Because of the time series nature of the data, we decided to use a convolution neural net as the base structure for our model. In addition, we will use latent output from the CNN to train an xgboost classifier to do the final classification.

In order to use this data with a CNN, it must not be missing any values, which the raw data is. In order to fix this, any values missing after the start were added using linear interpolation, then any values missing at the beginning of the signal were replaced with 0s .

In addition to the raw signal data, a channel of derived data was added by calculating the ratio of aortic pressure to brachial pressure at each time step. Data was split into training and validation sets using an 80/20 split.

The structure of the CNN is 6 convolutional layers each with kernel size of 65 followed by 3 fully connected layers. There is a 10% dropout layer after the first convolutional layer, and pooling layers after the second, fourth and sixth convolutional layers.

The CNN was trained using the training set, and at the end of each trained epoch, the network was tested on the validation set. Training was stopped when the validation score did not improve for 10 epochs.

In order to improve performance, the output of the CNN after the convolution layers and before the fully connected layers was fed to an XGboost classifier. The xgboost classifier was able to classify with better performance than the fully connected layers of the initial CNN by analyzing the latent space created by the convolutions.