**Final Evaluation Results**

**Final Models Directory**

With all the experimentation now complete and the optimal setups of models ascertained (including the different hyperparameters, input types to use, etc.), we wish to extract the models from the set of all created models that we have used for the project. In total, there were 762 models created, many of which were only used for a single experiment set or model predictions set. Therefore, in any effort to separate the models created for experimentation purposes and those being used for ‘production’ (in other words, the models called upon by a user assessing a file in it’s final state), we copied the necessary models from the ‘rnn\_models’ directory located within the local directory and added them to another directory, ‘rnn\_models\_final’, within the project directory under ‘<project directory>\source\’. This was done for several reasons:

* It allows one to use the system completely free of the local directory (thus not requiring the large amount of data to download or models to setup via the data pipeline and the ‘rnn.py’ script). Thus, a user would only need the models within ‘rnn\_models\_final’ to assess files using ‘model\_predictor.py’ and/or a wrapper ‘assess\_’ batch script.
* As the project directory contains the majority of what constitutes the project deliverables, we add in the chosen models as another deliverable in the form of a distinct directory; these are the deliverables as a consequence of many experiment sets and model predictions sets where we looked for the best possible model setups to solve the problems we were looking to solve.
* We wouldn’t necessarily want to include all the models within ‘rnn\_models\_final’, as these will not be accessed via any of the ‘assessor\_’ batch scripts, as by definition they would not be the best models to assess with via ‘model\_predictor.py’ (as they have been proven to be the inferior option via the various experiment sets and model predictions sets); furthermore, they are a form of intermediate data and thus predominantly lie within the scope of the local directory, along with other forms of intermediate data (such as computed statistical values and extracted raw measurements).

With regards to the models themselves, they broadly fall under three categories, which encompass all 48 models contained within ‘rnn\_models\_final’:

1. Models trained on all the subjects (i.e. no left-out subjects) contained within the NSAA data set, with supplementary data from NMB (maximum of 3 files per subject), all of the data available used for training, a sequence length of 600, a sequence overlap of 0.9, a discard proportion of 0.9, and the number of training epochs set to 20. One model trained per combination of input types (joint angle, sensor magnetic field, position, and AD) and output types (‘dhc’, ‘overall’, ‘acts’).
2. Models trained on all the subjects (i.e. no left-out subjects) except for files of ‘V2’ subjects (e.g. a file containing ‘D4V2’ is not used) contained within the NSAA data set, with supplementary data from NMB (maximum of 2 files per subject), all of the data available used for training, a sequence length of 600, a sequence overlap of 0.9, a discard proportion of 0.9, and the number of training epochs set to 20. One model trained per combination of input types (joint angle, sensor magnetic field, position, and AD) and output types (‘dhc’, ‘overall’, ‘acts’).
3. Models trained exclusively on either the NSAA of NMB data set with no subjects left-out, which is then useful in analyzing subject files from an alternative directory. All of the data available is used for training, along with a sequence length of 600, a sequence overlap of 0.9, a discard proportion of 0.9, and the number of training epochs set to 20. One model trained per combination of input types (joint angle, sensor magnetic field, position, and AD) and output types (‘dhc’, ‘overall’, ‘acts’).

It should be noted that categories 2 and 3 will have been created and used by the user undertaking model predictions sets 21 and 23, respectively, while models from category 1 will have been created independently by running the ‘models\_no\_leftout’ script found in ‘<project directory>\source\batch\_files’. This is because, while we have very similar models that will have been created in MPS 20, these all contain one subject left-out of the training set (so as to assess this subject on the models to test generalization ability). If we wish to test subject files in production, we want to use models that have been trained on all available training data; hence, the ‘models\_no\_leftout’ is run to create these models, which constitute category 1.