

MACHINE LEARNING: GAUSSIAN PROCESS MODELLING IN ROTATION MEASURE SYNTHESIS.

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Rotation Measure Synthesis

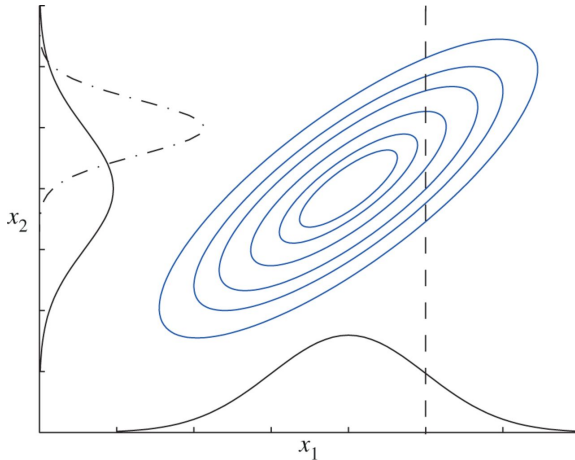


Your source is literally a needle in a haystack

Complex Model Dependencies

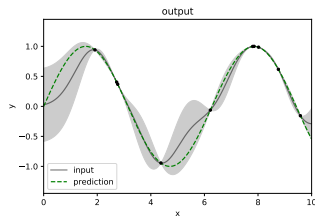
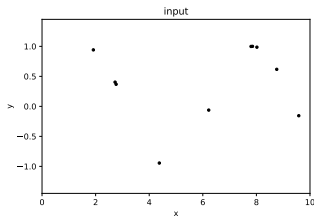
- So how do you quantitatively predict the missing data? You need to construct a mathematical model that could account for:
 - Radio frequency interference
 - Uneven Bandpass weighting
 -
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 - Unknown factors.
- But what if you don't need to model all this factors? What if you predict the missing data based on the behaviour of real data?

Gaussian Processes



Source: rsta.royalsocietypublishing.org

Gaussian Process Modelling

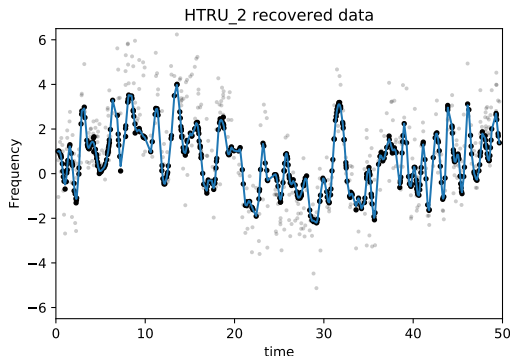


Data

HTRU2 Data

- Data had 17,987 candidates of Pulsars described by 8 variables
- 16,259 were spurious examples caused by RFI/noise
- 1,639 were real pulsar examples

Optimised Prediction



In this plot, I selected the HTRU2 dataset with 500 candidates, plotted in light gray points and the “de-trended” data with noisy component removed is plotted as black points. The prediction of the Gaussian Process model for missing data is shown as a blue line.