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無線充電機器人開發

Development of Wireless Charging Robot

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## 壹、計畫摘要

The aim of this research is to develop a novel and advanced mobile robot that can transfer power wirelessly. Now a day's wireless charger and mobile robot is very forefront technology. Our motivation for this research is to combine these two technologies and furthermore make this wireless power transmission robot autonomous so that our mobile devices can get the charge in different unusual situation.

The initial project has been started with the literature reviewing for the purpose of understanding the different wireless power transfer system and the better choice of wireless charging system for mobile devices. In addition, mobile robot that can be usable for moving the charging object is also reviewed by finding the latest mobile robot in the market as well as designed own prototype for user test.

Inspired by the first prototype and different user test, in the next phase a model will be developed which uses artificial intelligence and mathematical techniques to form the structure of the Probabilistic Roadmap algorithm where for the robot navigation we can reduce the charging path and get the shortest way to find appropriate charging node. Models and algorithms will be simulated for the purpose of research and development and later those models will be applied to the advanced robotic platforms for implementation which will be used for testing and verification. In the evolution phase the model will be applied to several other domains for extension. The proposed system would be able to develop a solution in which an action or event will produce a certain response to the action in the form of another event automatically using the algorithm Probabilistic Roadmap.

## 貳、背景及目的

Human life turns to be more luxurious and digital due to the facilities of modern technologies used in every moment and every aspect in social communities. As likely wireless power transmission and robotics are the two recent technologies that give human being to think about further extension to facilitate better technology by the combination between these two high techs. Furthermore, with advances of the technology the necessity of the robotic automation is gradually changing from the tool to social entity. This is already a century now; the concept of high-tech machines that can serve the people well or relieve humans of tiresome chores has been an object of human imagination which has been done in many working places where humans are replaced by robot. The term of automation here refers to the robot, which is mainly used to perform task that requires great levels of precision or simply repetitive. The common definition of robot is often interpreted as a human-shaped machine with enough intelligence to do some movements from its starting position to another in both structured and unstructured environments and also could behave like a human. In addition, a robot generally has characteristics such as sensing the environment where the robot will be able to detect surrounding, able to move, and requires adequate energy. The

research about autonomous robots have gained an increasing interest since it deals with many different aspects of engineering, ranging from control systems and hardware, to software architectures and artificial intelligence.

Robotic has achieved its greatest success to date in the world of industrial manufacturing. Wireless power transmission is one of the advanced applications where power is being transmitted from one transmitting end to the receiving end without connection of wires. Henceforth, this technology has been going popular in the smart mobile device sector where smartphone, laptop, mobile tab batteries can easily get wireless charging option in the new built technologies. Smartphone that going to be more synchronized and going to tiny electronic particle for daily communication, wireless charging batteries added extra value hereafter. In addition, mobile robot that can easily built in with this wireless power transmission technology can bring this facility to the smart mobile devices user for relief the extra tension to getting battery charge end its lifetime. Therefore, in this research these two technologies have brought in one combination to create wireless power transmission (WPT) robot.

In contrast, a mobile robot would be able to travel throughout the manufacturing plant and can put their position wherever its condition. Mobile robot is an autonomous or semiautonomous machine that capable to move around in their environment and also can perform various tasks either with direct or partial control by human supervision or completely autonomous.

#### SMART MOBILE CULTURE

Cell phone to smart phone during this generation gap where there are verities of mobile technologies keep up with new technological offering in our society. It's a smart phone cultural things that changes the traditional environment of communication to smart communication in both of its mobile application namely voice chatting and text message chatting. Developed and developing countries getting more involved with this new communication system.

For maintaining the power charge for this huge mobile industry, wireless power transmission or wireless charging system for the mobile devices can carry a great importance for this new wireless charging technology and this technology with the combination of mobile robot can figure out another wireless power transmission robotic technology to break the traditional charging system to a smart robotic charging system, which is concern of this research.

#### 參、研究方法及進行步驟

##### DESIGN

The main goal of the wireless power transmission robot is to establish a robot which is combination between mobile robot and wireless charging system. Therefore, different kind of recent mobile robotics system and wireless power transmission system have been reviewed Throughout this literature review process, design parameters for WPT robot were found.

##### PROTOTYPING



硬體設計	√	√	√	√								
軟體設計		√	√	√	√	√	√					
執行測試修正			√	√	√	√	√	√	√	√	√	√
進度累計百分比(%)	5%	10%	15%	20%	25%	30%	40%	50%	65%	80%	90%	100%

## 柒、參考文獻

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