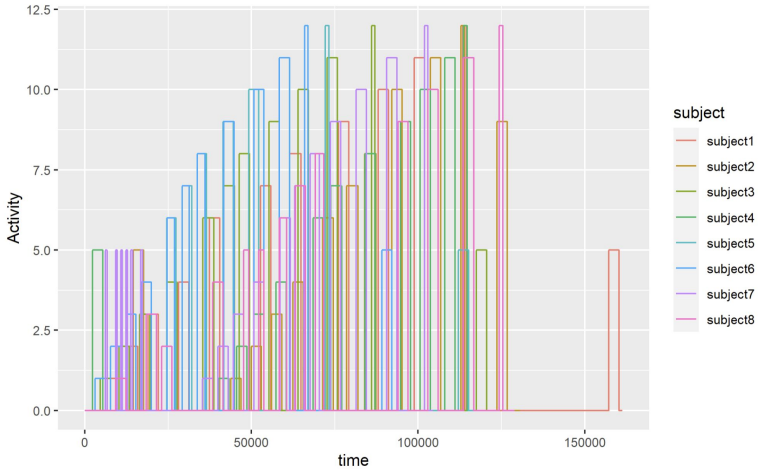
Data: mHealth wearable sensor data

- Sequential movement acceleration & gyro

Research question: Can a ML model be developed to classify activity type based on raw sequential movement data? How does hyperparameter tuning influence model performance?



Activities over time by subject

Data processing

- Activity & subject distributions
- Sequence organization
- Splitting data: 80% train, 20% test
  - Exclusive subjects
- Accounting for outcome imbalance

LSTM model

- Preserve sequential info
- Recalls early data better than RNN

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LSTM Model Building and Tuning

Training data

Normalize

Create sequences

Undersample activity 0 to balance

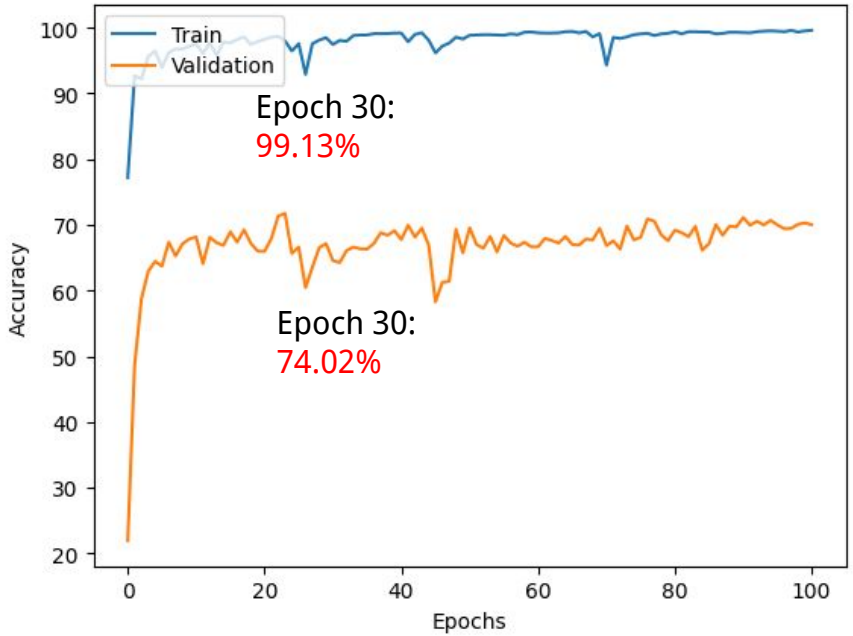
Test data

Normalize

Create sequences

Run model & tune hyperparameters

- Softmax activation function for non-ordinal multi-category outcome
- 100 epochs used, 30 epochs is best
- Adam Optimizer and Cross Entropy Loss



Gridsearch Parameters (Best in bold)

- Batch sizes: **64, 128**, 256, 512
- Learning rate: 0.001, **0.01**, 0.1
- Hidden size: 16, 32, 64

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