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Research Article

DOES BUTTERFLY CHARGING FRIENDLY TO OUR ENVIRONMENT? AN EXPERIMENTAL RESEARCH

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Abstract

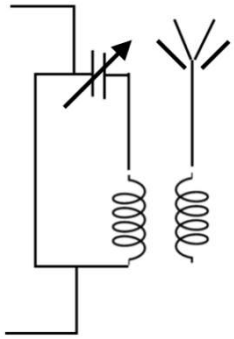
It is well-known that our present mobile recharge external batteries always have chance of catching fire. Hence, this author suggests that there would be a possibility of employing my HK Lam theory to capture different electromagnetic wave signals in the future modified telephone booth. One of the most practical usage is to capture the feasible microwave for the charging of small electrical devices such as the mobile phone. The source of the energy is from the solar panel. However, there is a danger of the microwave signal may cause harmful effects to both human and other living organisms. This author suggests how an experimental research may determine whether such kind of proposed "Butterfly Telephone Booth" may cause danger to our environment in this academic article.

Keywords: Physics, Digital electronics, Charging Philosophy, Environmental Science and Control Experiment

INTRODUCTION

Under rigorous assessment, climate scientists have proposed that the rapid changes to our present climate is probably due to excessive levels of carbon dioxide [1]. In turn, this leads to a serious greenhouse effect, especially in major cities [2]. Therefore, it is imperative to implement renewable energy policies and practical innovations around the world. The main research question of this study is: How can the technological and digital literacy of communities be developed/enhanced to establish and operate renewable energy systems which facilitate the move towards low-carbon smart cities and communities?

This author suggests that the telephone booths in major cities could be redesigned to turn them into multimedia (Bluetooth, Wi-Fi, radio waves) centres. At the same time, wireless renewable energy charging (by employing microwaves) for electrical devices such as mobile phones can also be installed in the booths [3]. In order to avoid serious electromagnetic (EM) interference, this author proposes to apply a suitable information management system to centrally control different frequencies of EM waves [4]. In fact, the wireless charging philosophy behind this suggested scheme is shown below by the theoretical physics LC transmitter and receiver resonance circuits [5]:



Resonance LC Transmitter circuit

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The modified receiver circuit with the inverting operational amplifier

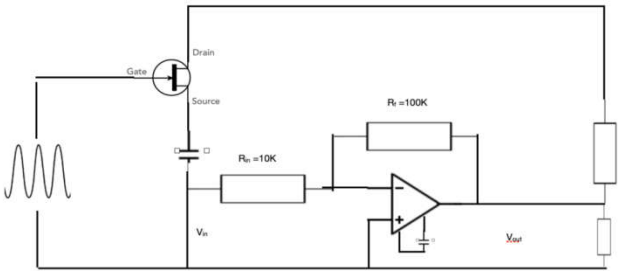

Figure 1. Receiver and transmitter circuit of the Wireless Charging

In order to capture the (various) electromagnetic signals from the transmitter side, one must add the corresponding (with the possibility of variable inductor) frequency resonance LC circuit:

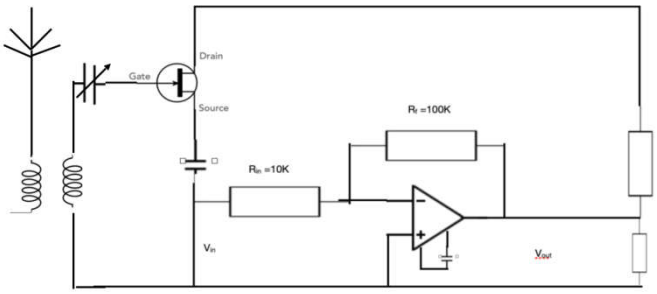

Figure 2. Variable (capacitor) frequency resonance LC circuit for the capturing of different EM signals (as the receiver circuit)

This author notes that there are lots of related resonance mathematics to the above transmitter and receiver but the focus of the present paper is how the EM wave may affect to our environment, thus I will skip the computational details. In order to employ the services of the proposed modified telephone booth, first, the user selects the service that they want. For example, if they want wirelessly charging for their mobile phone then they would select that option and then input a pre-registered username and password. This would then log them into the modified telephone booth through the centralised

management information system. After choosing the preferred payment method, wireless charging begins and a status bar appears showing a charging graphic [4]. This applicant proposes that it would be valuable finding out what types of wireless services (apart from wireless microwave charging) are required. The other multi-media services mentioned earlier are simply this applicant's own personal suggestions. Another important question is the source of the charge energy. This applicant proposes that wireless charging (microwave) energy should come from a renewable source such as solar panels located nearby. After collecting solar energy from the sun, the energy will be stored in a battery. The energy would then be transmitted wirelessly from an antenna to a receiver using a suitable rectifier circuit located in the booth. The advantage of this form of wireless charging over existing rechargeable mobile batteries is that it is less volatile and will not suddenly catch fire. However, it is unclear whether man-made EM waves are harmful to the environment [6]. Therefore, it is important to determine how much safer is this form of charging over traditional rechargeable batteries, and whether it is more environmental friendly?

RESEARCH METHODOLOGY

This author proposes a mixed methodology approach of both qualitative and quantitative methods. A qualitative online survey and focus group interviews will be used to determine what type of multi-media services people want. Participants will be invited to take part by reaching out online through email recruitment. There will also be quantitative experiments to measure the growth of plants and animal behaviours (latent variables) under the effects of man-made EM waves. The outcomes can be further studied using structural equation modelling to determine the relationships between these variables. As a result, it can be ascertained whether man-made EM waves are suitable for wireless charging. An experiment will also be performed to see whether the proposed method of charging is more environmentally friendly and safer than traditional rechargeable batteries.

Research Design

This author will employ a factorial design, which is a modification of the between-group design. The research will study two or more categorical or independent variables with the examination at two or more levels [7]. Hence, one can investigate the independent and simultaneous effects of two or more independent treatment variables on an outcome. In this research, the author suggests the following experiment to study the effect of wireless chargingon seeds:

Factor 1: Type of location

Level 1: Placing a seed near a wireless micro-wave charging station
Level 2: A normal garden without man-made EM wave effects

Factor 2: Height of the seeds after one week

Level 1: Large increase
Level 2: Medium increase
Level 3: Small increase

This is what is known as a two by three factorial design. If there are three independent variables with four different levels, it would be a 2 X 3 X 4 design. In this research, six factorial design groups will be assigned to two conditions:

Group 1	Small increase in height	Near charging station	Post-test
Group 2	Medium increase in height	Near charging station	Post-test
Group 3	Large increase in height	Near charging station	Post-test
Group 4	Small increase in height	Normal garden	Post-test
Group 5	Medium increase in height	Normal garden	Post-test
Group 6	Large increase in height	Normal garden	Post-test

The seeds will be divided into six groups and height of the seeds corresponding to the proximity of the charging station will be measured. Simultaneously, other seeds growing in a normal garden without man-made EM wave effects will have their height measured [8]. These two groups of seeds will be further divided into three categories: a large increase in height, a medium increase in height, and a small increase in height. At the end of the experiment, a post-test will be run, which will measure the rate of growth for individual seeds. The height of the seeds will be organised into six table cells to visually represent their differences:

	Increase in height of seeds		
Near Butterfly Charging station	Mean rate of growing	Mean rate of growing	Mean rate of growing
Normal garden	Mean rate of growing	Mean rate of growing	Mean rate of growing

Use of statistical software such as SPSS will allow the statistical results for both the main and interaction effects to be better analysed.

1. Main effects: The influences of each independent variable (type of location or increase in height of seeds) in the experiment;
2. Interaction effects: The influence on one independent variable depends on another independent variable (proximity to the charging station or in the normal garden) in the experiment.

In addition to the factorial research design, the study will also employ a cross-sectional survey design for the qualitative part of the research [9]. This was chosen because another part of the research concerns people's attitudes or practices in regards to the community's needs. Hence, the survey will attempt to answer: What type of wireless services, apart from wireless microwave charging, is required?

A cross-sectional study is able to better examine people's attitudes, beliefs, opinions, and practices, which are ways in which people think and behaviour, respectively. Group comparisons compare between males and females, old and young, private organisations and public sectors, etc. Indeed, there are many different types of questionnaires and interviews that can be used in qualitative research. One of the most well-known are online surveys such as the SurveyMonkey [10]. However, this may result in a low response rate. One of the ways around a low response rate is to provide some form of reward to attract people to participate.

Conclusion

This author believes that the proposed redesigned phone booth wireless charging station can replace the traditional rechargeable battery scheme. As a result, it is hoped that mobile devices will be able to be charged anywhere and at any time. Moreover, this author believes the proposed wireless

charging station will be safer and more environmentally friendly than traditional ones. Hopefully, it will not only be convenient but also common place in the near future.

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