CS 458 Project Suggestions

- VOTE: currently written in Common LISP. See /c/cs458/lisp
    - Rewrite in Python
    - Apply to other domain
    - Develop taxonomy of decision strategies (and meta-strategies) for one or more domains.
    - Add a new language. It already knows English and French.
- Emotions applied to a decision system.
- Recommendation system. Smart search, like a reference librarian who understands your goals.
- Qualitative arithmetic (When is a number a "good number" or a "bad number"?)
- Qualitative pre/post analysis for quantitative analysis. (Pre: Whiy perform test? Why use this data? / Post: what is the meaning of the results? what action should I take? should I perform additional tests?)
- Option generation if a or b, why not c?
- Create a Stakeholder taxonomy for specific decision domain.
- Build a rule base expert system.
- Build a case based system.
- Finance application: equity analysis, risk management, big data

Example: Create a risk management system for equity portfolios. Given a portfolio of US or international stocks, across the capital spectrum (large, mid, small), create a system that will calculate a 5 day value at risk (VAR) at the 95% level. Also, perform stress tests and scenario analyses using both historical data and prospective scenarios. For international stocks, include foreign exchange (FX) risk analysis. The system should produce a summary heat map analysis (Green, Yellow, Red) indicating the risk level of the portfolio. Extra credit: if the portfolio is in the red range, the system can suggest trades that would mitigate the risk.

- Monte Carlo simulation a la hw1
- Capital budgeting system a la hw2
- Machine Learning
- Yale cs cloud - open stack
- Big data application
    - Suggestion from Yale CS alum:

      From: https://earthengine.google.org/#intro

      Google Earth Engine brings together the world's satellite imagery — trillions of scientific measurements dating back over 40 years — and makes it available online with tools for scientists, independent researchers, and nations to mine this massive warehouse of data to detect changes, map trends and quantify differences on the Earth's surface. Applications include: detecting deforestation, classifying land cover, estimating forest biomass and carbon, and mapping the world’s roadless areas.

      their "playground" has some sample scripts: https://developers.google.com/earth-engine/playground?hl=en

      basically it allows you to use cleaned up geo pictures (they remove clouds etc) and see how areas

change over time. This could be linked to various clearer decisionmaking areas.

For instance, I could imagine certain oil drilling activity being visible from this data. So say you know where some oil sites are. You can then look at how they change over time, and perhaps build a model of what oil sites look like (I don't actually know if you can search for this sort of thing) and then use that info to be a leading indicator for oil prices.

It may not work for oil in particular, but you could imagine that there might be agricultural things you could look at or changes in the way cities look (expansion, or housing starts or change in the look correlating to the use of a different building material).

These are examples I like because you could then check them against market indicators like the price of oil or corn or housing starts.

Approved implementation languages: R, Python, Java, LISP, JavaScript.