human energy®

Downsampling Time Series Data for Visualizations (and other uses)

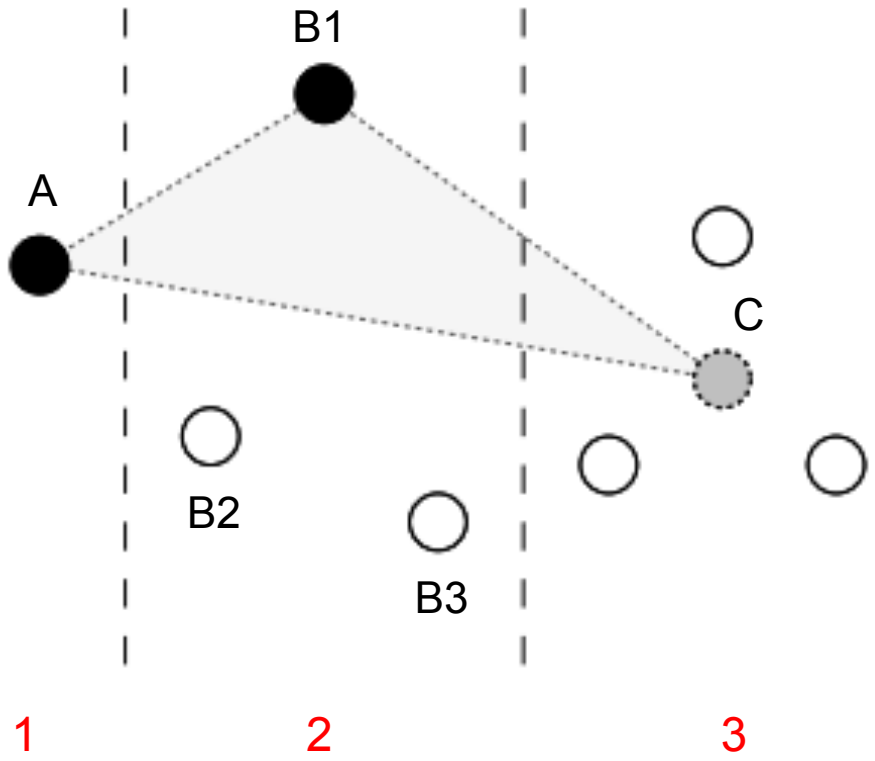
The Largest Triangle Three Bucket Algorithm

Delaina Moore, Data Scientist

The Introduction

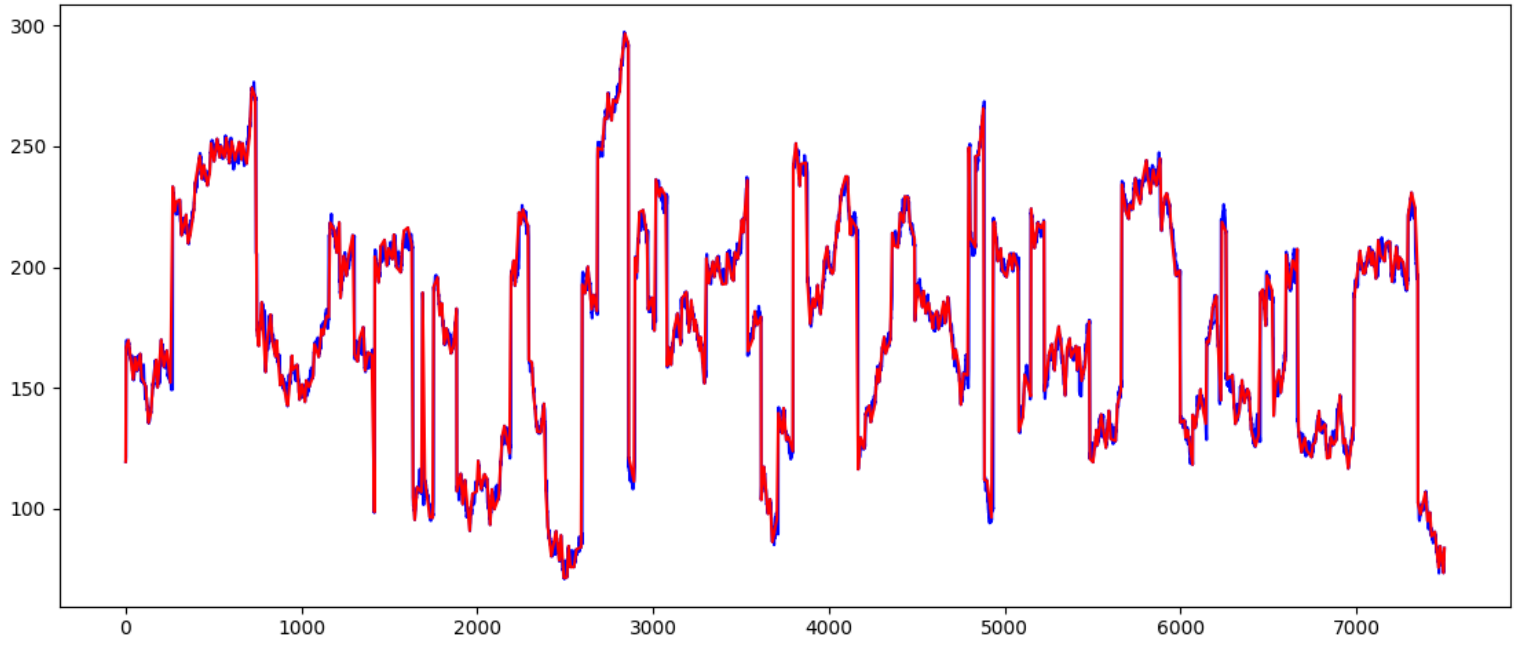
- The Largest Triangle Three Bucket (LTOB) Algorithm
- Down sample timeseries data for visualizations
  - Limit the number of data points, but keep the general shape
- Can also be used beyond visualizations and for other preprocessing and down sampling purposes
- Downsampling Time Series for Visual Representation by Sveinn Steinarsson
  - Many other algorithms are explored in this thesis, but the LTOB was examined to be the most precise and efficient for this use case.

The Math



- Separate data into buckets
  - # buckets == # sampled points
  - Choosing one point per bucket from left to right
- A is either the first point or the previous chosen point (previous B)
- C is a temporary point (average of the points in bucket 3)
- Calculate the area of each triangle
  - A-B1-C
  - A-B2-C
  - A-B3-C
- Keep the point in bucket 2 that creates the triangle with largest area

The Demo



Data

Sampled

References

Steinarsson, Sveinn. “Downsampling Time Series for Visual Representation.” *School of Engineering and Natural Sciences University of Iceland*, Háskólaprent, Fálkagata , 2013.

Sveinn Steinarsson’s GitHub Repo: sveinn-steinarsson/flot-downsample: Downsample plugin for Flot charts. (github.com)

-Adaption of algorithm in several languages