

An introduction to Facebook's Prophet

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PROPHET

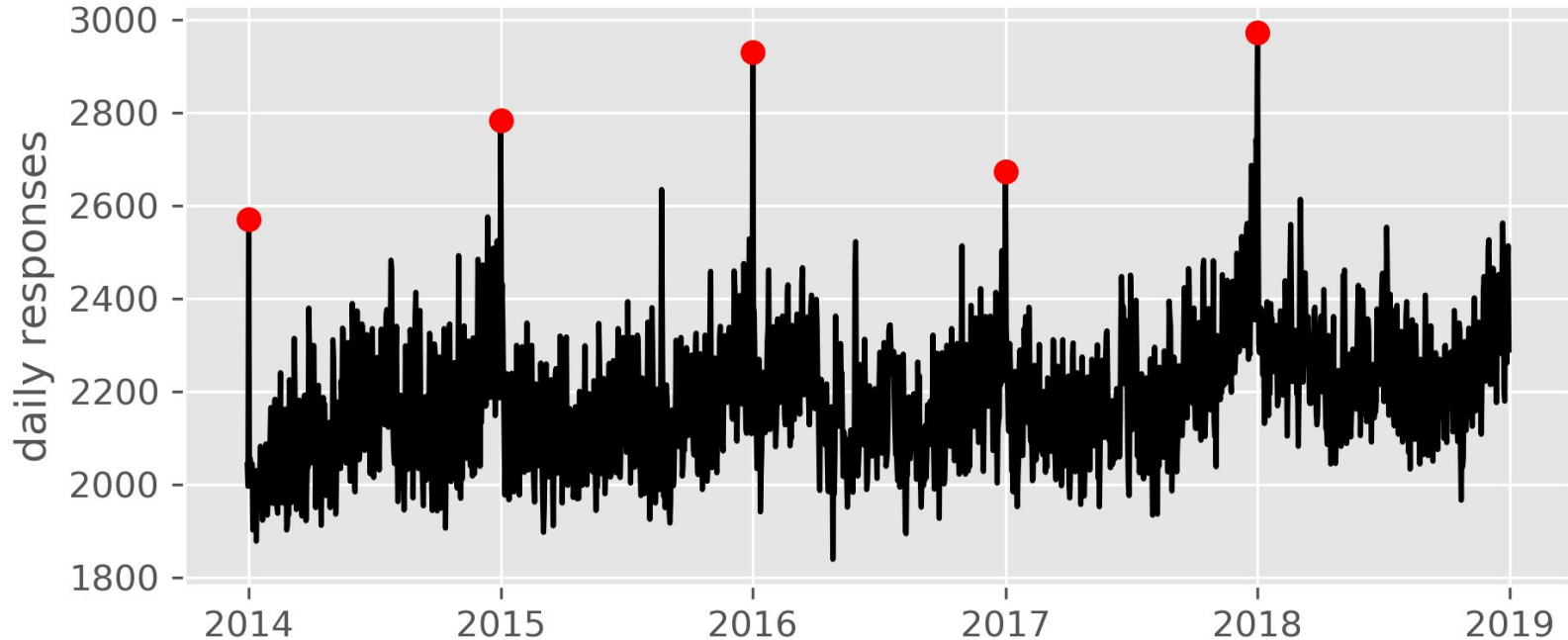
Forecasting at scale.

<https://facebook.github.io/prophet/>

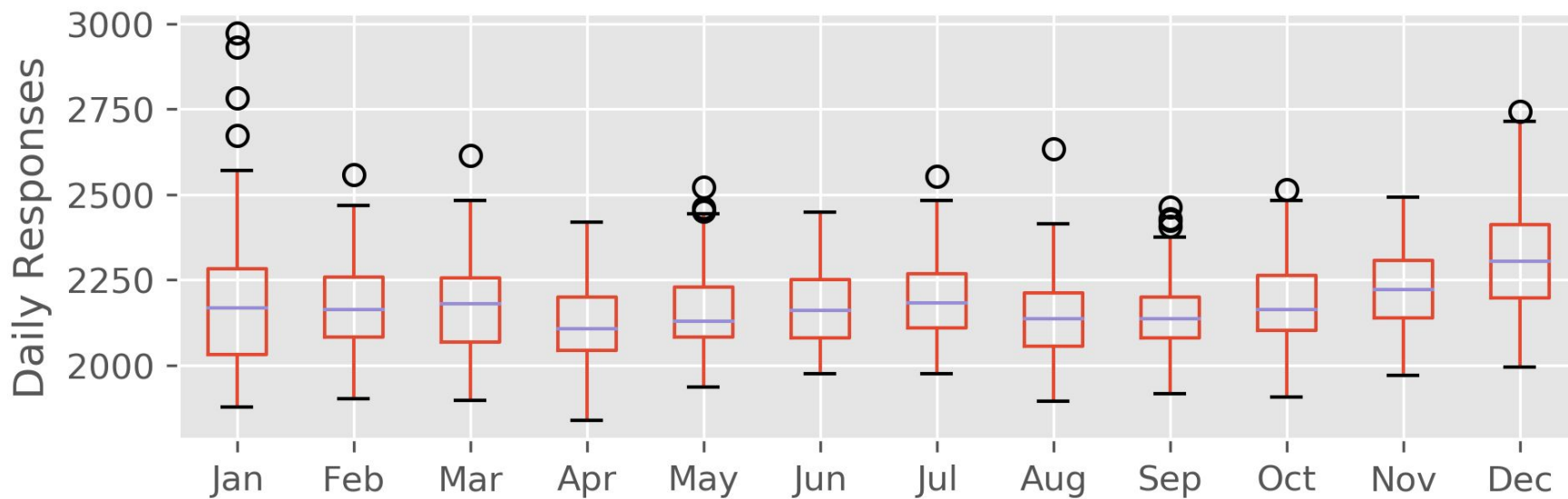
Motivation for Prophet

- 'Modern business' forecasting at the daily level
 - (but can be used at lower/higher levels)
 - Multiple levels of seasonality e.g. weekly, annually, special events/holidays
- Forecasting and time series expertise is limited
 - Unlikely to see any scaling in application with classical approaches
 - Facebook's data science view: tunable automatic forecasting is the answer
 - Simple to explain methods

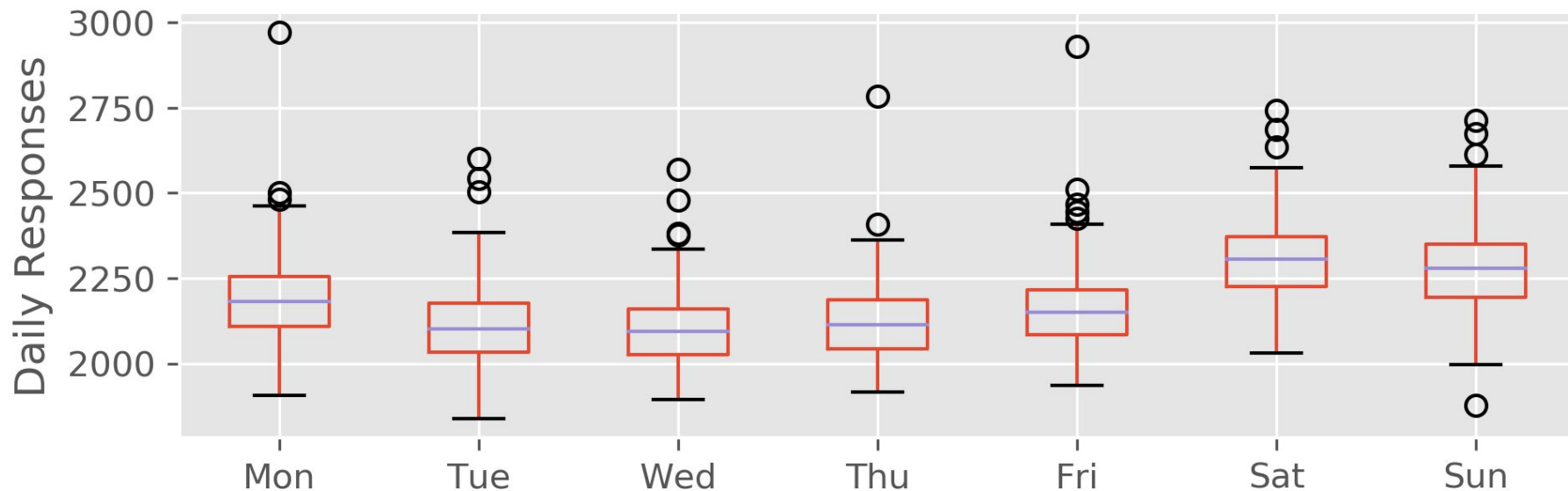
A motivating time series from health



Seasonality (1)



Seasonality (2)



Prophet

trend

+

seasonality

+

holidays

+

i.i.d errors

Trend

- Piecewise linear
- Logistic

(automatically detected)

Seasonality

- Month of year
- Day of year
 - Modelled by fourier series
- Day of week
 - Modelled by 'dummy' variables

(automatically detected)

Holidays

- Built in holidays and special events
 - E.g. Christmas, easter holidays or St Patrick's day's
- But flexible and can handle any dates
- Again modelled as dummy variables

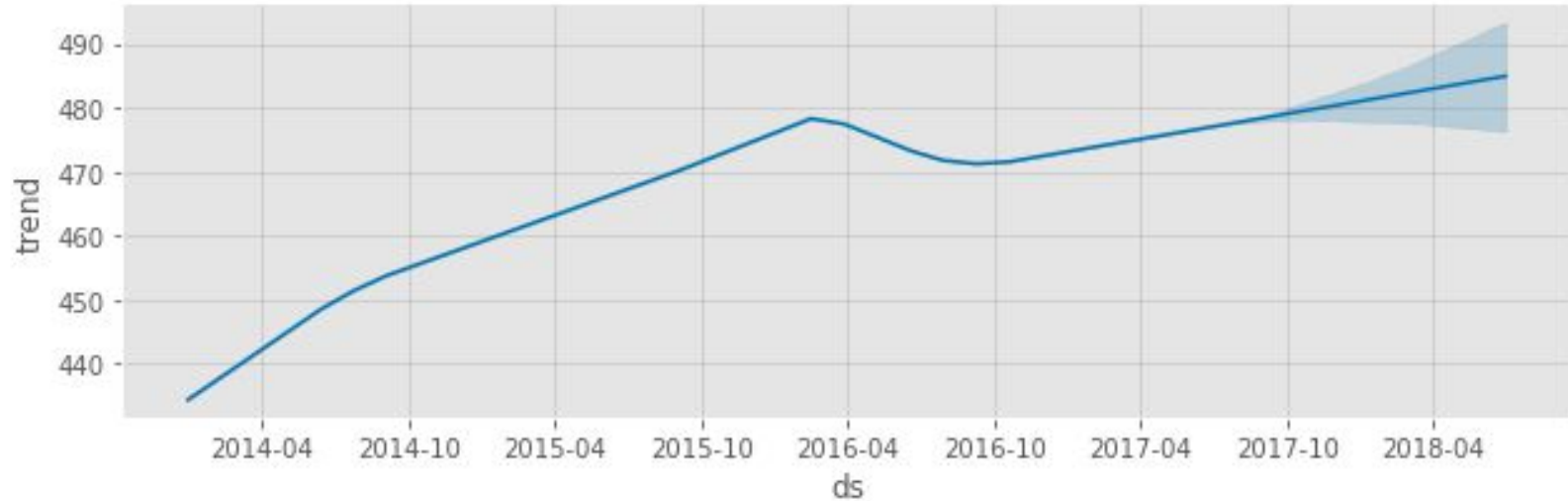
Additional Regressors



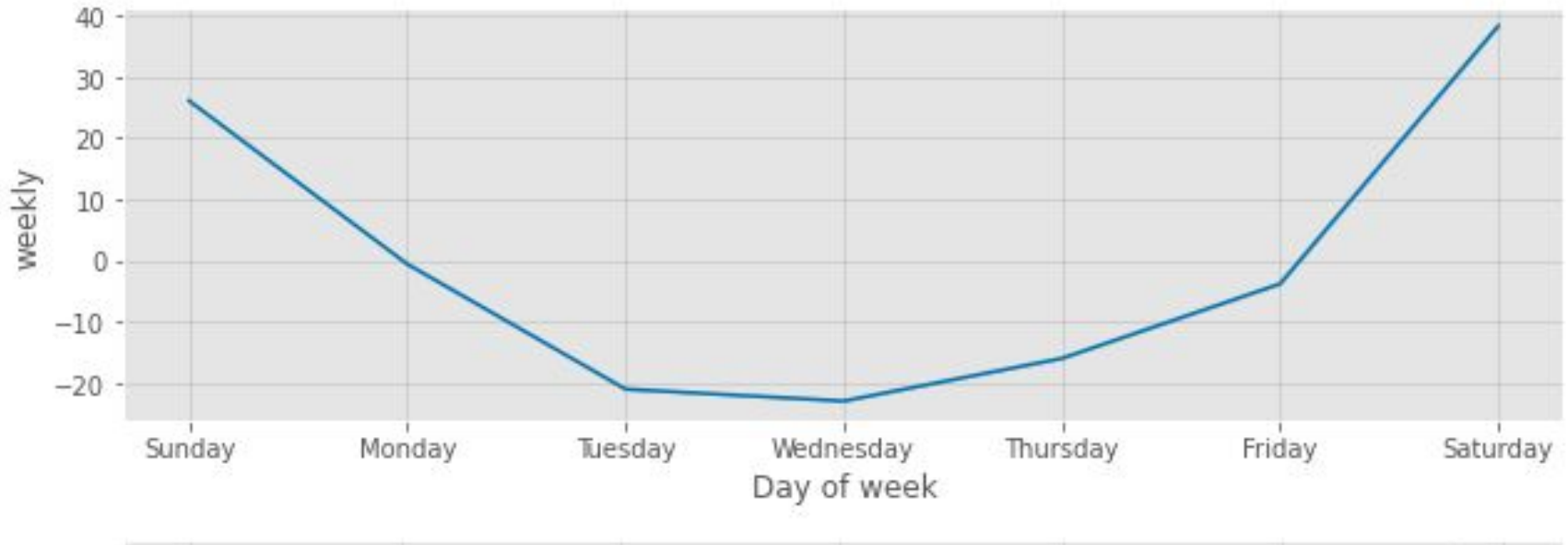
- The additive structure of Prophet actually allows for additional regressors
- In health this might include:
 - Weather
 - Air quality
 - Performance of other related health systems
 - Lagged combinations of the above

But always remember that to forecast you will need forecasts of your additional regressors!

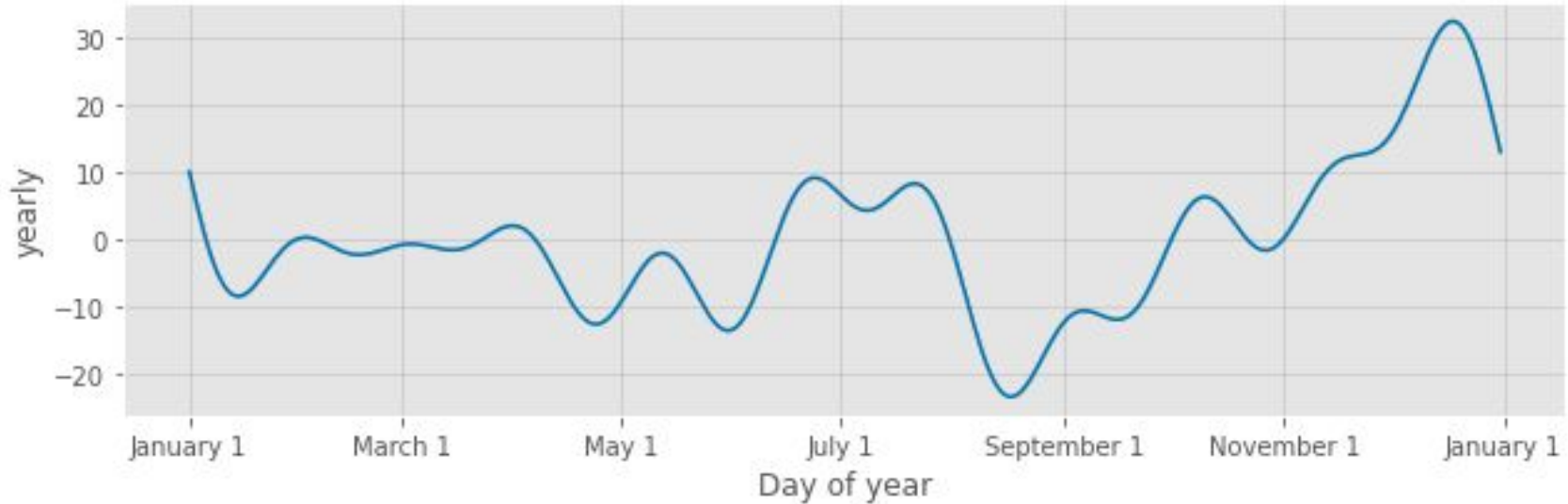
Prophet decomposition: Trend



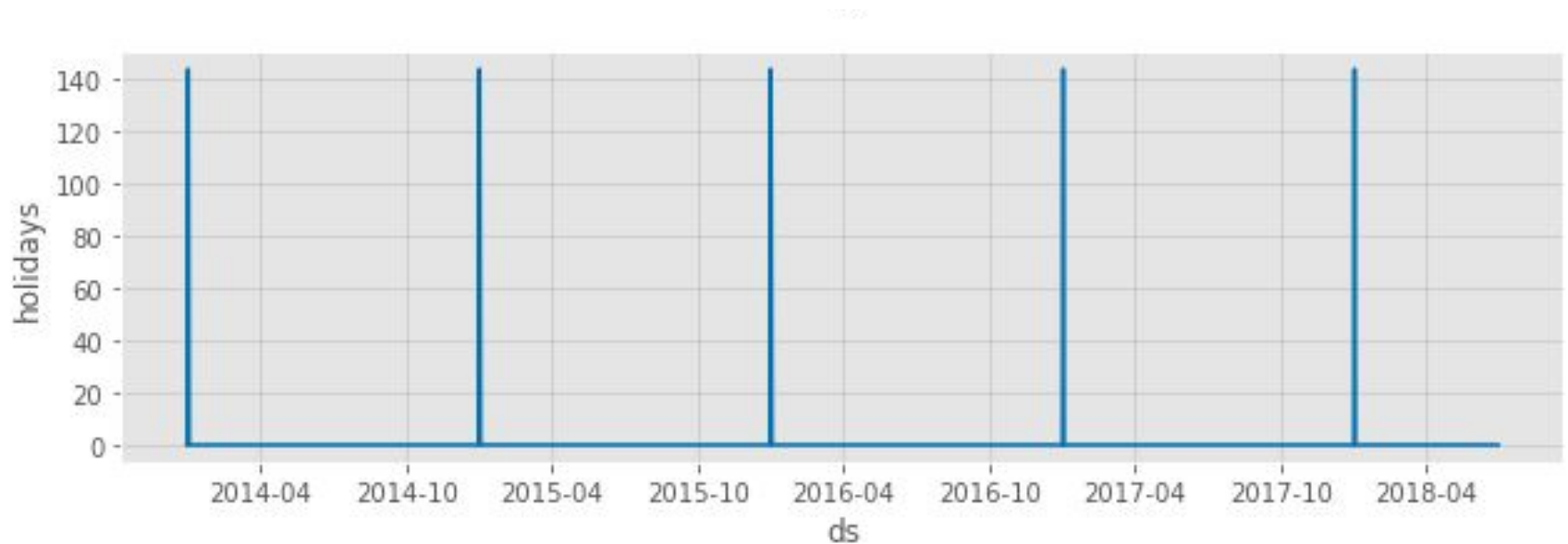
Prophet decomposition: Day of week seasonality



Prophet decomposition: monthly seasonality



Prophet decomposition: holidays



Prophet applied to the ambulance example

