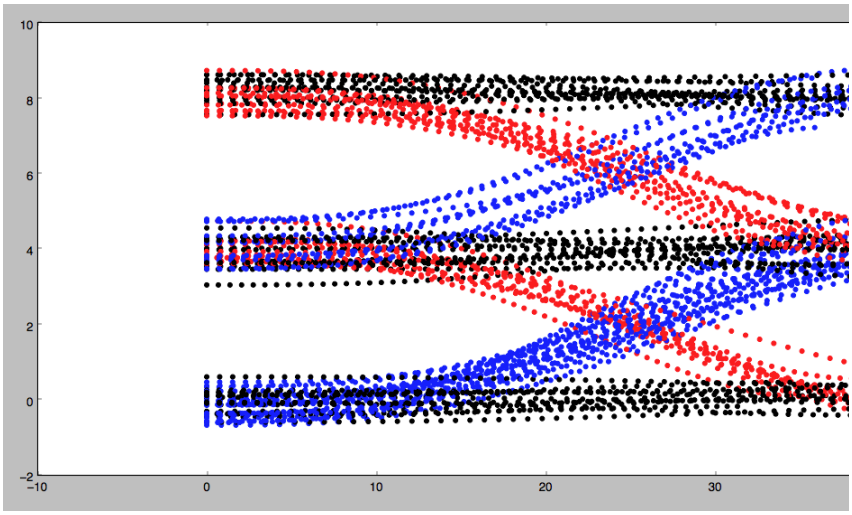
Implementing Naive Bayes

In this exercise you will implement a Gaussian Naive Bayes classifier to predict the on a highway. In the image below you can see the behaviors you'll be looking for (with lanes of 4 meter width). The dots represent the d (y axis) and s (x axis) coord they either...

1. change lanes left (shown in blue)
2. keep lane (shown in black)
3. or change lanes right (shown in red)



Your job is to write a classifier that can predict which of these three maneuvers a given a single coordinate (sampled from the trajectories shown below).

Each coordinate contains 4 features:

- s
- d
- $\dot{s}$
- $\dot{d}$

You also know the **lane width** is 4 meters (this might be helpful in engineering adc your algorithm).

Instructions

1. Implement the `train(data, labels)` method in the class `GNB` in `clas`

   Training a Gaussian Naive Bayes classifier consists of computing and storing standard deviation from the data for each label/feature pair. For example, gi lanes left" and the feature $\dot{s}$, it would be necessary to compute and store the deviation of $\dot{s}$ over all data points with the "change lanes left" label.

   Additionally, it will be convenient in this step to compute and store the prior each label C_k. This can be done by keeping track of the number of times ea the training data.
2. Implement the `predict(observation)` method in `classifier.cpp`.