Finish sorting out the classification log for all 25 – or check if that has already been done and ive just not checked properly

20/07/2020

Apply the ground truth

Search for machine learning

Have a look at the possible variations of things that we can do

Organise a meeting that can be for this side of the weekend, in two or three days to confdirm any implementation things before we start to commit to anything

Potential for remote access but we will discuss this at later date.

Start a lit review part of it

**Found a paper that made use of CWT followed by a SCNN (simple CNN?)(not sure what the s is for) for motor imagery**

* Li, F.; He, F.; Wang, F.; Zhang, D.; Xia, Y.; Li, X. A Novel Simplified Convolutional Neural Network Classification Algorithm of Motor Imagery EEG Signals Based on Deep Learning. Appl. Sci. **2020**, 10, 1605.

**This paper discusses both the usage of feature extraction techniques for deep learning algorithms such as the CNN as well as end to end learning for classification that makes use of just the LSTM model and the raw data as input for classification. This has mostly been used by ECG data but may have an application with this particular data due to the spiking that occurs.**

* Rim, B.; Sung, N.-J.; Min, S.; Hong, M. Deep Learning in Physiological Signal Data: A Survey. Sensors **2020**, 20, 969.
* Ma, X.; Qiu, S.; Du, C.; Xing, J.; He, H. Improving EEG-Based Motor Imagery Classification via Spatial and Temporal Recurrent Neural Networks. In Proceedings of the 2018 40th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), Honolulu, HI, USA, 18–21 July 2018

**This one takes into account LSTM and fast Fourier features for classification**

* Wang, P., Jiang, A., Liu, X., Shang, J. and Zhang, L., 2018. LSTM-based EEG classification in motor imagery tasks. *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, *26*(11), pp.2086-2095.

**This paper proposes feature extraction via: “We proposed the rational DSTFT, which is an adaptive generalization of the classical STFT”. Which is potentially worth more of a look into. I was looking at adaptive wavelet previously.**

* Samiee, K., Kovacs, P. and Gabbouj, M., 2014. Epileptic seizure classification of EEG time-series using rational discrete short-time Fourier transform. *IEEE transactions on Biomedical Engineering*, *62*(2), pp.541-552.

**time-frequency images using Short-Time Fourier Transform (STFT) for use in a CNN.**

* Zhang, J., Yan, C. and Gong, X., 2017, October. Deep convolutional neural network for decoding motor imagery based brain computer interface. In *2017 IEEE International Conference on Signal Processing, Communications and Computing (ICSPCC)* (pp. 1-5). IEEE.
* Shovon, T.H., Al Nazi, Z., Dash, S. and Hossain, M.F., 2019, September. Classification of motor imagery eeg signals with multi-input convolutional neural network by augmenting stft. In *2019 5th International Conference on Advances in Electrical Engineering (ICAEE)* (pp. 398-403). IEEE.

Have a talk about the phd things

Have a talk about the pgt form filling in for this month

Have a talk about next steps and see what needs to be done in gereal I don’t know iim just brainstorming here!!

Ahhhhhhhh

Creates an image-like output

Using the raw data as a signal – or feed it in as an image

We can create our own smaller image based on this signals – produced by ourselves