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CLASSIFY DIFFERENT ATTACK PATTERNS IN DEEP BRAIN IMPLANTS USING LSTM

Abstract

Deepbrain stimulators (DBSs), a widely used and comprehensively acknowledged restorative methodology, are a type of implantable medical device which uses electrical stimulation to treat neurological disorders. These devices are widely used to treat diseases such as Parkinson, movement disorder, epilepsy, and psychiatric disorders. Security in such devices plays a vital role since it can directly affect the mental, emotional, and physical state of humanbodies.Inworst-casesituations, it can even lead to the patient's death. An adversary in such devices, for instance, can inhibit the normal functionality of the brain by introducing fake stimulation inside the human brain. Nonetheless, the adversary can impair the motor functions, alter impulse control, induce pain, or even modify the emotional pattern of the patient by giving fake stimulations through DBSs. This paper presents a deep learning methodology to predict different attack stimulations in DBSs. The proposed work uses long short-term memory, a type of recurrent network for forecasting and predicting rest tremor velocity. (A type of characteristic observed to evaluate the intensity of the neurological diseases) The prediction helps in diagnosing fake versus genuine stimulations. The effect of deep brain stimulation was tested on Parkinson tremor patients. The proposed methodology was able to detect different types of emulated attack patterns efficiently and thereby notifying the patient about the possible attack.