

NATIONAL UNIVERSITY OF SINGAPORE
IS 5006 – INTELLIGENT SYSTEMS DEPLOYMENT
(Semester 2 – AY2020/2021)

Assignment Weightage	1
Final Project	2

Assignment Weightage

Assignments	% of Total Grade
Individual HW - Zapier - Fuzzy Logic Python	30% (Split Evenly)
Group Projects - Trading Signals - Sentiment Python	40% (Split Evenly)
Final Project	30% (Moderated based on peer feedback)
Bonus: Power BI	X-Factor

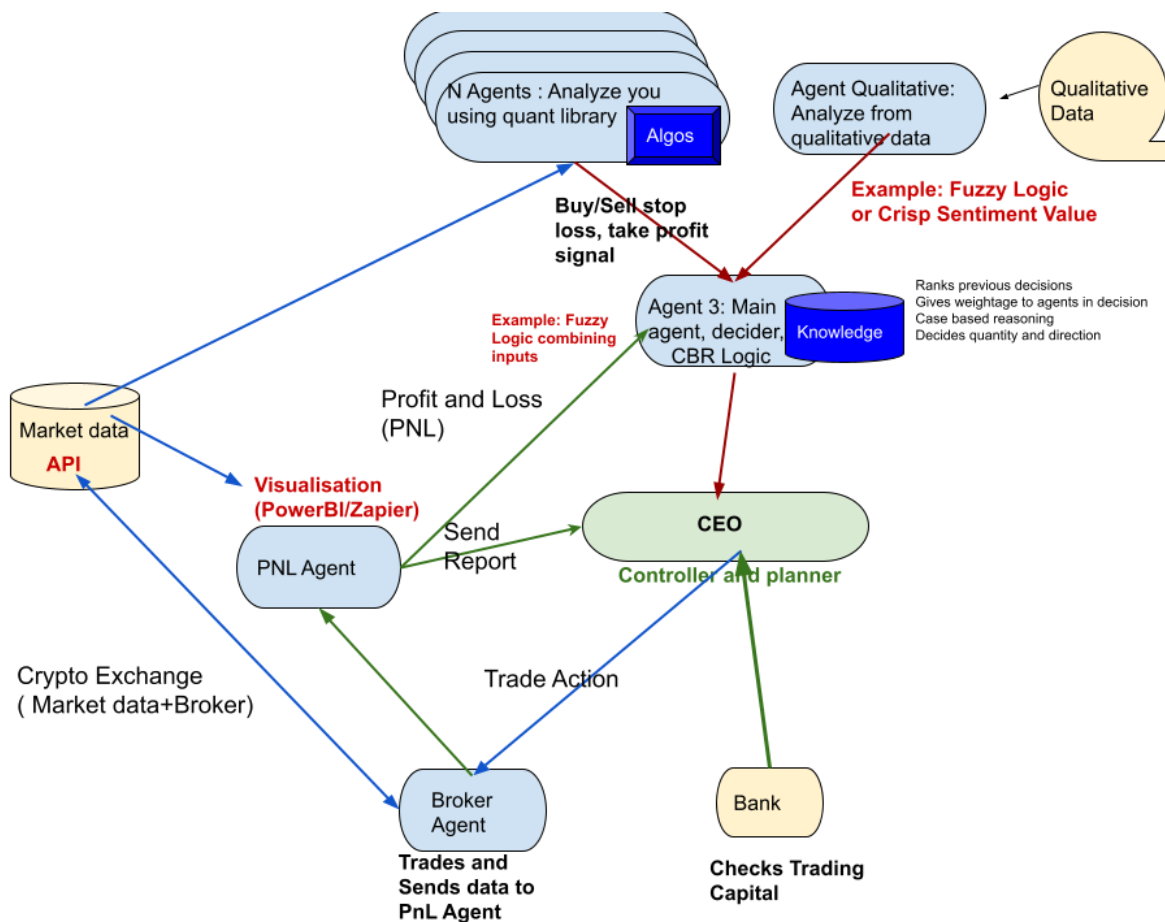
Final Project

Learning objective: the final project is designed to reinforce what you've learned in the course.

Objective

Review course key concepts such as MAS, Fuzzy Logic etc., review your past individual assignments, apply what you have learned into practice, produce a knowledge based system and data processing model.

Diagram:



Project Overview and Goals

Logic: Write the functions for the program. Consider ideas like: using algorithms to find better suggestions to buy/sell cryptocurrencies. Improve the logic of all the agents. At a minimum provide the following changes as a check list:

- ☐ N Agents:
 - ☐ Develop N number of strategies using historical data. One strategy per agent.
 - ☐ Come up with your own algorithms to give suggestions (buy/sell) - directional only.
 - ☐ Send the suggestions over to the Decider agent when the decider asks.
- ☐ Have at least one Agent that leverages Qualitative data:
 - ☐ Analyse from the qualitative data such as twitter OR news or comments from a stream of your choice and make recommendations on whether to buy or sell - directional only
 - ☐ Use fuzzy logic or crisp sentimental value or any other sentimental analysis to find the sentiment of the qualitative data
 - ☐ Send the suggestions over to the Decider agent when the decider asks at the same tick as the other agents.
- ☐ Decider Agent:
 - ☐ Synchronize the agent response so that all agents provide data one on one tick for review
 - ☐ From the result of all the agents, the decider agent would give the final decision.
 - ☐ Provide ability to :
 - ☐ Remember and rank previous decisions.
 - ☐ Give weightage to the decision based on the P&L report
 - ☐ Case Based Reasoning: Suggests quantity and direction
 - ☐ Decide the quantity (based on risk management) and then places the order (i.e. if all the agents say BUY, then you'll have more confidence to purchase and so possibly purchase more especially since if all the agents aligned last time, you made money. If you didn't end up making

money you would take this as not achieving the goal and so lower the weightage of even all the agents voting yes.)

- ❑ Decides direction. Example: You could use fuzzy logic to combine the inputs

- ❑ CEO Agent:

- ❑ Receives the Profit and Loss

- ❑ Consider whether drawdown (realized losses) is too much so stop trading?
 - ❑ Consider whether to close positions
 - ❑ Consider if goal of company has been achieved so can take a safe position (i.e. it has achieved the amount of profit or much more than planned so consider to stop trading too)
 - ❑ This is like a hand-brake on the system

- ❑ Checks balances available

- ❑ Receives the decision from the Decider agent.

- ❑ Send the decision to the Broker agent.

- ❑ Broker Agent:

- ❑ Call the exchange API with Ticker, Action Sell/buy, Amount, order type to send to the exchange.
 - ❑ Quantity limited based on amount available to trade
 - ❑ Needs to report whether was complete and if fill or partial fill and at what price

- ❑ Profit and Loss (PnL) Agent (Reporting Output): Use data visualization to insure humans understand what's happening. Visualization should occur in a visualization tool

Microsoft PowerBI or Zapier.

- ❑ Check for current balances every T minutes.
 - ❑ Check Stop loss or take profit reaches. Give command to the broker agent to square off.
 - ❑ Send a Report to the Decider Agent whether the trades were profitable or not.

(Decider will then update the weight of N agents based on this)

- ☐ Generate graph on profit and loss.
- ☐ Send Graph and report to the CEO agent on profit/loss.

Research Aspect

Learning point: For you to gain a better understanding of Case based reasoning, investing with algorithms and multi-agent systems please find articles and whitepapers and summarize the state of the art in this field. Also consider whether or not to use the ideas in the papers?

Part One is the summary of the articles

Part two is to write your group's idea and reflection from the papers

Write a minimum 4 page document but maximum of 10 pages **not including pictures or appendix.**

Research Grading: Total 30%

Description	%
Research about MAS	30%
Algo MAS and CBR System Components	50%
Personal opinion on whether you would or would not use this software. What are the pros and cons of the solution?	20%

Project Grading:Total 70%

Description of your project, what it does, logic, concepts applied:	30%
1,500 words (Or LESS, I encourage brevity) Final Project Report: <ul style="list-style-type: none">• Demonstrated use of ideas presented in class• Selection of features, assets, and information are logical• Describe strengths and weaknesses of your best MAS model• What could be done better if you had more time?	

<ul style="list-style-type: none"> • Bring in the Hopgood terms to demonstrate your knowledge. • Include your program flow plus any rules that you added • Following the format of the research paper, organize your results including charts, methods, write-up and references <ul style="list-style-type: none"> ○ Format: <ol style="list-style-type: none"> i. Title page ii. Summary iii. Table of contents iv. Main report vi. References 	
Video of Your Final Project (10 MINUTES or less)	10%
<ul style="list-style-type: none"> • Provide instructions on running your model • Show how the model performed • Share what you learned • Talk about challenges you faced • What you did to overcome the challenges • Conclude with what was great and what could be better 	
Code Provided and MAS is Working	40%
<ul style="list-style-type: none"> • Provide your code (python etc) which is well documented • Leverage content from class such as fuzzy logic, MAS communications, knowledge base systems • Meet the standards set in the assignment 	
How To Guide:	10%
<ul style="list-style-type: none"> • How to setup the environment for your model • How to re-create your model • Flow chart of the model • Data that is used, whether you brought in external data such as actual social media etc. 	

Bonus	10%
Describe functionality that you included that is either “bonus” or beyond bonus! Consider this a stretch goal, how far can you take the project?	

Sample Rubric: (this is indicative and subject to change)

ExcellentPoint: 9 - 10	SatisfactoryPoint: 6 - 8	PoorPoint: 0 - 5
Research 30% of total grade		
<p>Very clearly outlined the approach, capability, state of the art in this field. Even, balanced information clearly and effectively supports a central purpose or thesis and displays a thoughtful, in-depth analysis of a sufficiently limited topic. Reader gains insights.</p> <p>Use of references: Compelling evidence is given to support claims and attribution is clear and fairly represented.</p>	<p>Meets expectations:</p> <ul style="list-style-type: none"> - Clear understand of the research - clear understanding of the group's perspective and viewpoint <p>Information provides firm support for thesis and displays evidence of a basic analysis of a sufficiently limited topic. Reader gains some insights.</p> <p>Use of references: References to support claims are generally present.</p>	<p>Unclear or difficult to follow the research assessment</p> <p>Difficult and missing pro's con's of state of the art</p> <p>Paper does not successfully identify thesis. Analysis is vague or not evident. Reader is confused or may be misinformed.</p> <p>Use of references: Although occasional references are provided, the writer overrelies on unsubstantiated statements. The reader is confused about the source of the ideas.</p>
Project Grading 70%		
Code and MAS Working		
<p>Bug-free, production ready, better visualisation(than PowerBI class sample), improved performance, improved results from the baseline code.</p>	<p>Code Can Run and has several changes improving the original program</p> <p>Program has slight logic</p>	<p>Code can't run or is similar to the original program. Compilation errors</p> <p>Output is incorrect</p>

<p>Program displays correct output with no errors</p> <p>Program is logically well designed</p> <p>Program is stylistically well designed</p>	<p>errors that do not significantly affect the results</p> <p>Few inappropriate design choices (i.e. poor variable names, improper indentation)</p>	<p>Program has significant logic errors</p> <p>Several inappropriate design choices (i.e. poor variable names, improper indentation)</p>
How To Guide and Video		
<p>Excellent work easy to understand, all elements readily available for assessment</p> <p>The ideas are arranged logically to support the thesis. They flow smoothly from one to another and are clearly linked to each other. Reader can follow line of reasoning.</p>	<p>Meet the standards of the assignment</p> <p>The ideas are arranged logically to support the thesis. They are usually clearly linked to each other. For the most part, reader can follow line of reasoning.</p>	<p>Hard to follow, inadequate instructions to see entire work output</p> <p>The writing is not arranged logically. Frequently, ideas fail to make sense together. Reader can figure out what writer probably intends but may not be motivated to do so.</p>
Bonus		
<p>Excellent, above expectations on the bonus items</p> <p>We will start and end your program at the same time and see over a timeperiod of several days how your project performed in the market. The winning algo will receive 2% of the bonus</p>	Update 3 bonus items	Updated 1 bonus item

Deliverables Due **April 12th Monday at noon**

This project will require you to submit the following:

Submission LuminNUS, one file per group:

Submission File Name: Group##_NewMethod_GroupName.zip

- Description of the project: Group##_Write-up.pdf
- Code: Group##_Code (this can be a zipped directory)
- How To: Group##_How To Guide.pdf
- Research: Group##_Research.pdf
- Video: Group##_Video.pdf

Submission Folder: Final Project