ACTIVITY SET (class labels)

The activity set is listed in the following:

- L1: Standing still (1 min)
- L2: Sitting and relaxing (1 min)
- L3: Lying down (1 min)
- L4: Walking (1 min)
- L5: Climbing stairs (1 min)
- L6: Waist bends forward (20x)
- L7: Frontal elevation of arms (20x)
- L8: Knees bending (crouching) (20x)
- L9: Cycling (1 min)
- L10: Jogging (1 min)
- L11: Running (1 min)
- L12: Jump front & back (20x)

NOTE: In brackets are the number of repetitions (Nx) or the duration of the exercises (min).

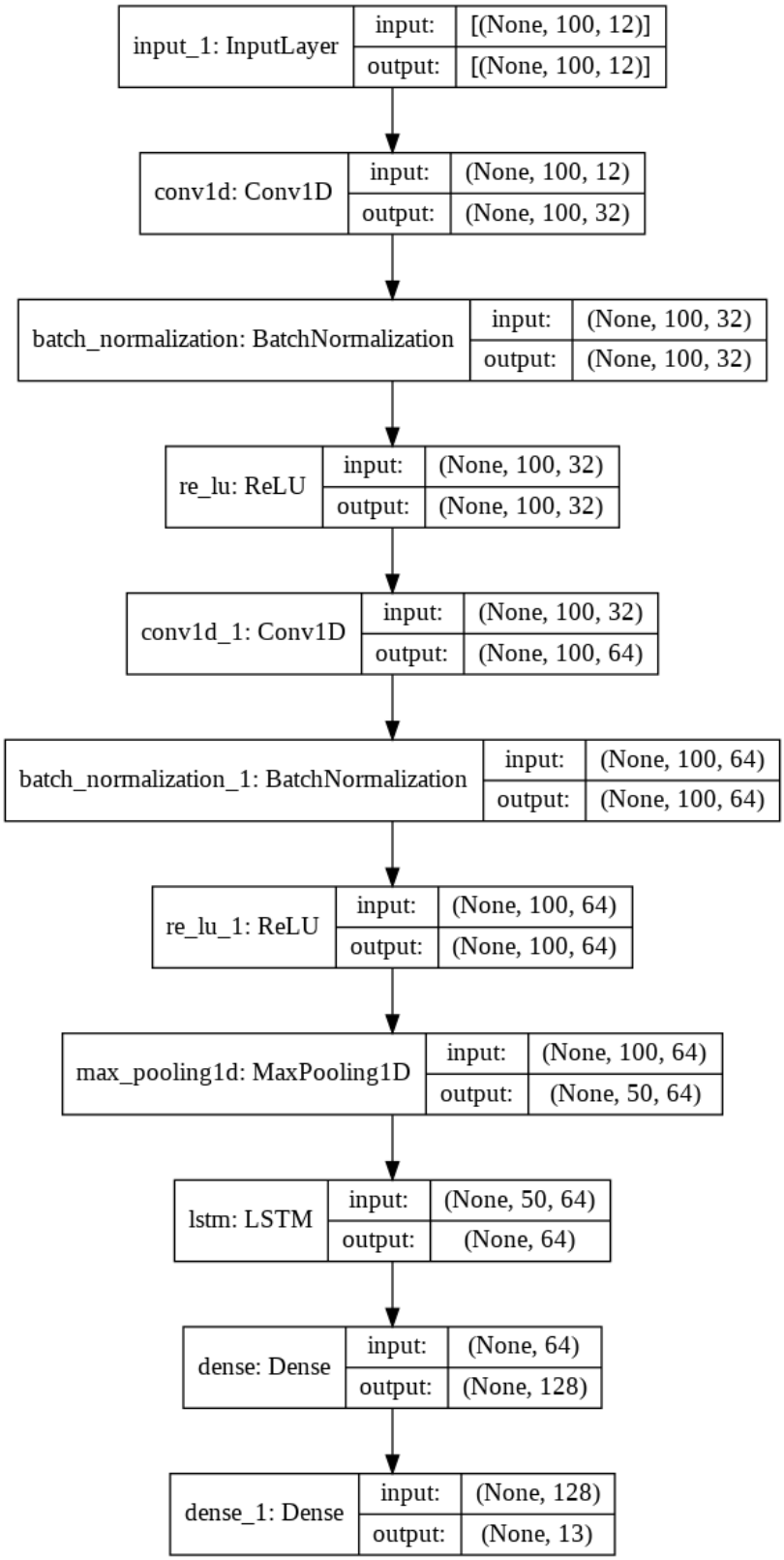
Code

Whole project is split into 3 parts:

- Fetching Data from UCI machine learning repository.
- Performing EDA to gain insights about the data and prepare dataset for DL.
- Train Deep Learning model and make predictions.

Well, we can easily distinguish between static and dynamic activities by looking at the data but for differentiate between same kind, we need Machine learning or deep learning model. As this is time series problem, I've used LSTMs for model training.

Model Architecture:


input_1: InputLayer
input: [(None, 100, 12)]
output: [(None, 100, 12)]
conv1d: Conv1D
input: (None, 100, 12)
output: (None, 100, 32)
batch_normalization: BatchNormalization
input: (None, 100, 32)
output: (None, 100, 32)
re_lu: ReLU
input: (None, 100, 32)
output: (None, 100, 32)
conv1d_1: Conv1D
input: (None, 100, 32)
output: (None, 100, 64)
batch_normalization_1: BatchNormalization
input: (None, 100, 64)
output: (None, 100, 64)
re_lu_1: ReLU
input: (None, 100, 64)
output: (None, 100, 64)
max_pooling1d: MaxPooling1D
input: (None, 100, 64)
output: (None, 50, 64)
lstm: LSTM
input: (None, 50, 64)
output: (None, 64)
dense: Dense
input: (None, 64)
output: (None, 128)
dense_1: Dense
input: (None, 128)
output: (None, 13)

Result

It performs well on almost all activities but confuses between few activities.