INNOVATION AND DEVELOPMENT OF HYBRID POWERED STREETLIGHT WITH SURVELANCE SECURITY

Basconcillo, Benji Felis B., Fabillar, Christopher C., De Guzman, Aldren P., Dulay, Allan, Balboa, Marlon R., Lagrada, Jerry II F., Coronacion, Karl Kevin, Pempena, Roque Mark Leo

***Department*: College of Engineering Course: Computer Engineering**

INTRODUCTION

Electricity has a vital role in human life; as the saying goes, "No power, no life". It is now being an integral part of everyday life. As the world's population increases, the demands of electricity also increase. Hence, advancement and technologies are developed and assessed to meet and satisfy the demands usage. While technological advances are developed, these are being assessed and compared to the existing products to ascertain whether the new product would be ideally suited to its intended purpose.

An example of an advancement of electricity is Street Light. Street lighting, in all of its types, is an essential component of modern life. Particularly, some of the streetlights mounted along the street have a solar photovoltaic system that allows it to charge itself and generate power through the use of sunlight. On the other hand, in rural areas, electricity is a critical challenge. Existing streetlights may be difficult to install due to the insufficiency of the power source, and the scarcity of the source access. Presently, streetlights are only built on urban areas and on expressways.

This paper will present the Innovation and Development of a Hybrid Powered Streetlight with Surveillance Security that can be used in rural areas. This device is powered by solar and wind energy, all of which are renewable sources of energy. Added to that, it has advanced technology to convert into electricity, and has a capability of charging.

This device can be used to capture footage of its surroundings using a surveillance camera that operates 24 hours a day, seven days a week. The device has modular framework that can be stacked or rearranged in various formations, is easy to transfer, navigate, and reassembled for flexibility. Enabling the device to be relocated and moved to a location where it is expected to secure access to this eco-friendly.

GENERAL OBJECTIVES

Objectives of the study:

To design and develop a hybrid power streetlight with security surveillance.

Specific Objectives:

1. To modify and design an advancement to increase the efficiency of

electricity

2. To calibrate and create a project that addresses the divisions between solar and wind

3. To promote innovation using the Sustainable and Green Energy Platform

STATEMENT OF THE PROBLEM

This study aims to determine the design and advancement of technologies to increase the development of hybrid-power using

conventional methods.

Specifically, this

answers paper the following research

questions:

1. What are the characteristics of the device / system in terms of which is currently in use?

2. What improvement can be made out of the existing device / system?

3. What new device / system can be derived with the improvement?

4. What is the level of assessment of the group of respondents on the developed device/system with the following criteria? Is there significant difference?

4.1 Functionality

4.2 Usability

o Reliability

o Efficiency

• Maintainability

5. What claims can be made from the developed device / system?

METHODOLOGY

This chapter presents the research methodology, statistical treatment, supplies and materials, tools and equipment, construction procedure, try-out and revision, and the cost analysis of innovation and development of hybrid powered streetlight with surveillance security.

Research Methodology and Sampling

The research study aims to give peaceful environment and a lesser crime rate to its surroundings. The device will help not only to maximize its potential energy, as well as to give better and secured place to its people

The device has a vital rode in the modern society. The Hybrid Powered Streetlight with Surveillance Security System is not only design to be place in urban areas, the device also aims to be place in rural where some part of it is not accessible by electricity. The device is design of an advance technology which provides renewable sources of energy powered by solar and wind energy that are efficient and very eco-friendly. In modern days, crimes are not only happening in the city, it also reaches most of the rural areas where quietness and peacefulness seems to happen. This study develop also to capture footage for a better place to live for the people. The device is flexible and can be relocated where it is expected to move.

Evaluation

The project was evaluated on the following criteria

namely:

➤ Funtionality

➤ Usability

➤ Reliability

➤ Efficiency

► Maintainability

Evaluation

Statistical Treatment

The mean was used as the tool for evaluating the project.

The formula is;

x = (Sigma*X)/N

Where,

Σ, represents the summation

X, represents scores

N, represents number of scores

The Likert scale was used for descriptive ratings.

Table 1: Likert Scale for descriptive ratings.

Numerical Scale	Average Response	Adjective Rating	Verbal interpretation
5	4.270-5.00	Exellent	E
4	3.40-4.19	Very Satisfactory	VS
3	2.60-3.39	Satisfactory	S
2	1.80-2.59	Fair	F
1	1.00-1.9	Poor	P

Equal Variance Not Assumed

When the two independent samples are assumed to be drawn from the populations with the equal variances (i.e., 012022), the test statistic t is computed as:

t= x 1 -x 2 sqrt((x_{1} ^ 2)/n_{1} * (s_{2} ^ 2)/n_{2})

Where:

x ^ - 1 = Mean of the first sample

x ^ - 2 = Mean of the second sample

n * 1 = sample size (i.e., number of observations) of first

sample

n * 2 = Sample size (i.e., number of observations) of second

sample

s * 1 = Standard deviation of first sample

s * 2 = Standard deviation of second sample

The calculated t value is then compared to the critical t value from the t distribution table with degree of freedom,

df= (s_{1} ^ 2)/s_{2} + s 2 ^ 2 1 s 1 -1 (pi7 s 1)^ 2 + T s 2 -1 (pi7 s 2)^ 2

And chosen confidence level if the calculated t value > critical t value, then we reject the null hypothesis.

Note that this form of the independent samples T test statistics does not assume equal variances. This is why both the denominator of the test statistics and the degree of freedom of the critical value of t are different than the equal variances form of the test statistics.

DATA GATHERING PROCEDURE

1. Deciding the title of the thesis, "HYBRID SOURCE CHARGING STATION USING SUPERCAPACITOR."

2. Gathering data through research.

3. Presentation of the proposed title.

4. Designing the project's structure

and circuitry.

5. Deciding on where the researchers will construct their design project.

6. Collection of materials and equipment that would be used for the whole project.

7. Construction and wiring the project.

8. Testing and trial of the output.

9. Writing the final report of the thesis.

10. Final defense of the study.

11. Final checking of the output.

12. Submission of the final report.

SUMMARY OF FINDINGS

This chapter shows the findings resulting from this study.

1. Who are the beneficiary of this project?

The people who reside in rural regions are the primary beneficiaries of this project. It will help facilitate their access to this type of streetlight; during night time, it has the ability to illuminate and secure particularly the gloomy areas. Added to that, this project will also benefit the environment because it aims to be eco-friendly by utilizing renewable energy sources such as solar and wind power.

2. How can it help in street areas?

Hybrid powered streetlights may be utilized not only in streets, but also in rural parts of our country, particularly in locations where energy is difficult It also has to access. attached to record what is occurring on around it. a camera

3. Is the device can still be used in places where electricity is not available?

Certainly, because the system is battery powered and has a charger controller to manage the power generated by wind and solar energy. It is available 24 hours a day, seven days a week. It is intended to offer light and security, particularly in rural locations where power is a big issue.

4. What is the assessment of the three groups of respondents namely; Students, Professional, and Community in terms of the following criteria? Is there any significant difference?

The three categories of respondents, Students, Professionals, and the Community, assessed the following criteria.

A. Summary on Functionalities

Table 2: ILLUSTRATION ON FUNCTIONALITY ASSESSMENT

INDICATOR	**STUDENT**		**PROFESSIONAL**		**COMMUNITY**		**COMPOSITE**		**RANK**
	WM	**VI**	**WM**	**VI**	**WM**	**VI**	**WM**	**VI**	

1. Functional Completeness, degree to which the set function covers all the specified tasks and user objectives. Students Professional 4.70 E 4.10 4.40 E 4.4 E 3

2. Functional Correctness. Degree to which the system provides the correctness of results with the needed degree of precision.

4.40 E 4.10 E 4.20 E 4.23 E 2

3. Functional Appropriateness. Degree to which the functions facilitate the accomplishment of specified tasks and objectives.
4.80 E 4.10 E 4.50 E 4.46 E 1

Overall Weighed Mean
4.63 E 4.10 E 4.37 E

The Students, Professionals and community on Functionality rated most of the Indicators as "Excellent" even for functional correctness and functional appropriateness which received "Excellent" rating from the group having an overall mean values of 4.63 for the Students and 4.10 for the Professionals and 4.37 for the community as evidenced by the obtained weighted mean values of 4.70, 4.40 and 4.80 for the Students; and 4.10, 4.10,4.10 for the Professionals, and 4.40, 4.20 4.50 for the community respectively. They ranked these indicators as follows: "Functional Appropriateness. Degree to which the set of function covers all the specified tasks and user objectives." (WM-4.53) Ranked 1; "Functional correctness. Degree to which the System provides the correctness of results with the needed degree of precision" (WM-4.23) Ranked 2 and "Functional Completeness. Degree to which the set function covers all the specified tasks and user" (WM-4.4) Ranked 3. It is implied that the Functionality covered all the specified task and user objectives, provided correct results with the needed degree of precision, and facilitated the accomplishment of specified tasks and objectives.

SUMMARY OF THE ASSESSMENT

TABLE 3: THE SUMARY OF THE ASSESSMENT

INDICATOR	STUDENT		PROFESSIONAL		COMMUNITY		COMPOSITE		RANK
	WM	VI	WM	VI	WM	VI	WM	VI	

1. FUNCTIONALITY
4.63 E 4.10 E 4.37 E 4.37 2

2. USABILITY
4.65 E 4.25 E 4.45 E 4.45 E 1

3. RELIABILITY
4.70 E 4.10 E 3.85 VG 4.21 E 5

4. EFFICIENCY
4.70 4.23 E 3.83 VG 4.25 E 4

5. MAINTAINABILITY
4.57 E 4.43 E 3.83 VG 4.27 E 3

OVERALL WEIGHED MEAN
7.75 E 7.37 6.77 VG 7.30 E

Looking at the summary table, it could be deduced that the respondents rated most of the Indicators as "Excellent" except for efficiency maintainability and reliability which received a "Very Good rating from the group Community with a composite mean value of 4.37 for functionality Ranked 2; 4.27 for

maintainability Ranked 3; 4.45 for usability Ranked 1: 4.21 for reliability Ranked 5: and 4.25 for efficiency Ranked 4 having a grand mean of 7.30 verbally interpreted as "Excellent" The data shows that the Innovation-and-Development-of-Hybrid-Powered-Streetlight-with-Surveillance-Security (IHDPSS) terms of its functionality, usability, efficiency, and maintainability were viewed Professionals, and Community. As an excellent system by both those Students,

Conclusion

Based on the findings of the study, the following conclusions are drawn;

A. According to the evaluation result of the functionality of the system, the degree to which the sets functional completeness, correctness, and appropriateness were interpreted as "Excellent" by the respondents, which means that the functionality of IDHPSS provided the specific tasks and user objectives, correctness of results with the needed degree of precision, and facilitated the accomplishments of specified tasks and objectives.

3. According to the evaluation result of the usability of the system, the degree to which the sets operability and accessibility were interpreted as "Excellent" by the respondents, which means that the usability of IDHPSS had an attributes that make it easy to operate and control and can be used by people with widest range of characteristics and capabilities to achieve a specified context of use.

c. According to the evaluation result of the reliability of the

system, the degree to which the sets maturity and availability were interpreted as "Excellent" by the correspondents, which means that the reliability of IDHPSS has met the needs for reliability under normal operation and it was operational and was accessible when required for use.