalah pada komponen dan Raspberry Pi. Kemudian, pengekodan melalui skrip python selesai apabila tiada ralat sintaks dan logik. Akhir sekali, ujian akhir mengenai projek dijalankan. Jika terdapat sebarang masalah, maka ujian keseluruhan akan diulangi sehingga masalah dapat diselesaikan. Sistem utama terdiri daripada sensor SCT-013-000 Current Transformer (CT), RPICT3T1 CT sensor adapter dan Raspberry- Pi sebagai unit pemprosesan. Komponen lain yang berkaitan adalah buzzer, penunjuk LED dan pembesar suara berfungsi sebagai peranti amaran, manakala cakera keras digunakan untuk penyimpanan data log. Sistem amaran boleh menghantar e-mel dan mesej teks untuk memberitahu pengguna mengenai penggunaan harian mereka yang melebihi had. Dari pengujian sistem lengkap yang terakhir, ia menunjukkan bahawa tenaga boleh disimpan dengan ketara melalui penggunaan beban yang terkawal. Ini kerana sistem terus memantau data penggunaan tenaga dan menghantar amaran kepada pengguna apabila penggunaannya melebihi had yang ditetapkan.