**General approach, modularization and work phases**

**Scope planned versus completed(step in robo workfiow)**

**Financial, statistical, ML, algorithms selected and implemented**

**View on gaps, difficulties and opportunities**

**#1 Up-to-date Data Collecting**

The data we have and are using now is directly from an excel provided by professor. In real robo-advisors, it must have the ability to collect data automatically from some outer sources. A good way to deal with this is using APIs from some open access financial database like Yahoofinance or polygon.io. For this project, the main difficulty that prevents us from using this method is there are so many features in the provided excel data, it is not so easy to find such a comprehensive database.

**#2 Feature Engineering**

Feature engineering or feature extraction is the process of using [domain knowledge](https://en.wikipedia.org/wiki/Domain_knowledge" \t "https://usc-word-edit.officeapps.live.com/we/_blank) to extract [features](https://en.wikipedia.org/wiki/Feature_(machine_learning)" \t "https://usc-word-edit.officeapps.live.com/we/_blank) (Characteristics, properties, attributes) from raw [data](https://en.wikipedia.org/wiki/Data" \t "https://usc-word-edit.officeapps.live.com/we/_blank). In our project, we are still mainly using features directly from raw data. In real robo-advisors, they may use various kinds of methods to extract features, like scaling, clustering, and principal component analysis. With better feature engineering, the predicted results will be better. To realize this, we also need more domain knowledge, researching some quantity finance and econometrics method.

**#3 App Based Front end**

In this stage, we only have our front end presented on the website. For many real robo-advisors, they will have diverse platforms, including website, individual app and insert part of other larger apps. Banks usually prefer to insert robo-advisors into their operating app.

**#4 Multifunctional**

In our project, we only predict risk tolerance to deal with asset class allocation. In real robo-advisors, they may provide more functions including stock selection, fund selection or risk exposure analysis. In order to get closer to real advisors, we need to develop more functions and implement them.