Short Communication

iMedPub Journals
www.imedpub.com

International Journal of Innovative Research in Computer and Communication Engineering

2021
Vol.6 No.3:07

Transfer Based on Hybrid Approach for Biomedical Implantable Device

Mihir R. Khan*

Department of Bioinformatics, Kermanshah University of Medical Sciences, Iran

Abstract

This work describes the creation of a new capacitive power transfer (CPT) design technique for biomedical implants that is based on a hybrid concept. This approach is capable of addressing a number of difficulties that have been identified in the widely used bipolar CPT method. Based on this capability, the CPT system simulation has been built to demonstrate the amount of power passed through a layer of tissue. The design was accomplished with square plates that had a layer of beef with a thickness of mm between two connecting plates to validate the suggested model for powering the implanted device. Class E zero voltage switching was used to generate the power signal. The Class E zero voltage switching has been designed to generate alternate current at a frequency of MHz, which is suitable for the hybrid CPT system requirements.

Keywords: Biomedical implant devices; Class E zero voltage switching; Hybrid capacitive power transfer

Received: September 04, 2021, **Accepted:** September 18, 2021, **Published:** September 25, 2021

***Corresponding author:**
Mihir R. Khan

mihirraj1984@gmail.com

Department of Bioinformatics, Kermanshah University of Medical Sciences, Iran

Citation: Khan MR (2021) Transfer Based on Hybrid Approach for Biomedical Implantable Device. Int J Inn Res Compu Commun Eng. Vol.6 No.3:07

Introduction

Wireless power transfers have been extensively investigated for a variety of applications, including electric vehicle charging, smartphone charging, RFID devices, implanted device powering, and much more. Near field and far field power transfer applications are two types of wireless power transfer applications. Inductive resonance frequency coupling (IRFC), ultrasonic energy transfer, and near-field capacitive coupling are three forms of near-field approaches (NCC) [1]. Other researchers had previously performed a comparison of the properties of each type of wireless power transfer.

According to the comparisons done, each type of wireless power transfer has an advantage over the others. This justifies the fact that each type of WPT can be used depending on the biomedical implanted device's compatibility and requirements. The development of biomedical implants has resulted in the production of a variety of implantable devices to meet medical demands, including cardiovascular implantable devices, Cochlear implantable devices, neural implantable devices, retinal implantable devices, and more [2]. Each implantable device has its own set of parameters, particularly in terms of power characteristics, that allow it to function safely. Some implantable devices require a biosafety electrical power source to function properly. The implantable device's sealed battery can only provide energy for a limited amount of time [3]. The patient will be traumatised by the repeated battery replacement surgeries. Because of the constant reliance on electrical power sources, a wireless power transfer method is needed to overcome the restricted battery power source capability, which could save the patient from having to undergo surgery again to replace the battery of implants.

Conclusion

The goal of this research is to develop a new hybrid capacitive power transfer technology for biomedical implanted devices. According to this research, hybrid capacitive power transfer systems are a novel technology that could be used in biomedical implantable devices. The hybrid CPT techniques eliminated the return path active coupling plate to produce the whole current flow in the circuit, which was a solution to the bipolar CPT problem. The analysis revealed that the hybrid CPT system is more efficient than the bipolar system, which has a lower total output reactance value. The biomedical implantable device specification, however, limited all aspects, particularly size and biosafety.

References

1. Baharvand H, Mehrjardi N, Hatami M, Kiani S (2007) Neural differentiation from human embryonic stem cells in a defined adherent culture condition. Int J Dev Bio 51:371-378.

2. Valensi-Kurtz M, Lefler S, Cohen MA (2010) Enriched population of PNS neurons derived from human embryonic stem cells as a platform for studying peripheral neuropathies. PloS One 5: 9290.

3. Hardingham G, Patani R, Baxter P (2010) Human embryonic stem cell-derived neurons as a tool for studying neuroprotection and neurodegeneration. Mol Neurobiol 42: 779-787.