

Novelty Detection in SkyMapper

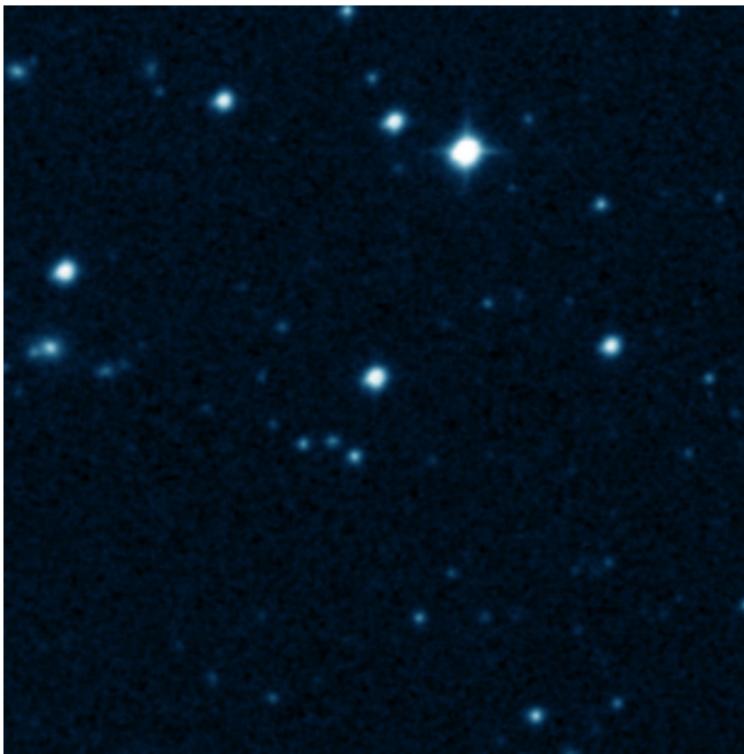
Developing an Open-World Classifier

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What Is This?



SkyMapper Survey

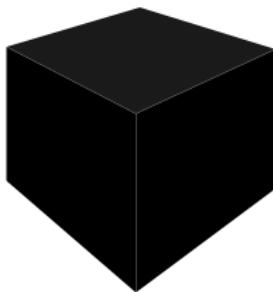
- A comprehensive survey of the entire southern sky.
- Huge amount of data.
- Need an automatic large-scale classifier.



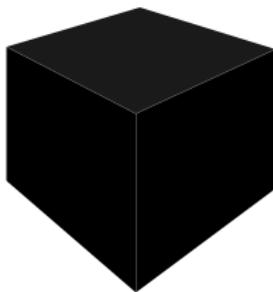
What Computers Actually See

$$\begin{pmatrix} 18.34817 \\ 16.99189 \\ 16.51436 \\ 16.28606 \\ 16.10466 \\ 18.22762 \\ 16.84973 \\ 16.33935 \\ 16.09515 \\ 15.96056 \\ 1.545161 \end{pmatrix}$$

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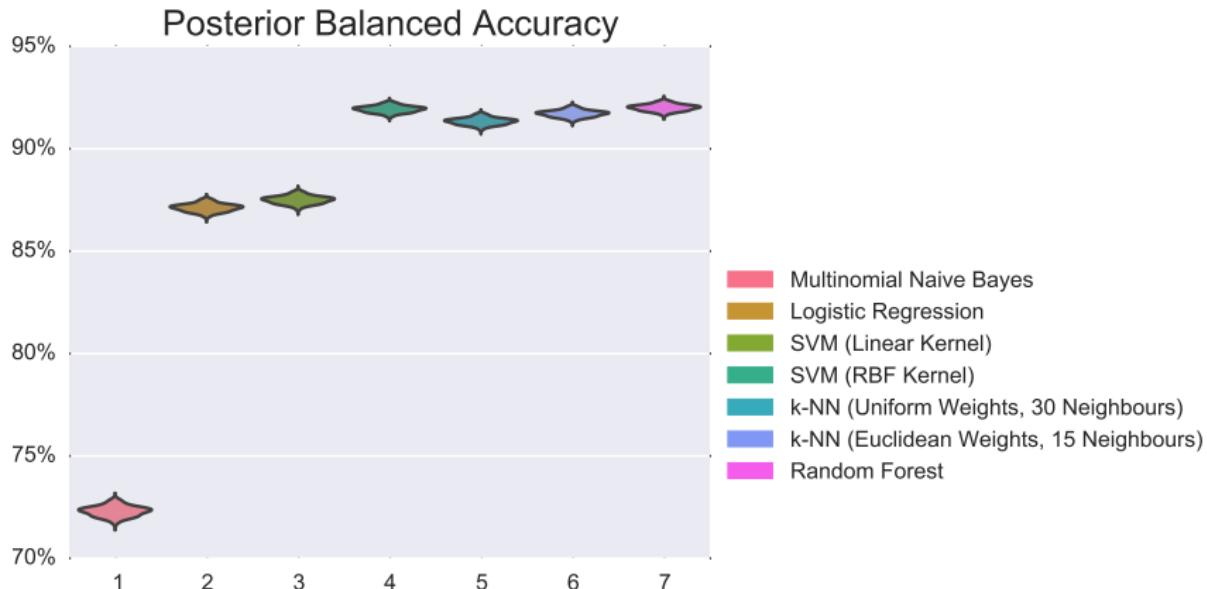
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 \implies Star

Classification Task

Photometric Measurements \implies Classifier \implies Class Prediction

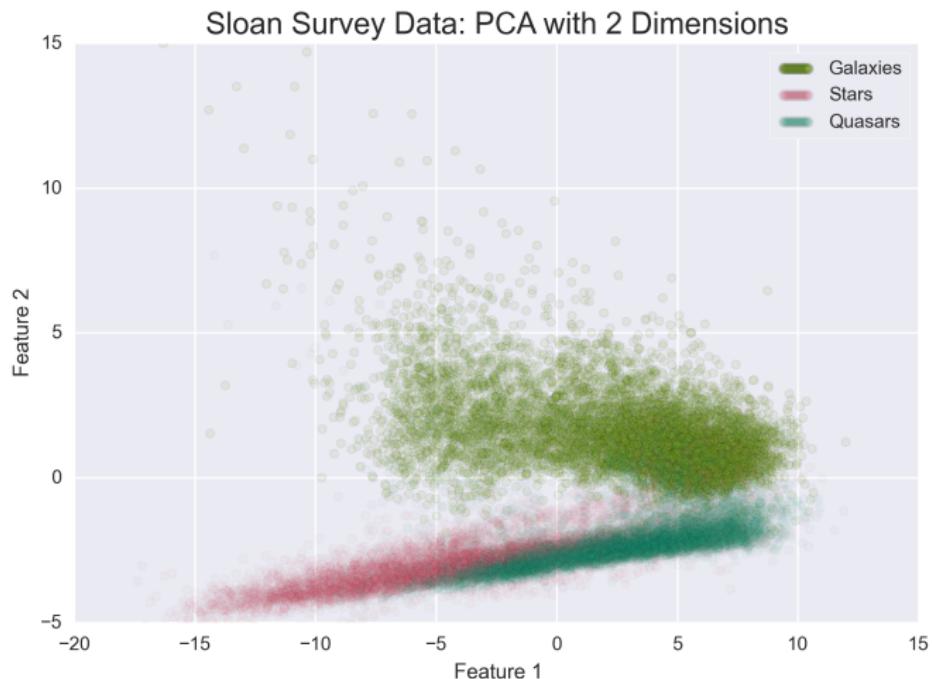
Easy Problem

Easy if we have info about all classes during the training phase.



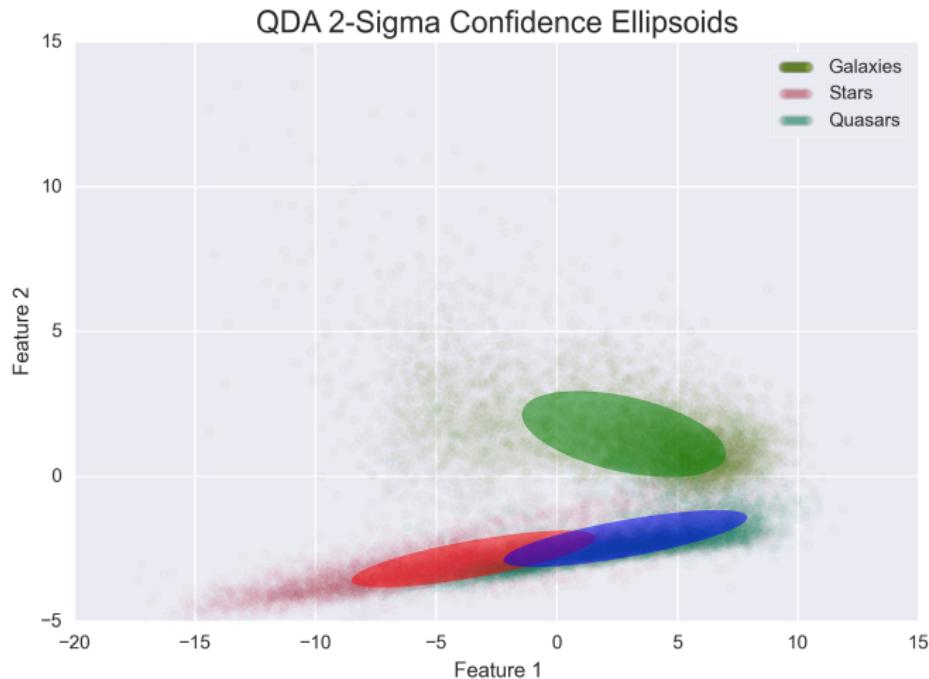
Example Training Data

Subset of the Sloan dataset (30,000 data points and 3 classes).



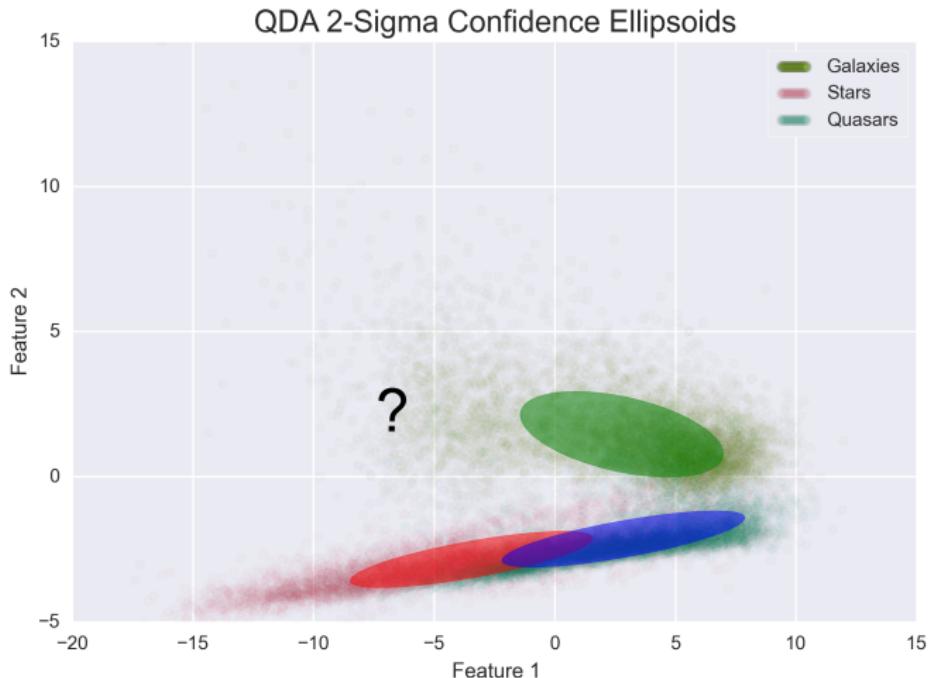
Training the Classifier

One approach: Fit a Gaussian distribution to each class.



Detecting Unknown Classes

Are these the best decision boundaries?



Further Information

My project is hosted at github.com/alasdairtran.

My supervisors:

- Cheng Soon Ong, NICTA
- Justin Domke, NICTA
- Christian Wolf, RSAA