**Bayesian regression part 1 – explained**

I will try to summarize (sans equations), point by point.

1. Classical Regression deals with minimizing the <sum of error squares>, which works well if you have a large amount of data and no bias (mathematically speaking) towards any variable (or feature). But doesn’t work at all if the number of features is equivalent to the number of training examples.
2. One way to remove that kind of “overfitting” is by adding an additional term to the <sum of error squares> + lambda\*<sum of abs of the features>. This forces the features to be small and this estimate can be done even when data is less. The technical term for this is called “Regularization”, what they have used in the paper is known an L1 – Regularization (since abs sums of the features are added), the lambda is a parameter which is set by the operator and is usually estimated on a trial and error basis (on the cross-validation data set)

Step 1 & 2 are the ground work on which the authors build the results.

1. For the estimation of the “Regularized (lasso) Regression” as discussed above, they have used a probabilistic approach (hence the name Bayesian Inference).
2. Data for the regression is generated as follows :
   1. Assume that we have 2  variables, vis. P1 (yesterday’s price) and P2 (day before yesterday’s price)
   2. Aim is to be able to predict Long (1), or Short(0)
   3. Then they use past data and equations (4) to (7) to conditional probabilities (u) for each variable.
   4. Then consider the regression equation Y=BX + Lambda \* (sum (abs(B))
      1. Y is known 1 or 0
      2. X is known based on point c above
      3. Estimate B (beta) using an optimization routine. Do note that they haven’t mentioned the value of the Regularization Parameter (lambda) that they have used or what kind of cross-validation (if any) they have done
3. Once B (beta) has been estimated, use the estimated B to generate the trading signal

Questions

1. Y is known – what is y?
2. How to use classification for a regression problem where we are trying to predict a real number i.e. Bitcoin price or price change?