Introduction and Motivation

- Sensors collect huge amounts of data on a day to day basis which can be very helpful for analysis.
- Quality of data can hamper the analytical result to a very great extent. Hence, veracity of data matters a lot.
- Good quality sensor data can be readily used in a real life dynamic application.
- Human Activity Recognition is one such real life application which uses sensor data.
- Since gait of humans differ from person to person, static classifiers fail to produce a good classifying mode.
- So, here we are using RNN for creating dynamic classifier and see how it fares against static classifier.
- How time series can help improve efficiency using dynamic classifier.

Data Collection and Preprocessing

- Sensor data was collected from different people at different mounting positions for experimenting with various human gait.
- Accelerometer and Gyroscope data was selected as main sensors because of huge variations.
- Activities performed – Sitting, Standing, Walking, Running, Cycling, Walking Up and Down.
- Features Extracted – Standard Deviation, Variance, Mean and Mean Tilt (Square root of Squared Sum)

System Flow & Network

- Experiment A & B - Training and testing with a single accelerometer data set and then by combining gyroscope data in it.
- Experiment C – Training with one accelerometer data set and testing it on couple of another accelerometer data set.

Experiments and Results

- Dynamic (RNN) vs Static (J48)
  - Accuracy (%)
  - Dynamic (RNN)
    - 92.12
    - 94.37
  - Static (J48)
    - 85.46
    - 86.65

Fig 1: System Flow

Fig 2: RNN Network

Fig 3: Accuracy for Mixed Model

References

- Rohit B “Impact of Mounting Positions on Data Quality and Human Activity Recognition for Wearable Sensors”
- Shashank G “Feature Set Analysis for Activity Classification and Impact of Data Quality on Classifier Accuracy”

Conclusion

- RNN proves to be a good classifier model for recognizing human activity as compared to a static classifier.
- Also can be used for different human gaits because of its great classification accuracy.