Using Snorkel to Generate Human Activity Data Labels

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November 27, 2018

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What is Human Activity Data?

- Your smartphone has many sensors.
  - Accelerometer
  - Gyroscope
  - Magnetometers
- Often want to know what activity you're doing
  - For example — are you standing still? Are you running?

What is Snorkel

- *"a system for rapidly creating, modeling, and managing training data."*
- The procedure:
    1. Programmer writes a set of (perhaps quite inaccurate) labelling functions
    2. Apply the labelling functions to the data
    3. Train a *generative* model over the functions — try to learn how noisy they are, and how they are correlated

What Datasets are Available?

- There is at least one large dataset for human activity data [1].
- Alternatively, there's a new dataset that used wearable sensors, and recorded people's moods — neutral, stressed or amused [2].

- Note: most examples with Snorkel have been with text data — we are trying something different.
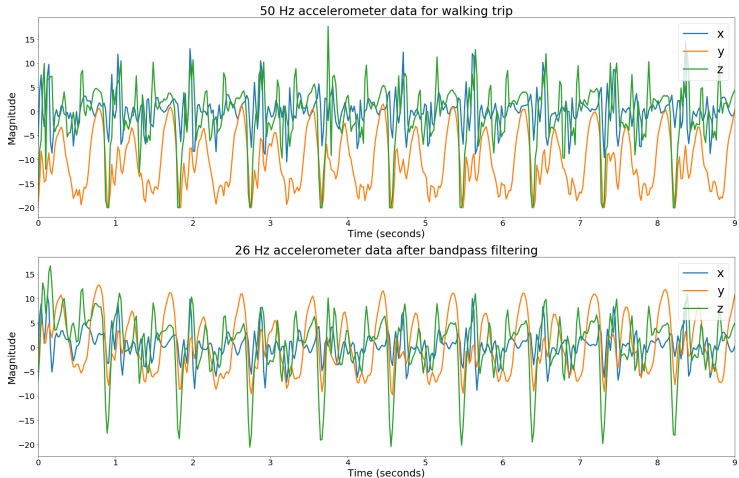
An Accelerometer Trace

Image Credit: Sentiance

Some Features We Can Use

- Consider the accelerometer.
- Look in the frequency domain — normally walk at around 100 steps per minute.
    - Will be a bit different for when you're running, or moving along stairs
- Look at raw magnitude — you expect the maximum magnitude to be much higher when you're running than when you're still

Progress

- I have looked at the Snorkel tutorial
- I've found the datasets

But I haven't got much further just yet...

References

Davide Anguita et al. "A Public Domain Dataset for Human Activity Recognition Using Smartphones". In: *Computational Intelligence* (2013), p. 6.

Philip Schmidt et al. "Introducing WESAD, a Multimodal Dataset for Wearable Stress and Affect Detection". In: *Proceedings of the 20th ACM International Conference on Multimodal Interaction*. ICMI '18. New York, NY, USA: ACM, 2018, pp. 400–408. ISBN: 978-1-4503-5692-3. DOI: 10.1145/3242969.3242985. URL: http://doi.acm.org/10.1145/3242969.3242985 (visited on 11/27/2018).