

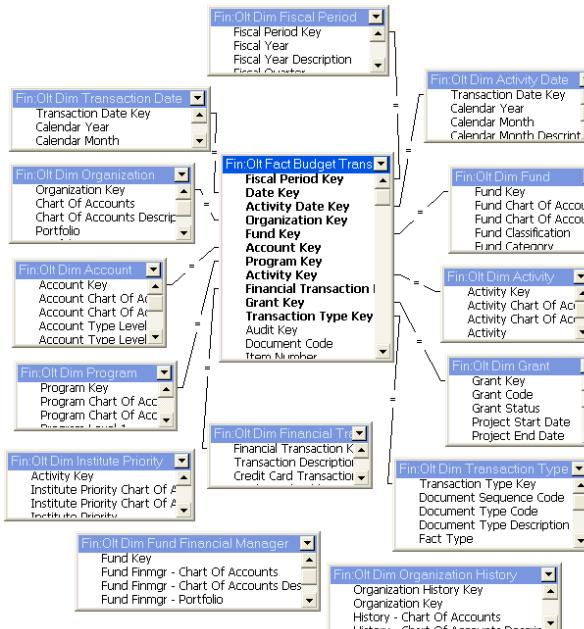
Automated time series analysis, monitoring use case

.Egidijus Pilypas

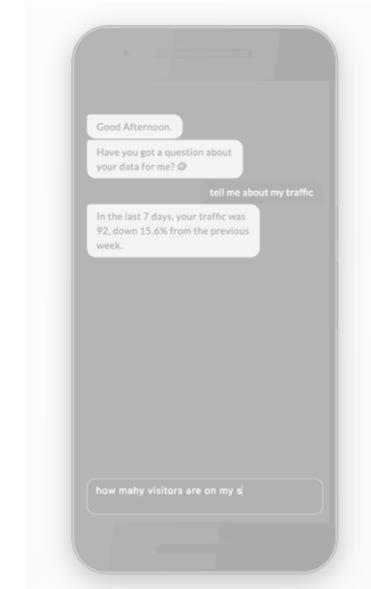
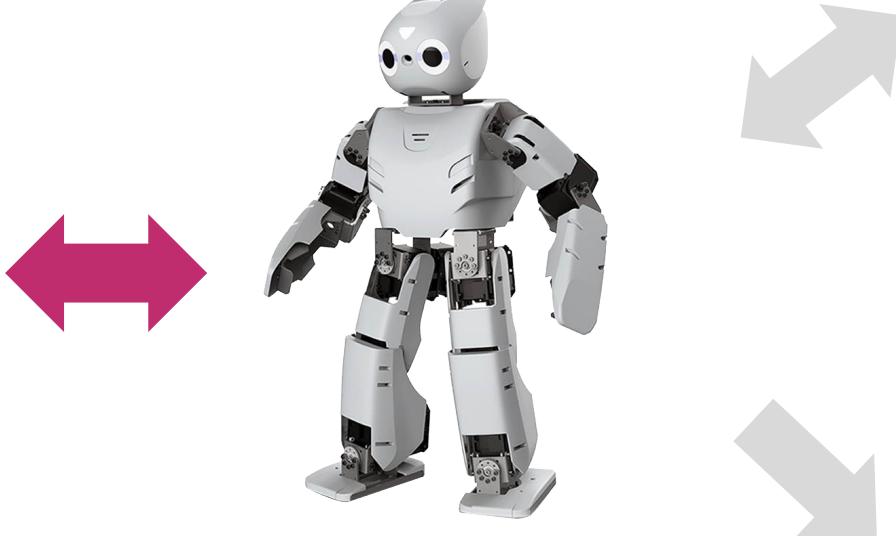
How to automate BI analytics?

Chatbot

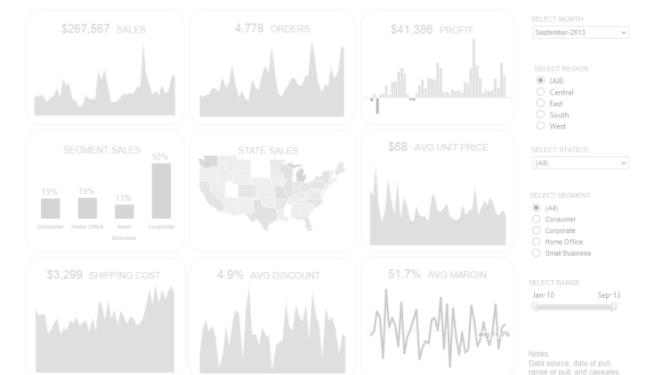
Data Warehouse



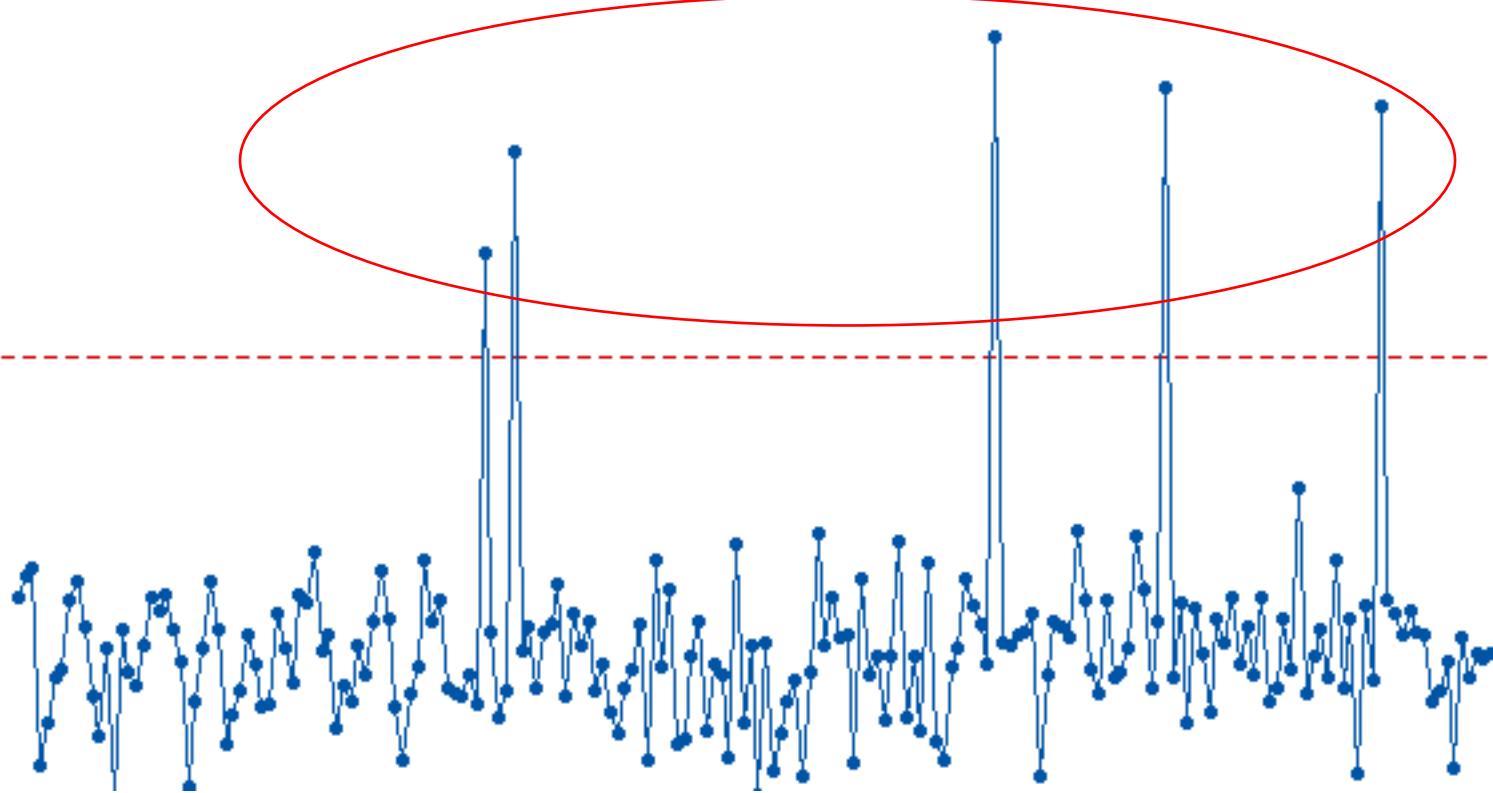
Robotic Analyst API



Reporting



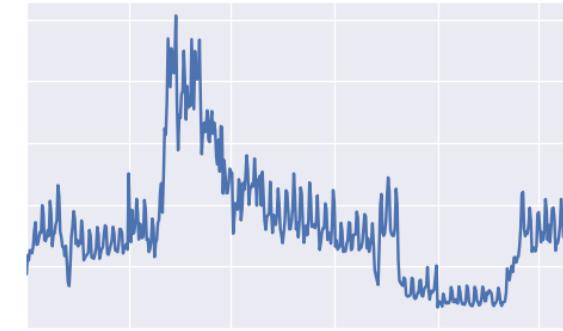
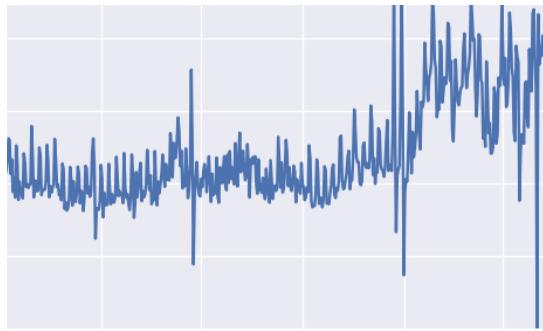
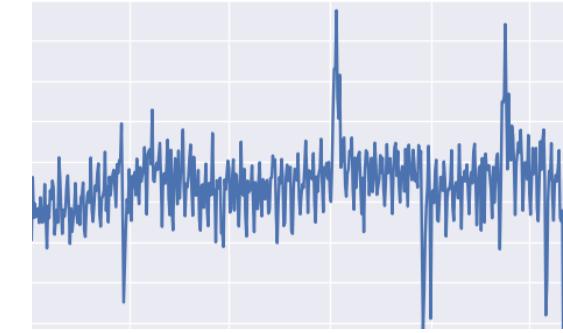
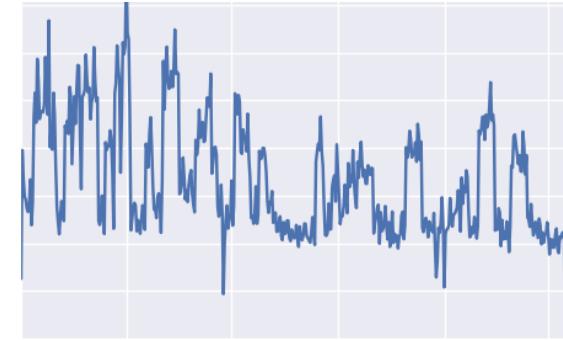
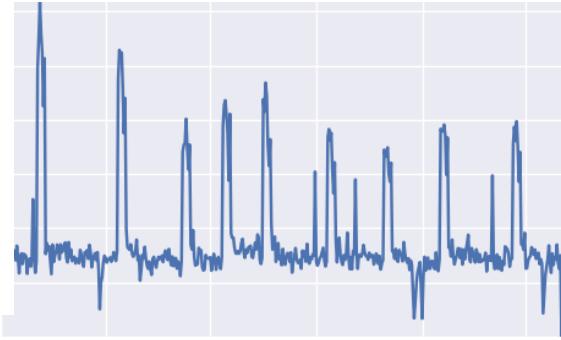
First use case – monitoring



Monitoring use cases:

1. ETL run time
2. Table size
3. Aggregate metric values
4. Cluster utilization
5. Product sales
6. Etc.

Real life data

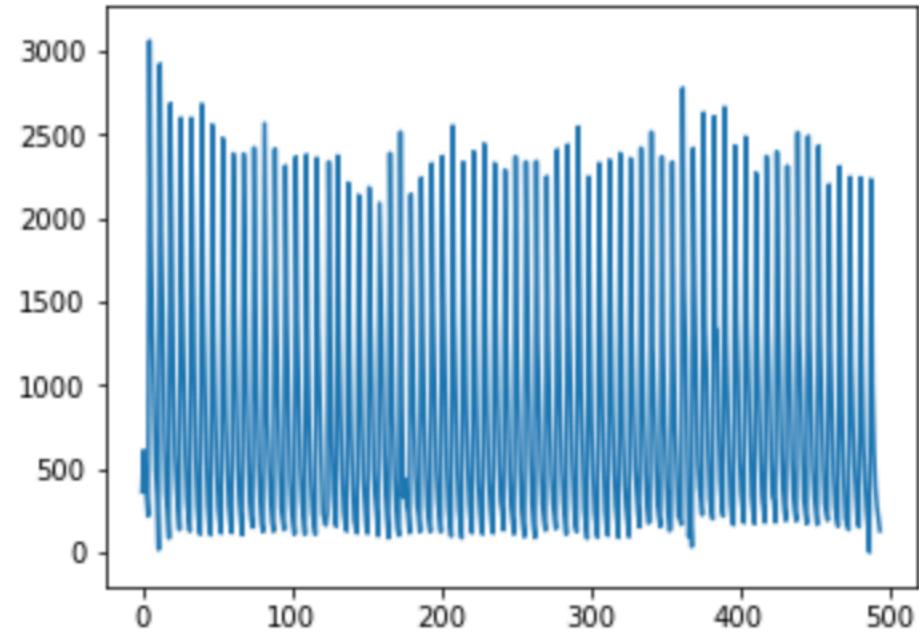


High level approach

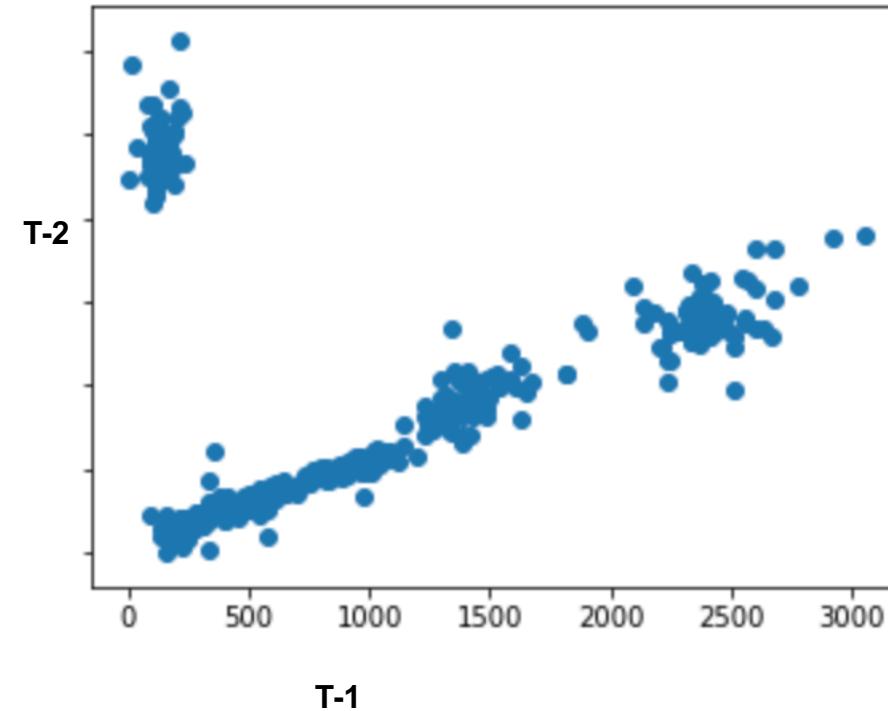
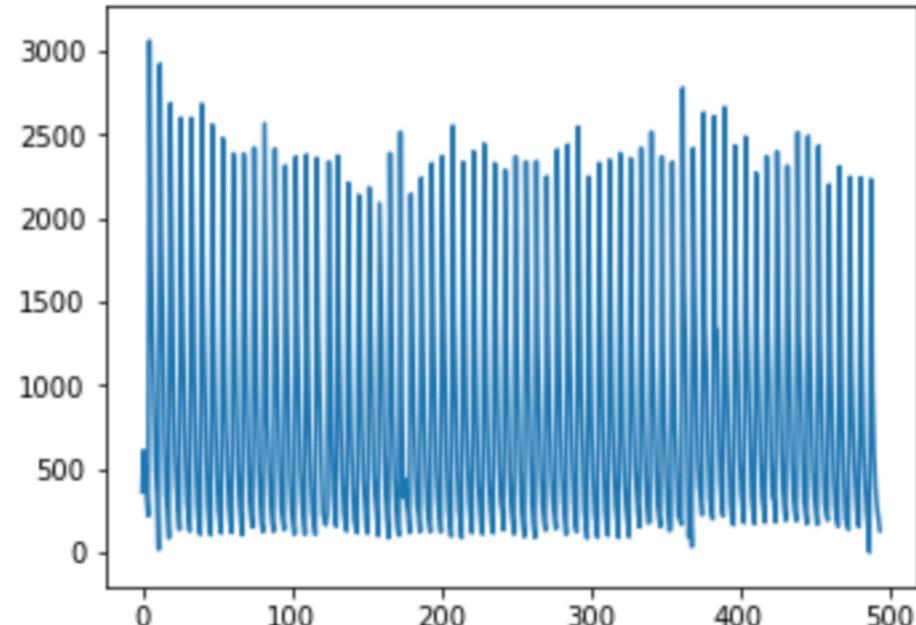


Detecting random data

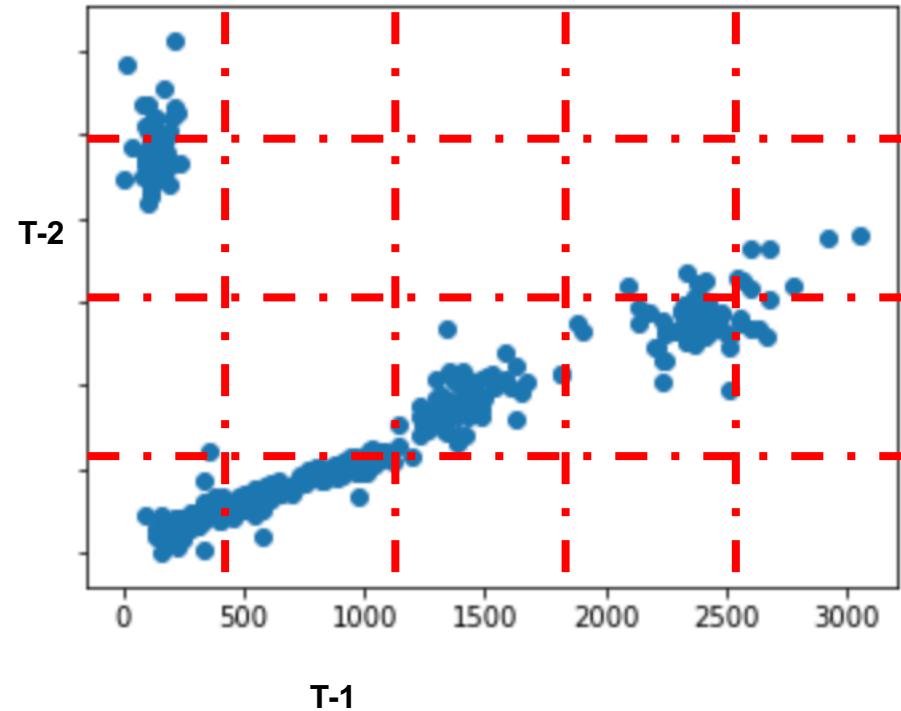
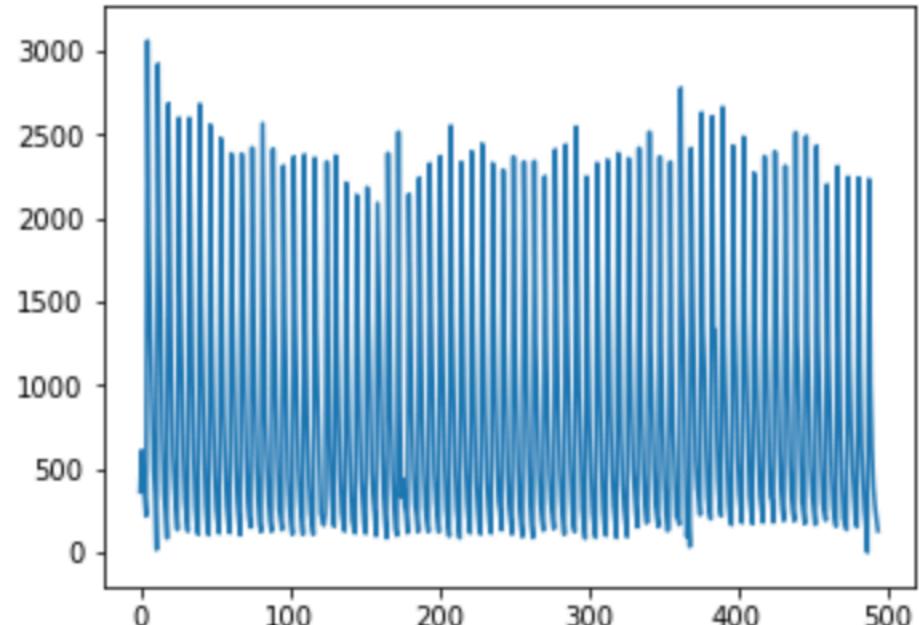
Detecting random data



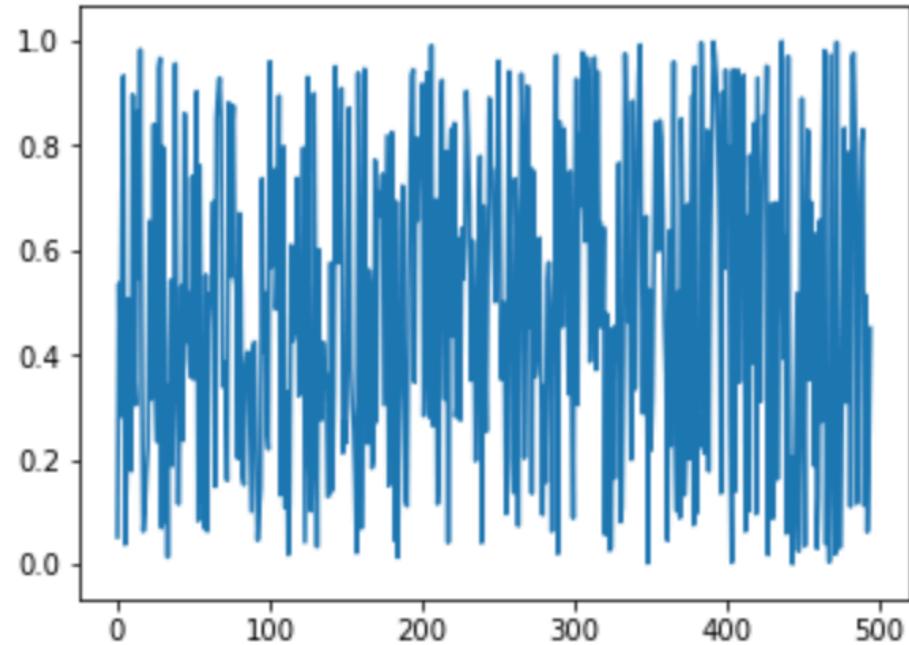
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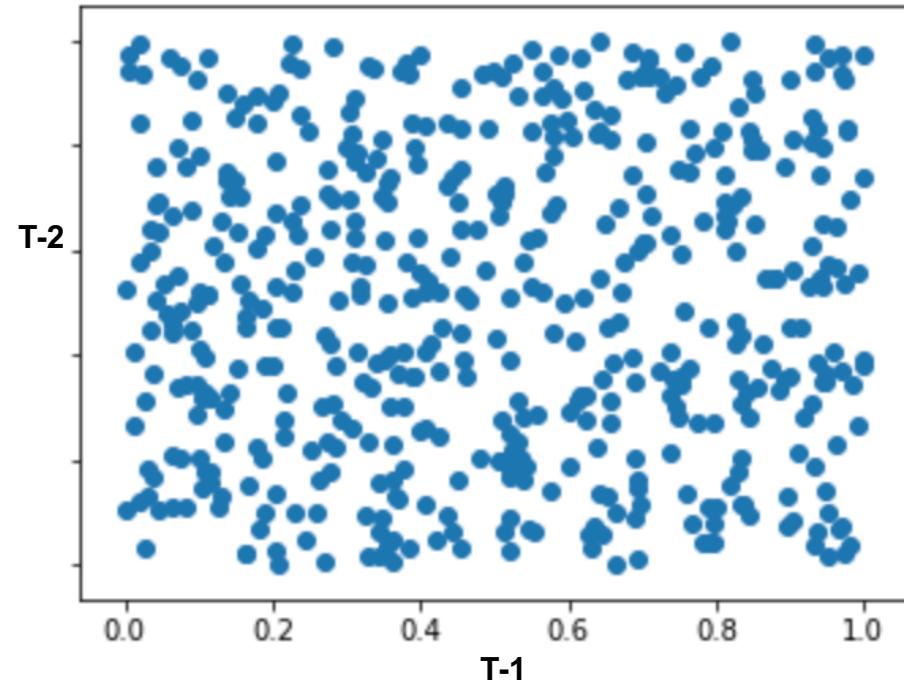
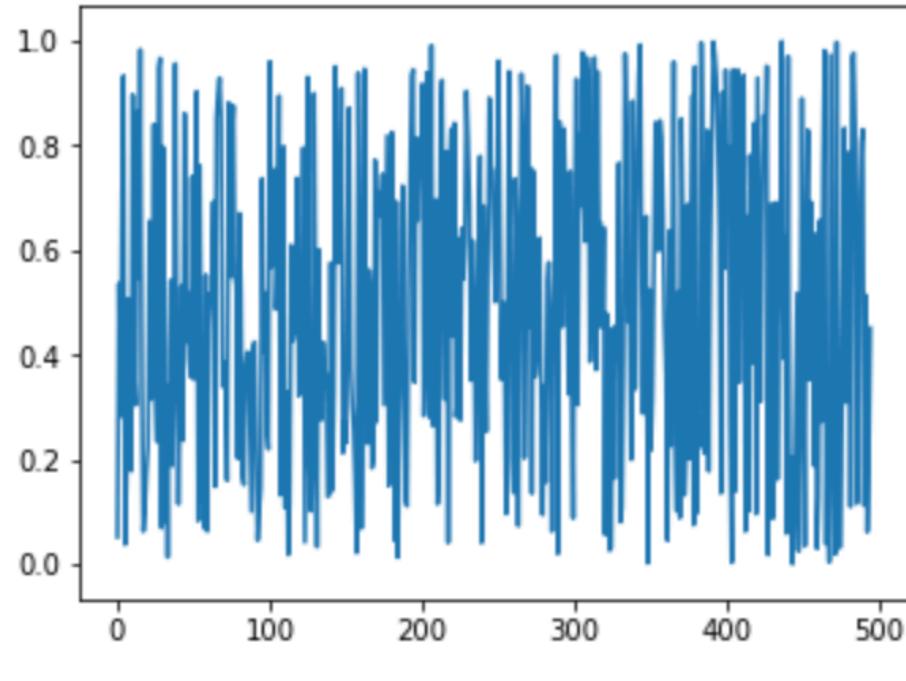
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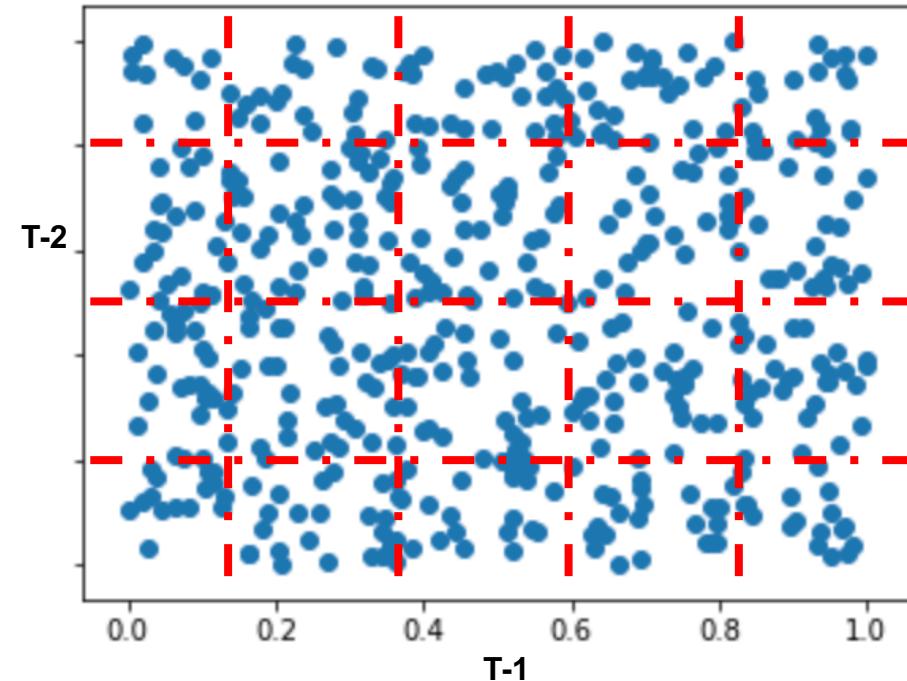
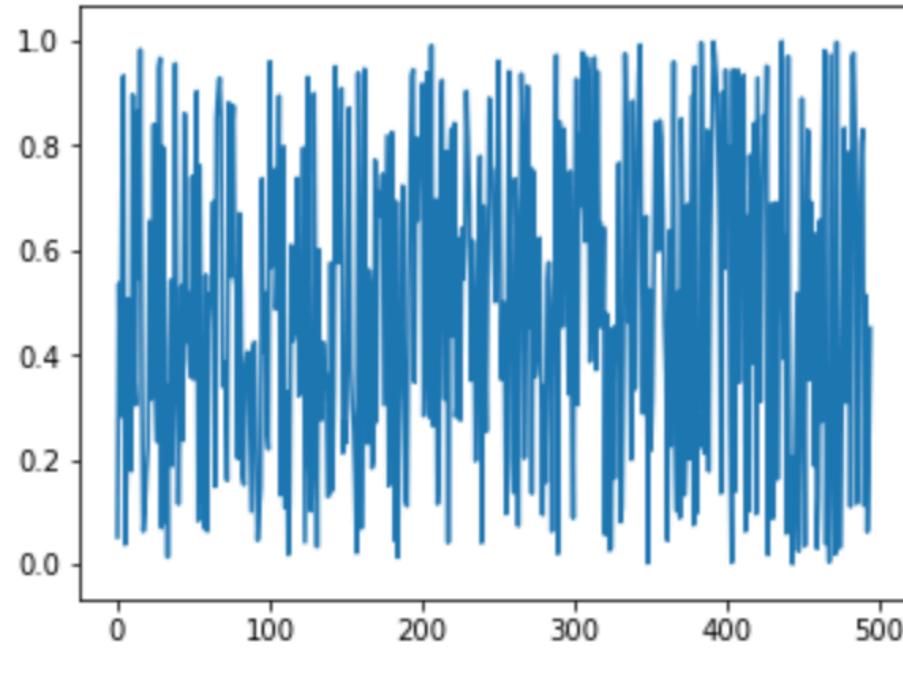
Detecting random data



Detecting random data



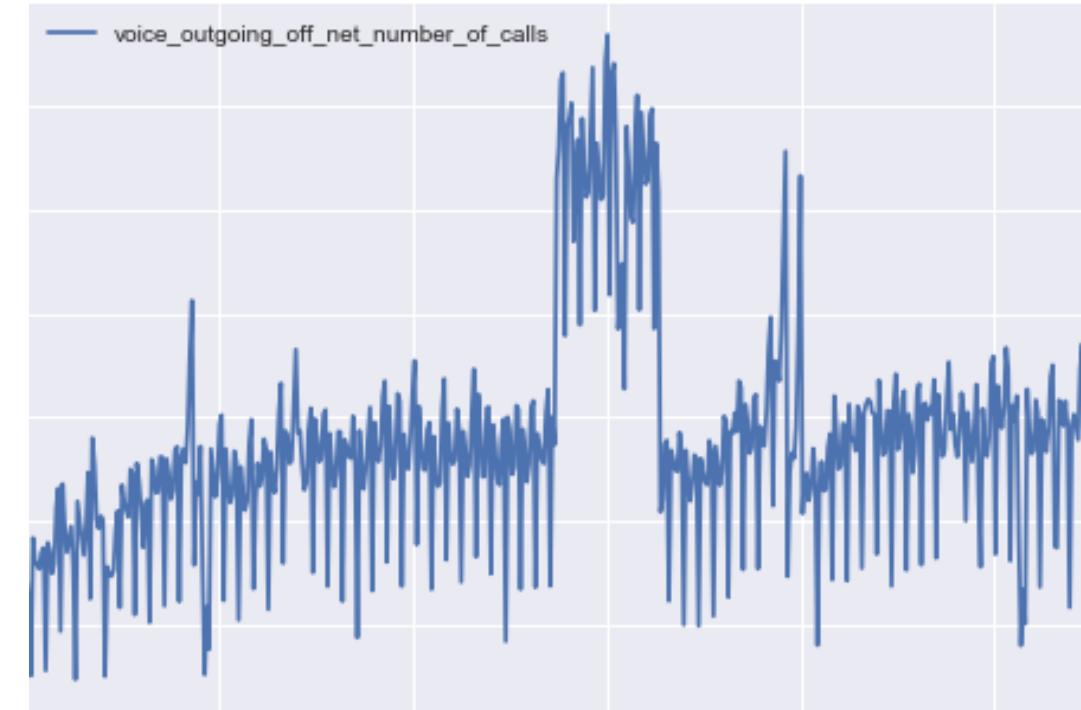
Detecting random data



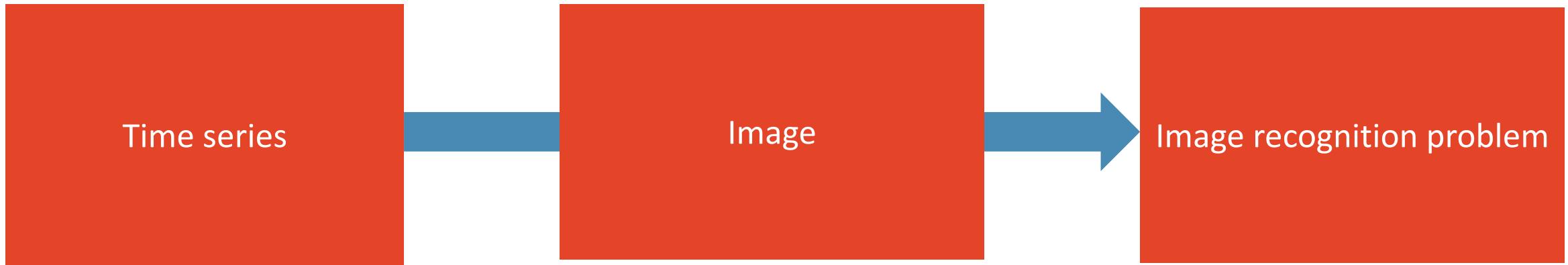
High level data description

Why to analyze numbers if we can analyze images?

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24,335090,292974,720860388.440,29 2017-03-  
08,349026,304274,716619209.950,29 2017-03-  
18,388593,344743,825693036.140,29 2017-02-  
08,325956,286869,758814217.490,29 2017-01-  
15,272637,241044,754226336.050,29 2017-03-  
16,319541,280409,668519990.150,29 2017-01-  
27,328521,289449,862319449.720,29 2017-03-  
09,318088,279317,648536267.640,29 2016-11-  
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```



Why to analyze numbers if we can analyze images?



```
dt,rows,accounts,sales_amt,offers 2017-02-24,335090,292974,720860388.440,29 2017-03-08,349026,304274,716619209.950,29 2017-03-18,388593,344743,825693036.140,29  
2017-02-08,325956,286869,758814217.490,29 2017-01-15,272637,241044,754226336.050,29 2017-03-16,319541,280409,668519990.150,29  
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2016-11-25,340025,300246,897417507.200,29 2016-11-29,312252,276246,822070688.600,29 2016-12-02,338016,296347,884080433.220,29  
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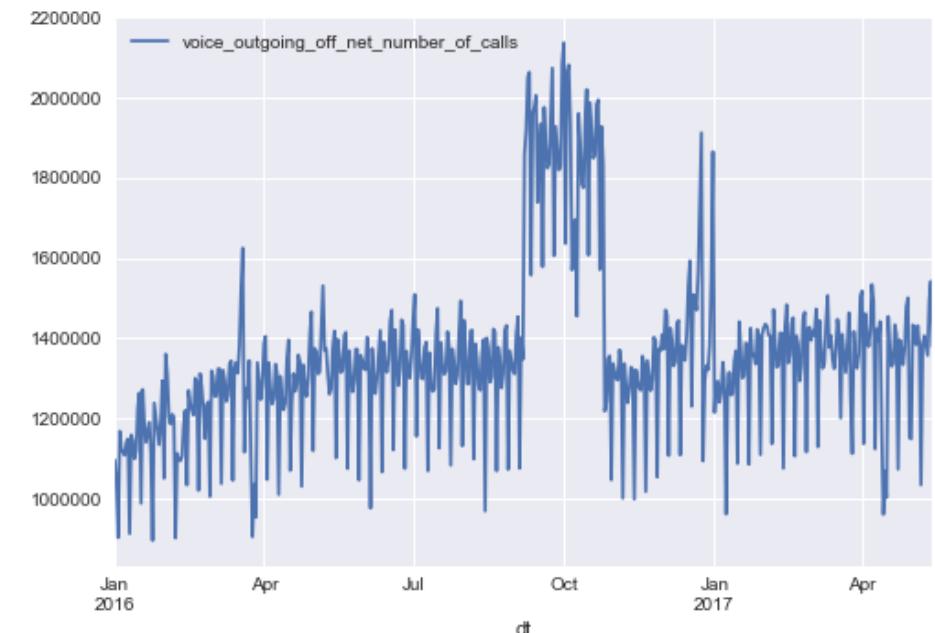


Image recognition is already solved by deep learning



Periodic



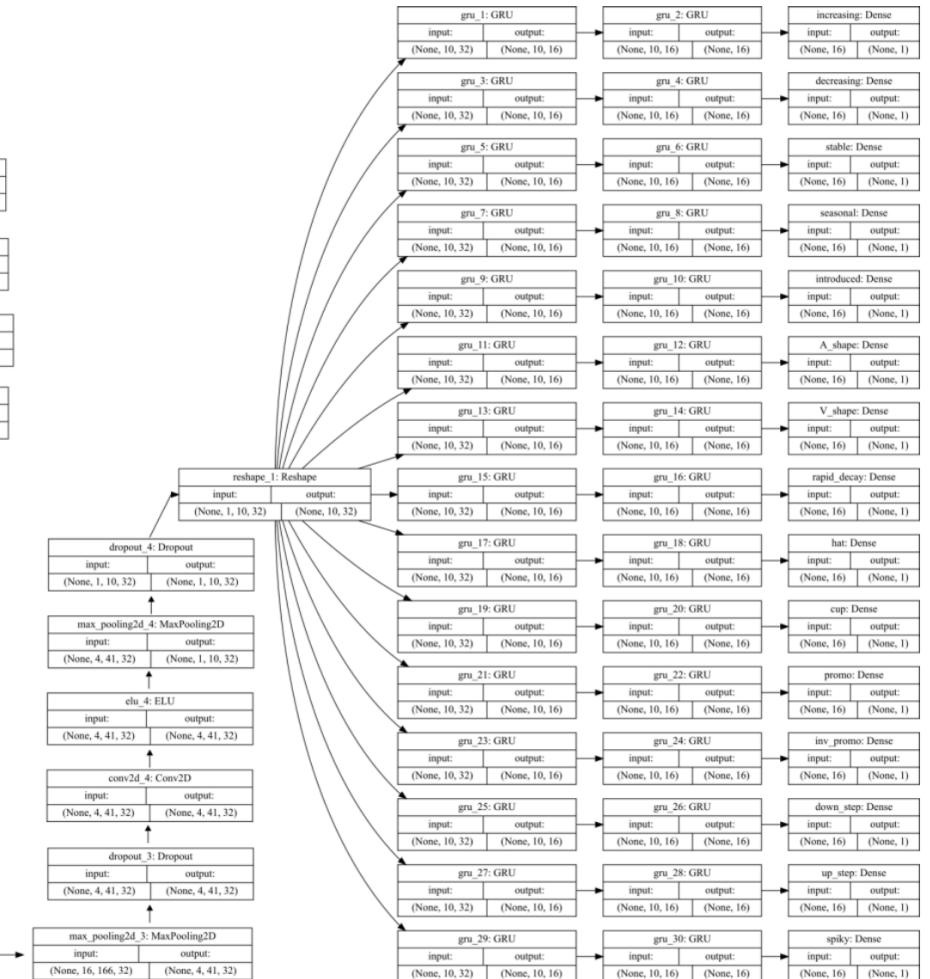
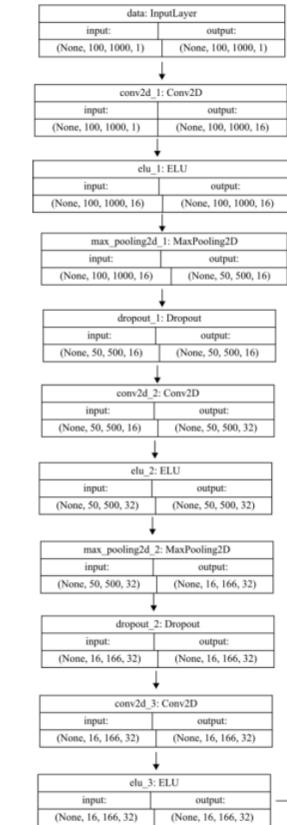
Step-up



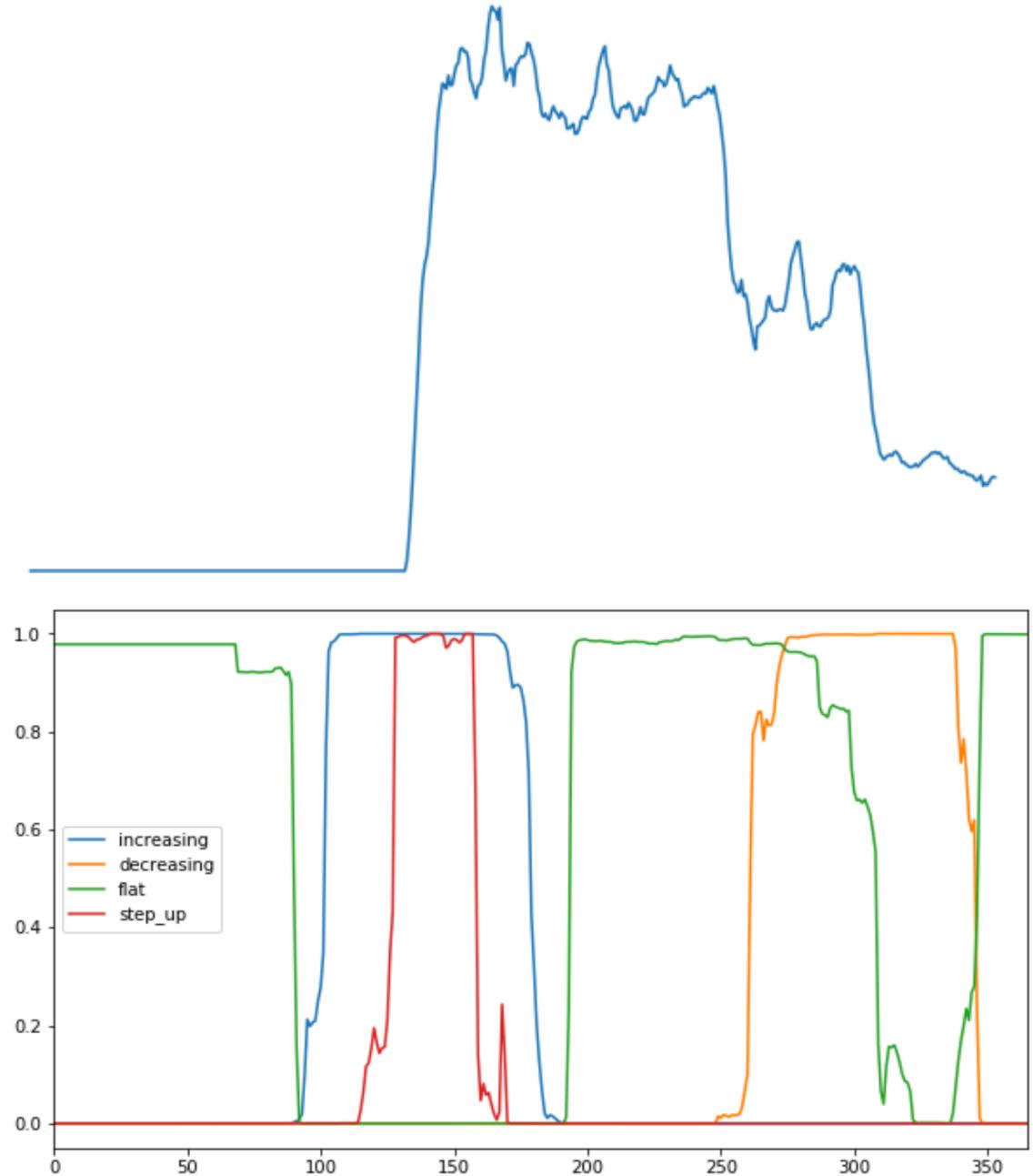
Hat



Decreasing

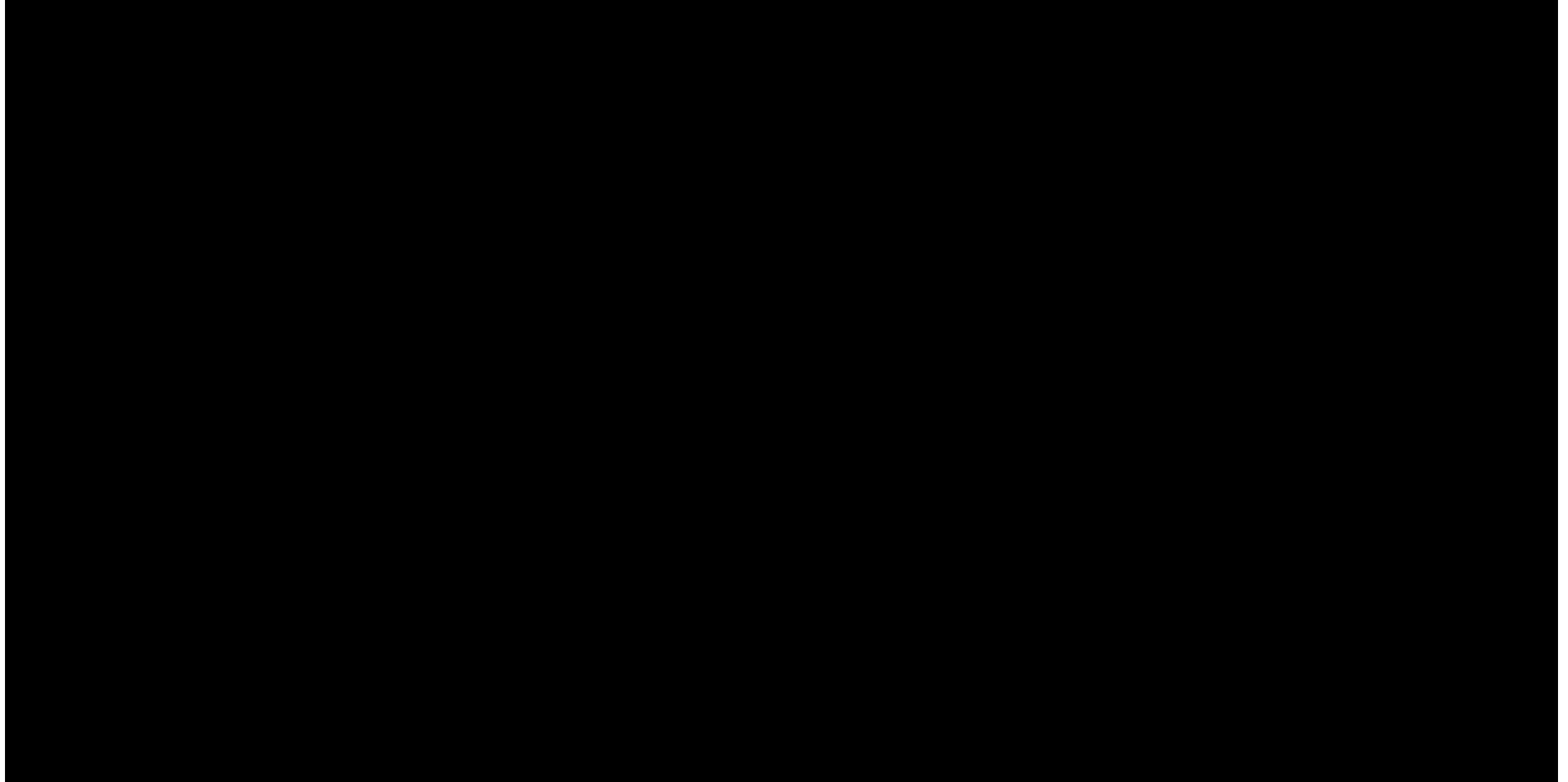


How does Robotic Analysis see a time series?



A short demo video

<https://www.youtube.com/watch?v=mvAJWh9h1xo>



Outlier & Change detection

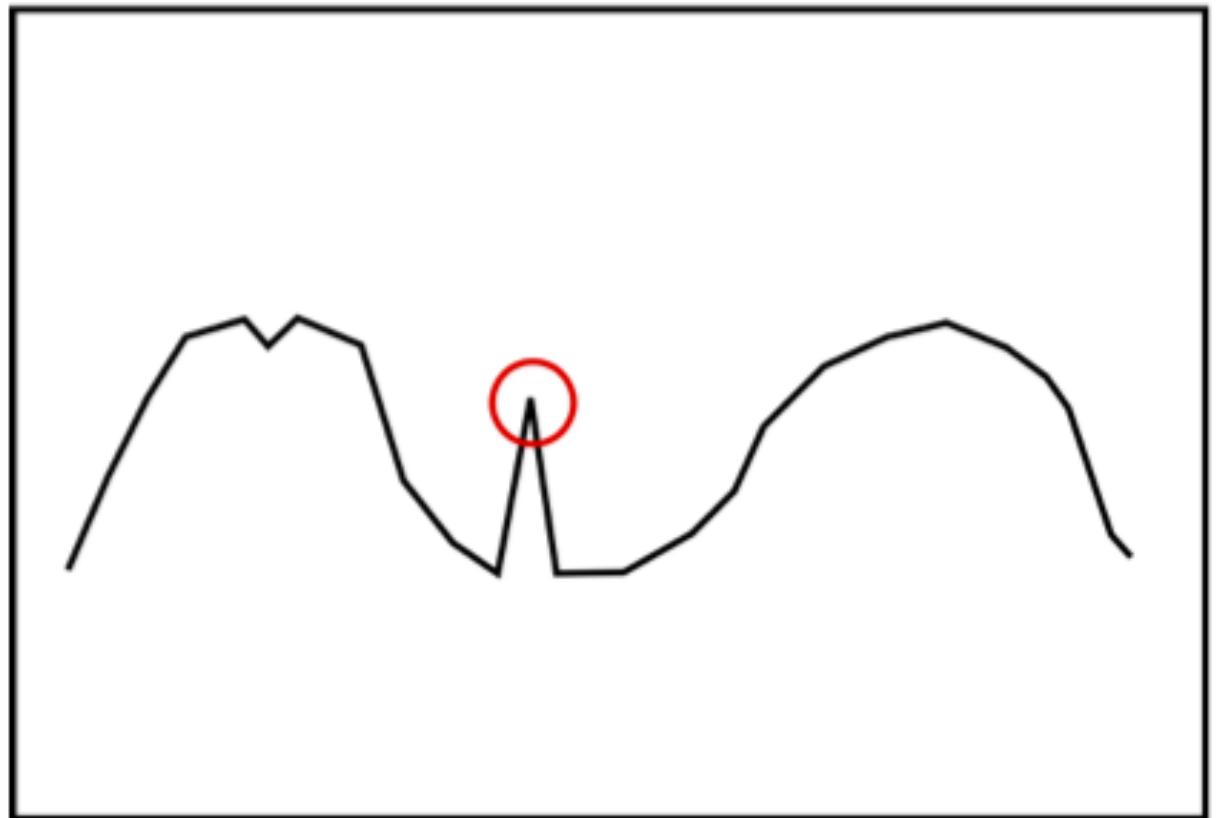
Outlier detection

Simple and very robust outlier detection

$$\mu := \frac{Q_1 + Q_3}{2}$$

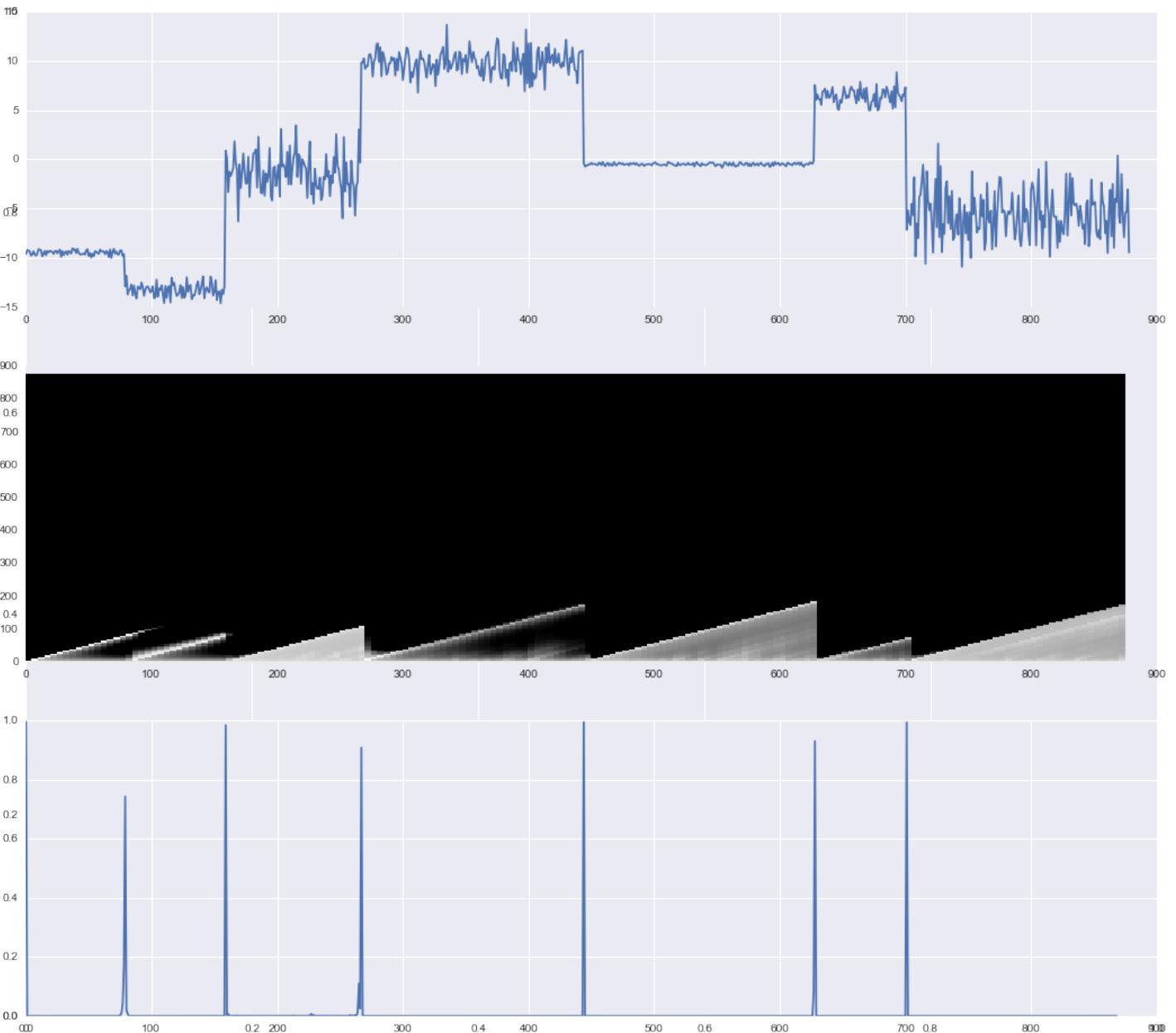
$$\sigma := Q_3 - Q_1$$

These metrics are tracked through a time window and value $> 3\sigma$ are treated as outlier.



Change detection

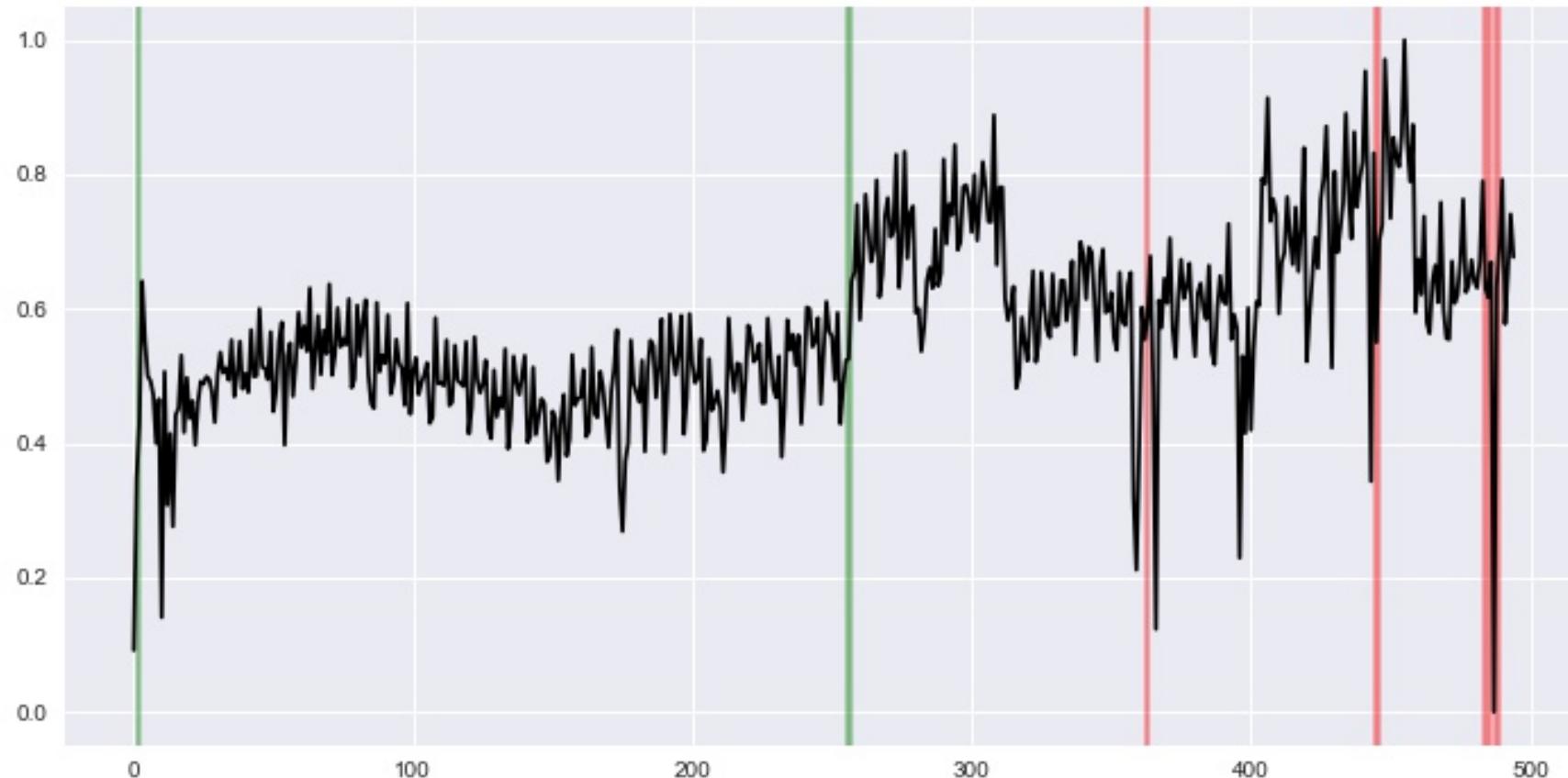
Bayesian change detection



Examples

Change

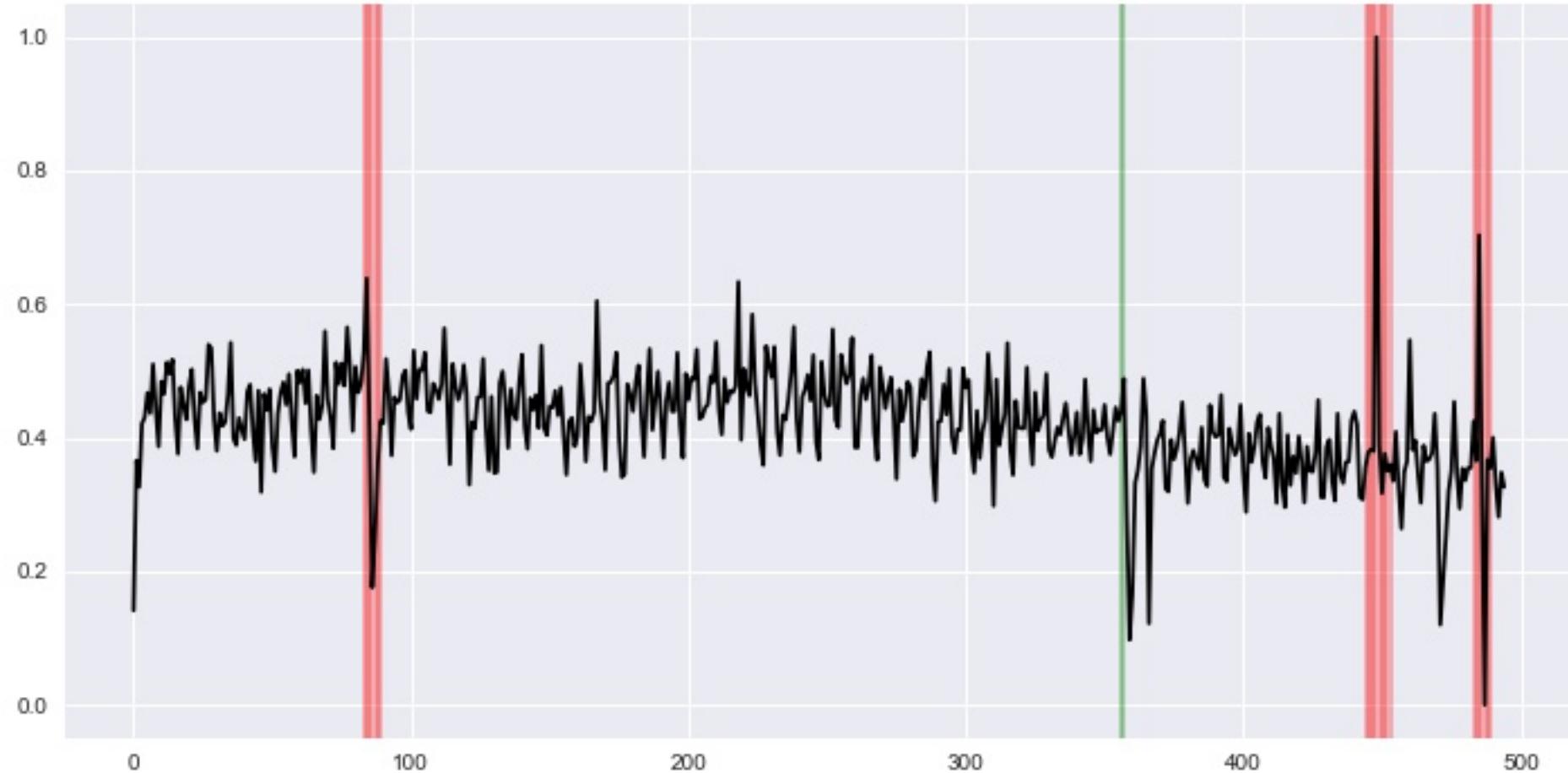
Outlier



Examples

Change

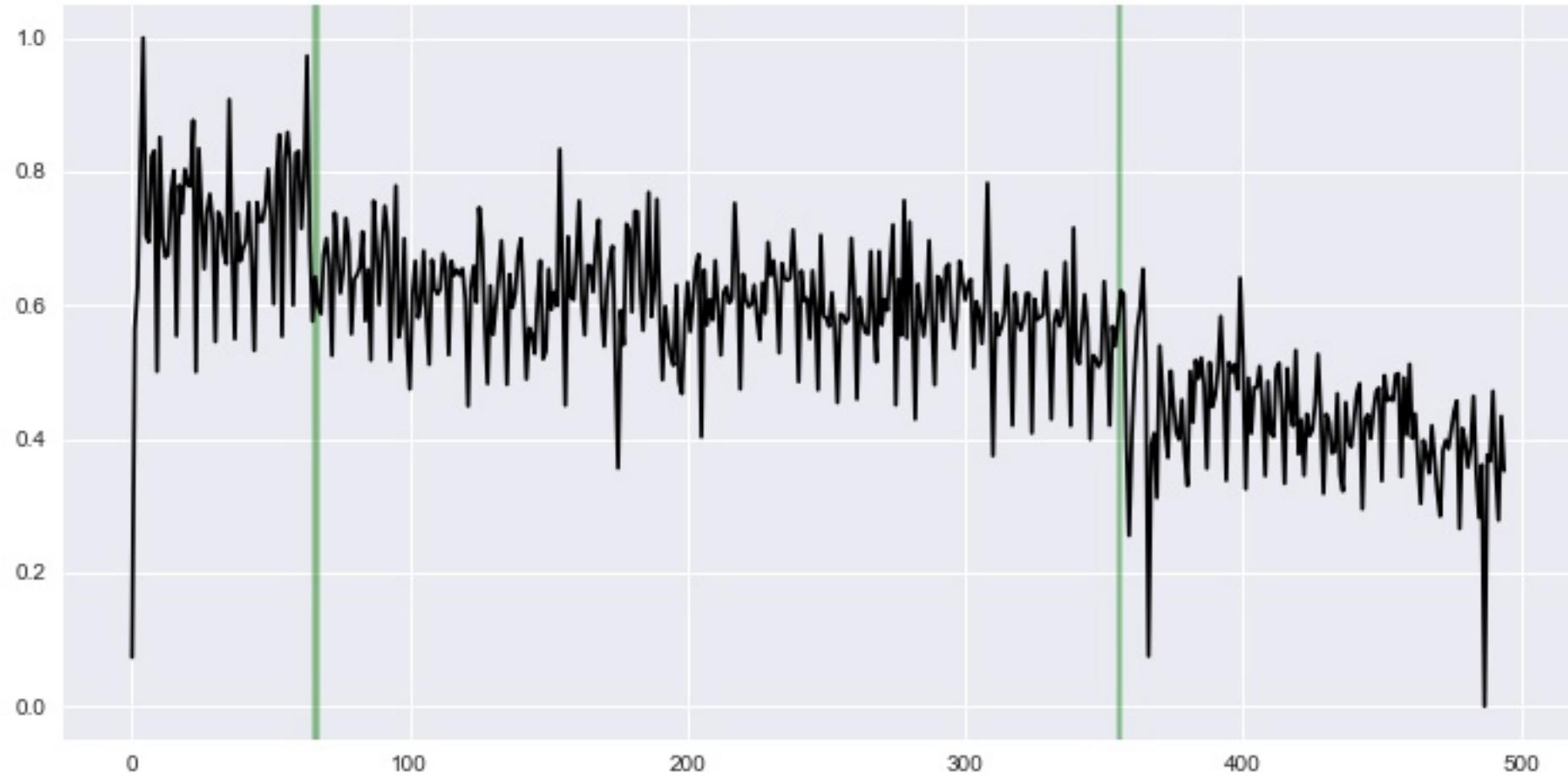
Outlier



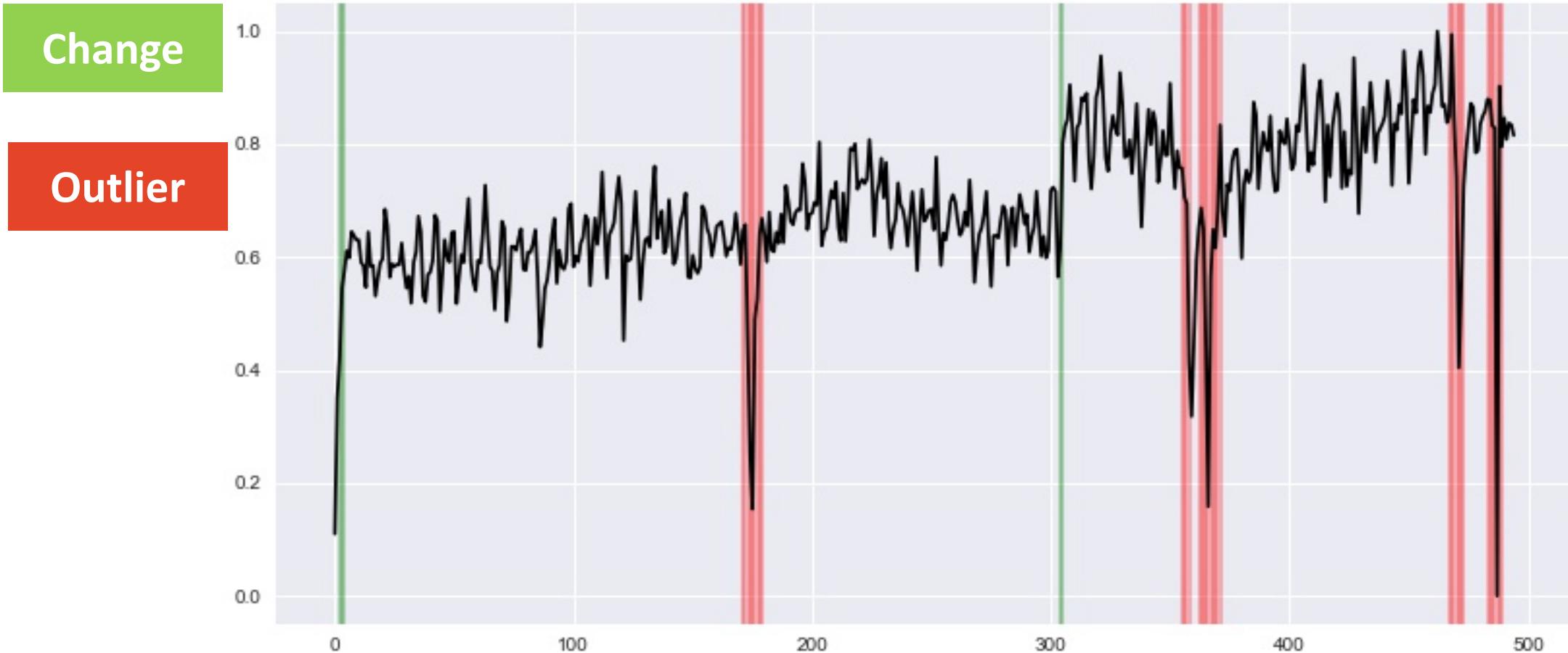
Examples

Change

Outlier



Examples



API coming soon, want to try this out?

egis@excaster.com

A photograph of a family of three shopping in a supermarket aisle. A woman with blonde hair, wearing a light grey blazer over a white top, holds a white plastic bottle. A man with dark hair and a beard, wearing a blue button-down shirt, stands next to her. A young girl with brown hair tied up in a bun, wearing a white ribbed sweater, sits in a red shopping cart. They are looking at something off-camera to the right. Shelves filled with various products are visible in the background.

Thank You!

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egis@excaster.com