bhimmetoglu / **time-series-medicine**

Branch: **master** **time-series-medicine** / **HAR** /

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README.md

Human Activity Recognition (HAR)

In this part of the repo, we discuss the human activity recognition problem using deep learning algorithms and compare the results with standard machine learning algorithms that use engineered features.

The data can be downloaded from the UCI repository.

Also see G.Chevalier's repo and A. Saeed's blog where I have got lots of isnpiration.

Contents

The `utils` folder contains the code for reading and processing the data into a tensor form. The generated tensors has the dimensions

```
(batch, seq_len, n_channels)
```

where `batch` is the number of training examples in each batch, `seq_len` is the number of steps in the time series (128) and `n_channels` is the number of channels where observations are made (9).

The aim is to clasify the activities correctly, which are

```
1 WALKING
2 WALKING_UPSTAIRS
3 WALKING_DOWNSTAIRS
4 SITTING
5 STANDING
6 LAYING
```

Below are the architectures used for training

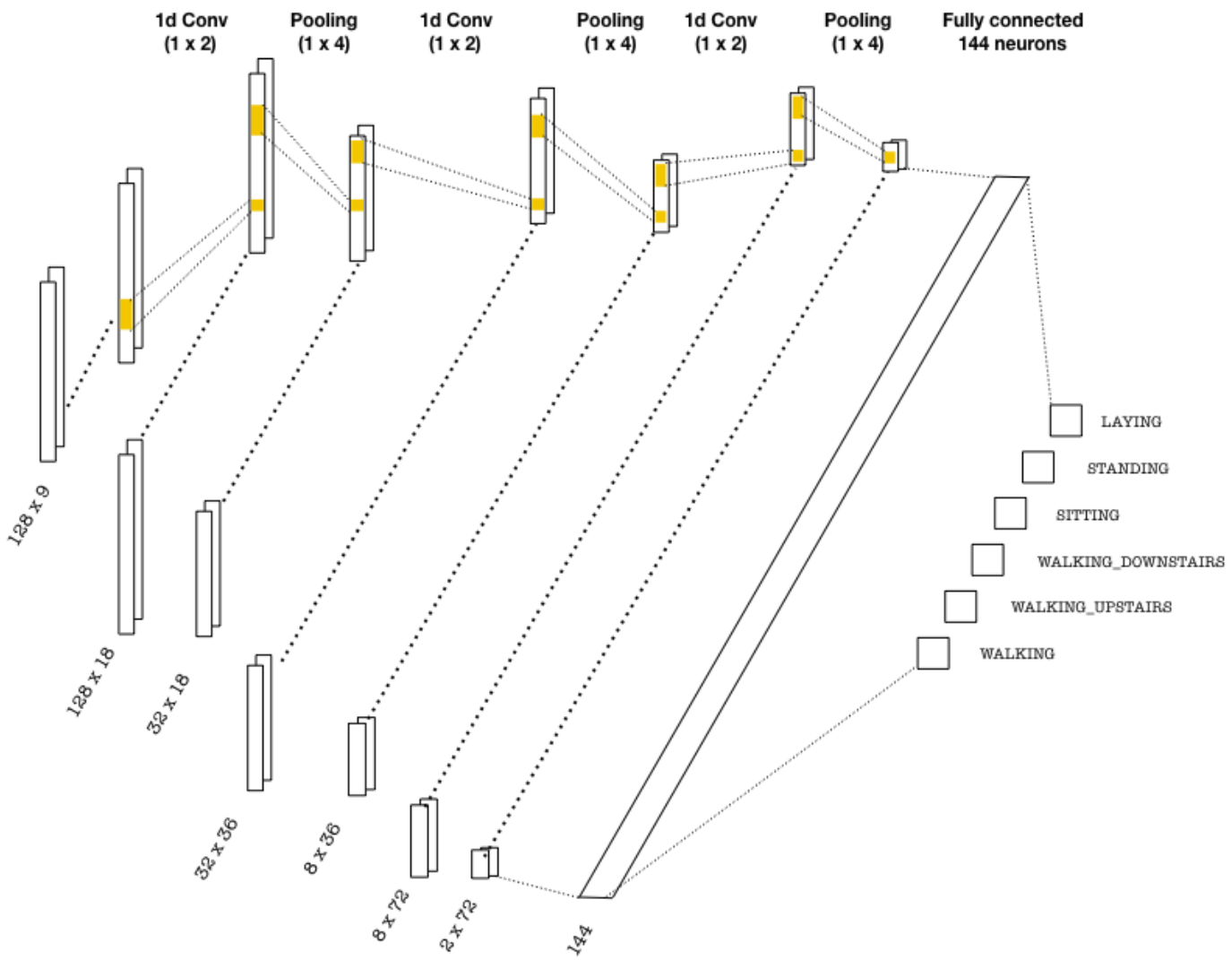
Notebook	Description
explore_data	Data exploration
HAR-LSTM	LSTM network
HAR-CNN	Convolutional neural network(CNN)

Notebook	Description
HAR-CNN-LSTM	CNN + LSTM hybrid
HAR-CNN-Inception	CNN with inception module

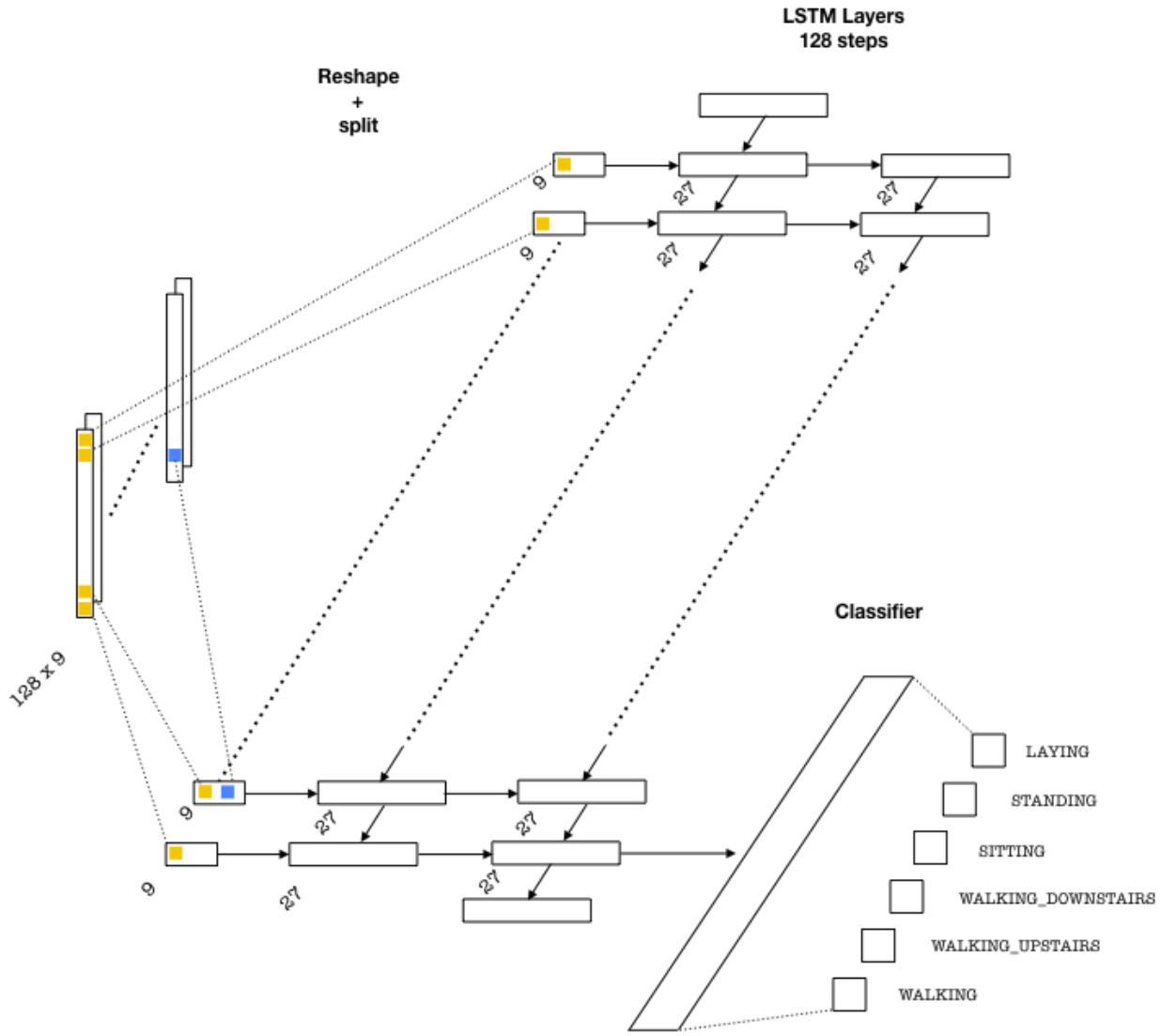
Results

Method	Test accuracy
CNN	93%
LSTM	88%
CNN+LSTM	88%
CNN+Inception	89%
Xgboost	96%

CNN architecture


1d Conv
(1 x 2)
Pooling
(1 x 4)
1d Conv
(1 x 2)
Pooling
(1 x 4)
1d Conv
(1 x 2)
Pooling
(1 x 4)
Fully connected
144 neurons
128 x 9
128 x 18
32 x 18
32 x 36
8 x 36
8 x 72
2 x 72
144
LAYING
STANDING
SITTING
WALKING_DOWNSTAIRS
WALKING_UPSTAIRS
WALKING

LSTM architecture


LSTM Layers
128 steps
Reshape
+
split
9
27
128 x 9
Classifier
LAYING
STANDING
SITTING
WALKING_DOWNSTAIRS
WALKING_UPSTAIRS
WALKING