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MERGING BRAIN COMPUTING INTERFACE (BCI) & NEURAL NETWORKS FOR BETTER AUTHENTICATION & RECOGNITION

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Brain Computing Interface (BCI) has been proved helpful for the different streams of technology, considering the sensitivity of data in the current era it is required to build new security protocols and authentication models. Just like other fields of technology Brain Computing Interface could also be useful for making the data security better by using BCI as an authentication method without any hard physical inputs. The focus of the issue shifts to 'recognition' of EEG signals pattern and making the authentication model self-learning to increase its efficiency. This leads us to involve Artificial Neural Networks in the authentication system to make it efficient and intelligent.

A brain computer interface (BCI), sometimes called a mind-machine interface (MMI), direct neural interface (DNI), or brain–machine interface (BMI), is a direct communication pathway between an enhanced or wired brain and an external device. BCIs are often directed at researching, mapping, assisting, augmenting, or repairing human cognitive or sensory-motor functions.

BCIs comprise an active area of research and could start to integrate advances from adjacent fields such as neuroscience, nanomaterials, electronics miniaturization, and machine learning. For example, one neuro-imaging research project is starting to make guesses as to what participants see during brain scans, purporting to be able to distinguish between a cat and a person. Merging this kind of functionality with BCIs might produce new applications. Other experimental BCI projects have been proposed. One is Neocortical Brain-Cloud Interfaces: autonomous nanorobots that could

connect to axons and neuronal synaptic clefts, or embed themselves into the peripheral calvaria and pericranium of the skull. Another project, Brainets, envisions linking multiple organic computing units (brains) to silicon computing networks. A third project is Neural Dust, in which thousands of 10-100 micron-sized free-floating sensor nodes would reside in the brain and provide a computing processing network.

Combining Brain Computing Interface (BCI) with Neural Networks. Presently ever device is under a threat of security breach and taking into account the sensitivity of personal data and how human lives are half digital makes this issue an important one for humans. It is required to secure our devices with a more secure and innovative protocols instead of the mainstream methods. All the past authentication methods being used by us are breach-able and have a history of either hack attacks or simple security breach due to the weak type of authentication models. All of the authentication models we have so far need an input from the user. This input method is the main loophole which makes it not good enough to protect our devices.

If the authentication models will need a physical input from users then it is highly likely that the user is at risk because the input can be acquired either by trick or by force.

An authentication model based on EEG signals was proposed to overcome this problem and it could be a method of thoughts without any hard physical input. BCI is capable of reading the Brain Signals and then the proposed model in previous paper was developed to authenticate a user based on brain signals and matching the patter with the one stored in a database.

Authentication for BCI with Neural Networks. As we have developed a consensus above that Neural Networks can perform recognition in a very impressive way which is not possible otherwise. So a better thought is to use Neural Networks on the EEG Based Authentication Model and make the Neural Network learn the patterns of user's authentication routine. Here the Neural Network will not only match the pattern to authenticate the users but it will learn gradually the changes in EEG Signals pattern and become more intelligent in a way to recognize the user.

The ultimate task will be to train the Neural Network to the point where it will not need to match the EEG Signals with the first every stored pattern but it will be able to recognize the user based on the later learnings which were learnt in result of trainings.

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РЕШЕНИЕ ЗАДАЧИ ПРЯМОЙ КИНЕМАТИКИ ДЛЯ АНТРОПОМОРФНОГО МЕХАНИЗМА С ИСПОЛЬЗОВАНИЕМ КВАТЕРНИОНОВ

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Роботизированные системы различного рода и назначения в современном мире получили большое распространение и используются не только в промышленности, но и в сферах, где жизненно необходимо заменить человека (экстремальные температуры, радиация, пожары, боевые действия). В настоящее время помимо промышленных роботов,