

Abstract:

Transcutaneous Electric Nerve Stimulation mainly aims at improving quality of life of people suffering from chronic pain. In this project, we aim to investigate transcutaneous electric nerve stimulation in order to take further steps in developing TENS technology, which can offer a new treatment options for patients with chronic pain. This technology uses electric impulses that passes through the nervous system, reducing its ability to transmit pain signals to the central nervous system. Also, electrical impulses stimulate the body to produce natural pain relievers which is called endorphins. This project describes how to produce these electric impulses using microcontrollers integrated with other electronic components like transistors, diodes, and transformers, in addition to, conducting certain tests to ensure it produces the desired output. Another section discusses implementing a smartphone application to control the device, improving the patient experience. Finally, designing the device enclosure, besides using additive manufacturing to produce it in order to have a complete prototype device. The goal of this project is to familiarize engineers and designers with the knowledge to implement such a device and pave the way for further developing and improving the device that will provide patients with the optimum solution for their pain, improving the human welfare. Guidelines are mentioned to assist in components selection and the designing process to achieve favorable results.