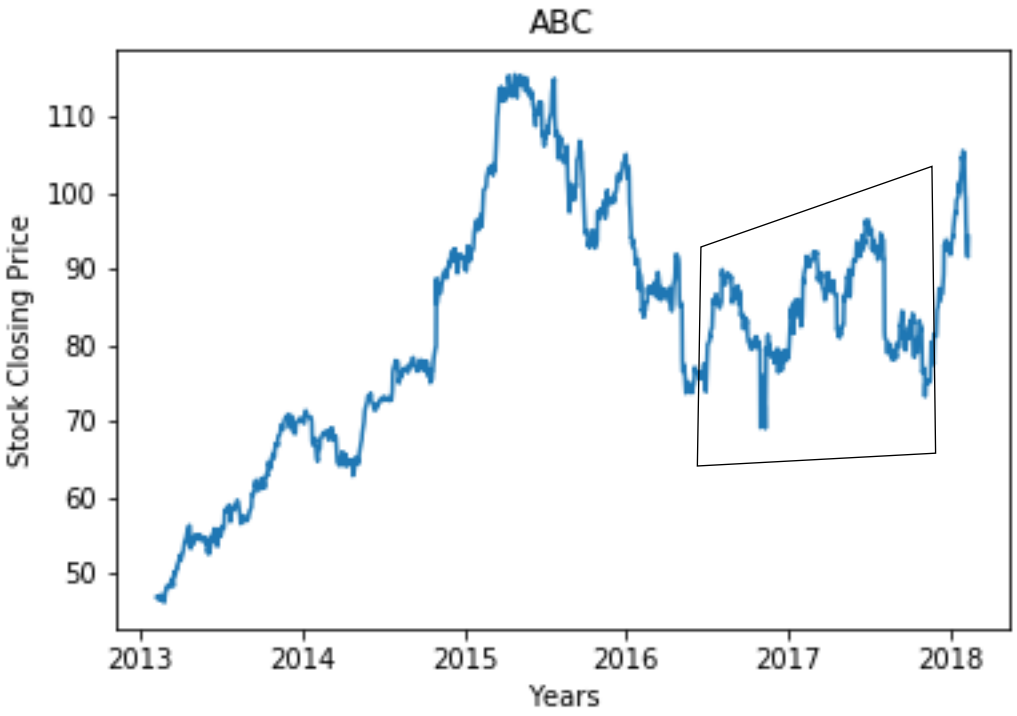
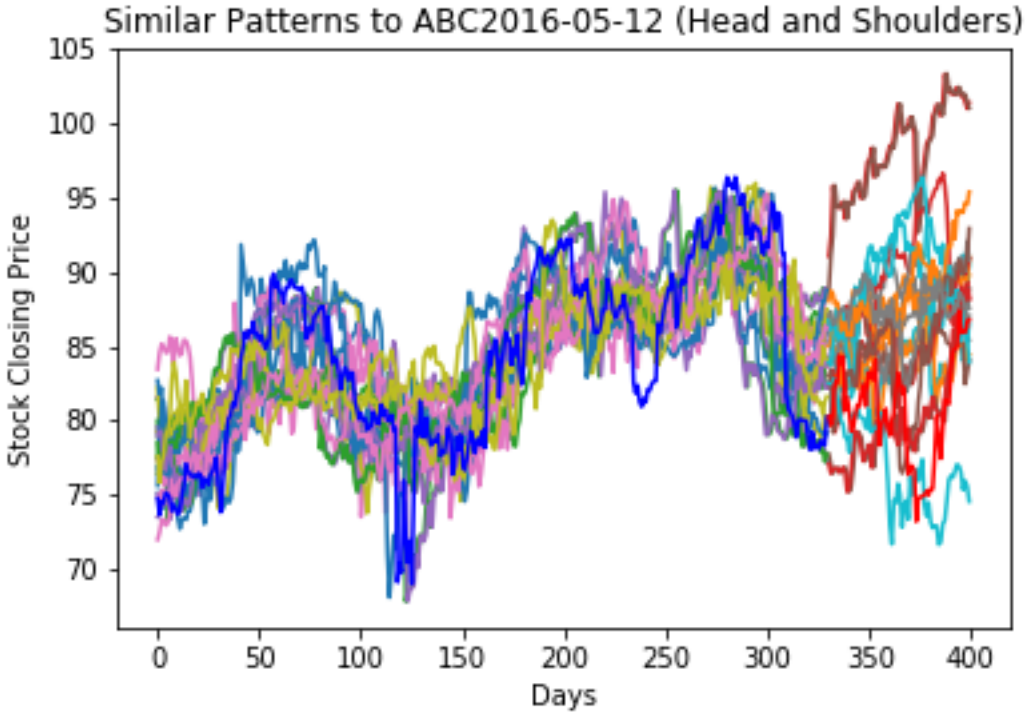
Example of some of our data:

Idea - look for 'Chart Patterns' such as 'Head and Shoulders'. See below example of this chart pattern contained within ABC's 2013-2018 history.



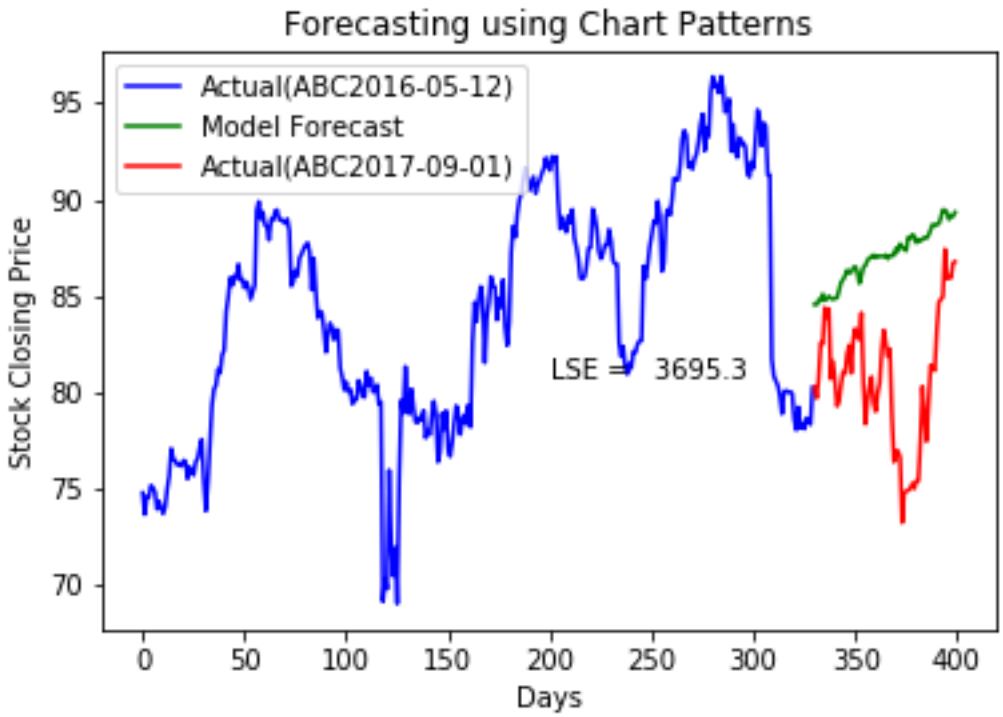
Isolate the pattern; then look for similar patterns from other stocks. Use the data we have about what happened to a stock's price following a 'Head and Shoulders' pattern to make a forecast.



I've scaled other stocks' charts, changing their prices, to best fit the Head and Shoulders pattern from ABC beginning May 12, 2016 using least squares error as the cost function.

We can see that there's not a consensus about what should happen next according to our comparable stocks (the bolder blue line throughout the middle of the pattern is ABC).

Take a weighted average of the predictions made by the other Head and Shoulders patterns we found. Predictions here refers to what comes after the Head and Shoulders pattern according to our comparable stocks. Let the weights be applied by some TBD function, for demonstration I weighted inversely proportional to calculated least squares error. The forecast can be seen below:



The LSE label here indicates the computed least squares error of *the forecast to what actually happened with ABC following its Head and Shoulders* pattern.

Where can we go from here?

- Look at many other patterns, check out the links I inserted earlier.
- Can we pick comparable stocks in a smart way?
  - nominally I decided to just take the n stocks with the lowest least squared errors *after* scaling their charts to best fit ABC's Head and Shoulders pattern.
  - We're going to have to bin industries no matter what - might as well leverage that here; ex. only look within a stock's industry, the possibly comparable stock must have a least squares error below some threshold.
  - Scikit-Learn has some cool Clustering Algorithms. Lets use them to group stocks by:
    - industry
    - volatility
      - need a metric for this that accounts for daily/weekly/monthly/yearly highs and lows and isn't distorted by cheap or expensive stocks
    - volume traded
      - volume correlates highly with *daily* volatility. Its a gotcha to look out for if we dabble into any regression analyses that could maybe make a design matrix singular
- Can we come up with a smart weighting function to take similar stock charts and combine them into a forecast?
  - Kalman Filtering
    - Done something very similar to this routine at work; uses 1-step Kalman Filter to compute weighted average of similar 'curves'.
- Can we use the financial guys' and gals' chart pattern knowledge?

- Head and Shoulders is actually supposed to result in a downward trend, unlike my forecast, but also unlike the actual behavior of ABC
- We could even set out to prove/disprove the viability of looking for chart patterns