UNIVERSITI TEKNIKAL MALAYSIA MELAKA

IMPLEMENTATION SOLAR TRACKER AND AUTO CUTOFF CHARGING FOR PHONE CHARGING STATION

This report is submitted in accordance with the requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor of Electrical Engineering Technology with Honours.

by

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APPROVAL

This report is submitted to the Faculty of Electrical and Electronic Engineering Technology of Universiti Teknikal Malaysia Melaka (UTeM) as a partial fulfilment of the requirements for the degree of Bachelor of Electrical Engineering Technology with Honours. The member of the supervisory is as follow:

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Co-supervisor: DR. MOHD BADRIL BIN NOR SHAH

ABSTRAK

Tesis ini membentangkan ‘Implementation Solar Tracker and Auto Cutoff Charging Station’ adlah satu station yang membolehkan pengguna mengecas bateri handphone, lampu rechargeable dan peralatan berkapasiti rendah. Untuk meningkatkan kesedaran tentang penggunaan tenaga solar yang dapat membantu dalam mengurangkan pencemaran disamping menghubungkan satu kawasan ke satu kawasan yang diluar grid elektrik. Langkah-langkah ini dapat mengurangkan kos perbelanjaan kerajaan dalam menghasilkan tenaga elektrik. Projek ini adalah untuk membangunkan stesen pengecas, iaitu sistem solar sebagai punca tenaga untuk menghidupkan stesen pengecas. Station yang dilengkapi dengan sensor ldr yang dipasang di atas solar panel bagi membaca arah matahari dan memberi isyarat kepada Arduino board untuk mengerakkan motor kearah sepatutnya. Oleh kerana teknologi solar di Malaysia kurang berdaya saing berbanding negara luar, projek ini akan menjadi sebuah projek yang boleh diikuti atau dihasilkan untuk pembelajaran bagi masa akan datang, Untuk menjadikan ia lebih menarik untuk difahami, ia boleh diletakkan dimana sahaja yang terdapat cahaya matahari yang mengenainya tanpa memerlukan sumber tenaga luar. Ini membolehkan projek ini diletakkan di kawasan yang diluar grid elektrik yang dapat membantu pengguna di kawasan tersebut. Arduino uno digunakan sebagai pengawal mikro untuk memberi kuasa kepada sistem. Sekiranya ldr dicaskan atau dicetuskan, ia akan memberi signal kepada arduino untuk memberi isyarat kepada modul pengawalan motor bagi mengerakkan motor kearah yang diperlukan atau yang telah diprogramkan di perisian Arduino. Sebagai kesimpulan, selain menggunakan pendedahan sistem solar, projek ini juga boleh memberi manfaat kepada alam sekitar dan pengguna diluar kawasan yang sukar mendapatkan bekalan elektrik

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ABSTRACT

The 'Implementation Solar Tracker and Auto Cutoff Charging Station' is a station that allows users to charge mobile batteries, rechargeable lights and low-capacity machinery. Increase understanding of the use of solar energy, which can help to minimize emissions by linking one place to another outside the power grid. The cost of government spending on energy production can be decreased by these measures. The project is to build a charging station, a solar system that acts as a supply of electricity for the charging station to be switched on. The station is fitted with a ldr sensor to read the position of the sun on a solar panel and a signal to the Arduino board to drive the motor in the correct direction. This project will be a project that can be pursued or developed for future learning, as solar energy in Malaysia is less competitive than foreign countries, so it can be put anywhere there is sunlight around it to make it more important to understand. Without the need for supplies of foreign electricity. This encourages the initiative to be put outside of the electricity grid in places that will benefit users in those areas. The Arduino uno is used to run the machine as a micro controller. If ldr is charged or activated, it will signal the Arduino to signal the motor control module to drive the motor in the direction necessary, or that the Arduino software has programmed the motor. In conclusion, in addition to utilizing proximity to the solar system, this initiative will also support the atmosphere and customers outside regions where energy access is difficult to access.

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DEDICATION

Alhamdulillah, praise to the Almighty Allah S.W.T

Dear parents, thank you for all the help and prayers given. I cannot repay all the efforts made, only god can. This will also be reserved for my friends and supervisors of Universiti Teknikal Malaysia Melaka who are directly or indirectly involved in completing this project report and helping me complete this project in the final year.

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LIST OF ABBREVIATIONS

ldr	Light Dependent Resistor

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CHAPTER 1

INTRODUCTION

In this chapter, it will briefly discuss about the Implementation solar tracker and auto cut-off charging for phone charging station system. This chapter also will briefly explain about the project background, problem statement, objective, scope, and methodology of the project. To understand more details about the project can be obtained from this chapter.

1.1 Background

Nowadays, renewable energy resources are getting priorities in the whole world in order to provide a sustainable power production and safe world to the future generation. Furthermore, the current industrial field has been exposed to the 4.0 Industrial Revolution (IR4) which will change the way our lives in the future. Now, the combination of renewable energy and IoT systems will help life in a remote area in the future.

Other that, movement of the sun and cloud sometimes will minimize the energy that capture from the sun. The charging energy will continue to flow until it is exhausted resulting in the loss of energy and the damage will occur if it is not controlled. When we consume to reduce the power loss, we can make a project to move on its own. By taking steps to reduce power loss, we will make a project that last longer. In addition, the reduction in energy loss has many advantages such as saving our money, can increase the economy, and improve the quality of life.

Recently that has been various cases of stray groups in the forest or in the mountains that the problems faced by the community in getting electricity to charge in an inland or mountainous area. A charging station can assist individuals who are lost or need a charging service that to charge their phone, rechargeable battery flashlight or power bank.

As an overview of this project, the major components of this project such as solar panel that as our main component that to charge the battery for our project supply system by using the energy that capture from the sun as power source, an Arduino UNO as a main controller of the system, a battery for energy storage system, some servo motor for the movement of the solar and some electronic components. The device will work together with controlled by Arduino for the movement and the cut-off charge.

1.2 Problem Statement

In Malaysia, understood that Malaysia has over 250 mountains as of now. There are no complete statistics on the total list of mountains. There may also be local mountain areas that are difficult to explore, impossible to find or still unnamed according an article (Ithnin, 2017). Hiking or climbing is a form of recreational activities that have long been a favourite of Malaysians but there are also benefits and hazards that will certainly be experienced and left during climbing state to (Ruby, 2019) article. In the natural of hiking, hikers also faced with the risks that often occur in mountainous terrain.

According by research had been done by (Othman, 2016), in his article that shows the record of mountain accident cases in Malaysia. The records shown are not representative of all occurrences, which may be missed. The purpose of this record is to

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be used as reference to Malaysians that there are cases that have occurred in the area according to (Othman, 2016). The record is among 26 Mei 1999 to 10 Jan 2016 that which has recorded 54 cases which are divided into 26 cases of lost persons, 9 cases of people stranded and 19 other cases which are crowded breath, earthquake, slipped, landslide stones, crushed by trees, a lightning-off, rock-drunk (AMS-HAPE) and gas poisoning based on (Table 1.1,1.2,1.3).

However, there were a total of 94 victims comprising local citizens and foreigners were reported lost in forests since 2016 to 2018 according to Assistant Director of Malaysian Fire and Rescue Department Training Division (JBPM) Johor, Siti Hajar Sanusi during survival exercise in Gunung Ledang based on (Berita MediaCorp, 2019) article.

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1999 Mei 26	Perak	Gunung Korbu	Keracunan Gas
2004 Mei 5	Pahang	Gunung Rajah	Sambaran kilat
2006 Mei 16	Kelantan	Gunung Yong Yap (Lojing)	Orang Hilang
2007 Mei 16	Johor	Gunung Ledang	Dihempap Pokok
2007 Mei 20	Johor	Gunung Ledang	Dihempap Pokok
2008 Feb 8 -25	Pahang	Gunung Tahan	Orang Hilang
2008 Nov 10	Selangor	Gunung Nuang	Terkandas
2009 Feb 8	Selangor	Air Terjun Kubang Gajah	Orang Hilang
2009 Feb 15-∞	Kelantan	Gunung Yong Yap	Orang Hilang
2009 Sep 4-7	Selangor	Gunung Semenyih	Orang Hilang
2009 Nov 19	Johor	Gunung Lambak	Orang Hilang
2009 Nov 22	Terengganu	Gunung Tebu	Terkandas
2010 Feb 17-19	Pahang	Gunung Buah	Orang Hilang
2010 Jul 31 – Ogos 7	Pahang	Gunung Irau	Orang Hilang
2010 Dec 13	Perak	Gunung Chabang	Orang Hilang
2010 Dec 17-24	Perak	Gunung Chamah – Ulu Sepat	Terkandas – Hujan Lebat

www.gunungonline.com/beiru/?p=1004 1/3

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Figure 1.1: Accident Record

4/2/2020 Rekod Kes Kemalangan Gunung di Malaysia – Gunung Online

2011 Jan 20	Selangor	Bukit Broga	Gelongsoran batu
2011 Jan 30	Perak	Kem Seroja, Gng Korbu	Tergelincir
2011 Jan 28 – Feb 6	Perak	Gunung Chamah – Ulu Sepat – Gerah – Bilah – Bieh	Terkandas – Hujan Lebat
2011 Mac 4	Sabah	Gunung Nombuyukong, Sabah	Sesak Nafas
2012 Jan 26	Kelantan	Gunung Stong	Orang Hilang
2012 Feb 23	Sarawak	Gunung Santubong	Terkandas
2012 Jul 16	Johor	Gunung Ledang	Tergelincir
2012 Nov 17	Pahang	Gunung Benum	Orang Hilang
2013 Jan 3	Pahang	Gunung Benum	Orang Hilang
2013 Feb 14	Pahang	Gunung Tahan	Sesak Nafas
2013 May 4	Negeri Sembilan	Gunung Datuk	Sesak Nafas
2013 Sep 12	Terengganu	Gunung Tebu	Terkandas
2013 Sep 17	Johor	Gunung Lambak	Sesak Nafas
2013 Sep 18	Sabah	Gunung Kinabalu	AMS – HAPE
2014 Jan 27	Kedah	Gunung Jerai	Terkandas
2014 Feb 12	Sabah	Gunung Kinbalu	Tergelincir
2014 Mac 17	Perak	Gunung Bubu	Orang Hilang
2014 Jun 4	Selangor	Puncak Tok Wan	Orang Hilang
2014 Nov 1	Terengganu	Gunung Gajah Terom	Orang Hilang
2014 Nov 21	Negeri Sembilan	Gunung Datuk	Orang Hilang
2014 Dec 22	Kelantan	Gunung Noring	Terkandas
2015 Feb 1	Negeri Sembilan	Gunung Datuk	Orang Hilang

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Figure 1.2: Accident Record

4/2/2020 Reiod Kes Kemalangan Gunung di Malaysia – Gunung Online

2015 Feb 3	Kelantan	Gunung Gerah	Orang Hilang
2015 Mar 30	Negeri Sembilan	Gunung Angsi	Sesak Nafas
2015 Apr 5	Negeri Sembilan	Gunung Datuk	Orang Hilang
2015 Apr 26	Selangor	Gunung Nuang	Sesak Nafas
2015 Jun 5	Sabah	Gunung Kinabalu	Gempa Bumi
2015 Ogos 2	Selangor	Bukit Saga	Orang Hilang
2015 Sep 18	Selangor	Hutan Ayer Hitam	Orang Hilang
2015 Oct 28	Selangor	Bukit Kutu	Orang Hilang
2015 Nov 8	Kedah	Gunung Jerai	Sesak Nafas
2015 Nov 10	Kelantan	Gunung Chamah	Orang Hilang
2015 Dec 10	Kedah	Gunung Baling	Orang Hilang
2015 Dec 17	Selangor	Puncak Tok Wan	Orang Hilang
2015 Dec 26	Pahang	Gunung Semangkok	Orang Hilang
2016 Jan 10	Kedah	Gunung Bintang	Terkandas

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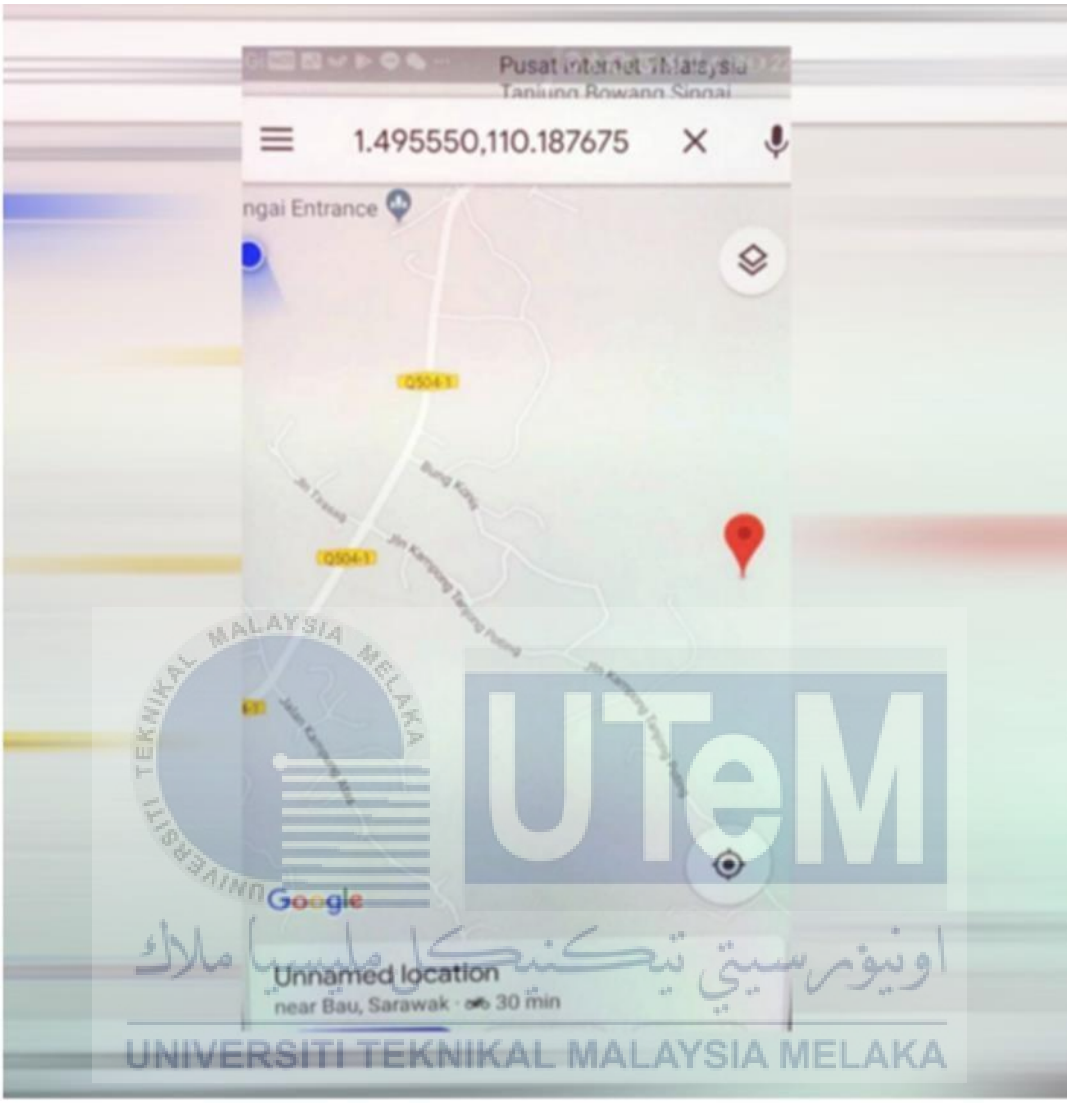
Figure 1.3: Accident Record

These events occur when climbers lose communication with outsider because of lack of communication base on their communication equipment or climbing equipment that running out of resources. In addition, there are also individuals who go astray successfully sending location signals before interrupting contact with outsiders. In an article (Kawi, 2018) said a man who had been lost in the jungle at Gunung Singai since yesterday successfully posted his location via whatsapp app based on Figure 1.4.



Lelaki yang sesat di dalam hutan di Gunung Singai, di sini, sejak semalam berjaya menghantar lokasi kedudukannya menerusi aplikasi WhatsApp. - Foto ihsan Jabatan Bomba dan Penyelamat

Figure 1.4: Description of Incident

This happens when communication devices such as smartphones still have power supply and can send out signals. But, the capacity battery of the phone can only last for a few hours or day depends to their phone energy storage such as 5300mAh battery capacity can sustains for 2 days(Areff, 2018). In Malaysia there is an estimated battery capacity of the smartphone based on Table 1.4 article of (AZRAI, 2019).

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Telefon	Bateri
Asus ROG Phone 2	6,000mAh
Asus ZenFone 6	5,000mAh
Huawei Mate 30 Pro	4,500mAh
Samsung Galaxy Note 10 Plus	4,300mAh
Huawei Mate 30	4,200mAh
Honor 20 Pro	4,000mAh
OPPO Reno 2	4,000mAh
iPhone 11 Pro Max	3,969mAh
Nokia 9	3,900mAh
Honor 20	3,750mAh
Samsung Galaxy Note 10	3,500mAh
Sony Xperia 1	3,300mAh
iPhone XS Max	3,174mAh
iPhone 11	3,110mAh
Samsung Galaxy S10e	3,100mAh
iPhone 11 Pro	3,046mAh
iPhone XR	2,942mAh
iPhone XS	2,714mAh

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Figure 1.5: Phone Battery Capacity

According to the battery capacity in handphone based on Table 1.4, it can only last 3 to 4 days with user in the forest. For rechargeable flashlight, it can only last for a few hours for example Samlite 4 in 1 type that can last up to 30 hours based on an article (Latham, 2018). Therefore, with innovation on this project it be able to overcome the problem that causes the barrier or difficulties in obtaining resources to charge communications equipment or climbing equipment for survival in the wild jungle long time.