Plans and Progress

**Conceiving of the Project Idea**

We settled on the idea of an AI driven investment platform as our project idea at the beginning of week four. We initially established our group a few weeks prior to finishing the first assignment; however, it was not until the beginning of the second assignment that we started to work together and communicate on a regular basis. Shortly after submitting our first assignments we held a video chat to discuss the pros and cons of each other's project ideas, and whether we should move forward with one of them or try and come up with a new one as a group.

Going through our projects we wanted to identify some key aspects that would need to be considered should we move forward with them.

* Complexity of the project idea
* The ability to expand on the project idea from A1
* Possible deliverable artifacts for the project idea
* The real-world implications of the project idea
* Interest levels amongst the group about the project idea
* How interesting the project idea would be to others

We discussed at length all our project ideas and our thoughts on how we could progress them further; it was very constructive to see how we all viewed each other’s project ideas and what we could add or improve upon. Ultimately, we settled on Felipe’s project idea of an AI driven investment platform due to the fact we all thought that it was the most interesting and unique project idea out of the choices. Even though we identified that it is the most complex and intricate, we all agreed that as far as real-world implications, level of interest we all had for it, and our ability to expand on Felipe's idea from A1 it would be the best project idea to explore.

**Initial Exploration of the Project Idea**

The thing that stood out most to us about this project idea was the number of different facets of technology that it incorporates, and these technologies all fit within our ideal jobs. Felipe is very interested in machine learning and software engineering as a career, Chris is interested in web development and using programming languages such as Python which is used in AI, and Ben is interested in data analytics which is another aspect of the project.

Additionally, this project idea would be very beneficial to the general population, should it be able to be developed.

We began looking at the project idea subjectively as a group to see what could be explored and delivered. As it is such a complex and intricate project, we realised that we would not be able to deliver an actual working platform at the end of the subject but did discuss the idea that we should have a collection of work that is detailed enough to pass on to another team, or a group of industry professionals, who could make the idea a reality.

Viewing the project idea, as it was presented with feedback in A1, we each started to contribute thoughts and ideas as to how we could better expand on the idea. We discussed the positives of the idea, shared thoughts on ways it would work, who it would be best suited for, possible problems that such an application would face, and some technologies behind how it would operate. We also begun to explore different operational features that could be utilised, the different types of data and personal information that would be needed for them to function, and how they all would shape the type of platform the project would become.

**Developing the Idea**

Several key aspects of this project needed to be identified for it to be a viable idea with functioning features. We discussed at length how the platform would operate, and we landed on these major factors that would directly influence the success of such a platform.

Who the platform is targeted at:

The everyday user who has no previous experience in dealing with investment trading, stocks, or other such financial activities. The platform would be a way for the average-joe to dip their toes into the world of investments and try to capitalise on the stock market, something that previously would be unrealistic.

Stages of Usage:

* Sign up
* Verification
* Fill in personal information
* Deposit of funds
* Make investment type selections based on recommendations
* Create the trading plan (long term, short term, etc.)
* Allow the platform to operate

The way we were able to determine what would be needed for a platform such as this to be functional is to pinpoint the stages and ways in which a user would utilise it. By considering the steps of operation we can identify the processes and information required to successfully develop our idea.

The user details that would be considered:

* Age
* Saving/debt levels
* Weekly spending habits
* Assets
* Earning levels
* Job security

The options that the user would be able to choose/determine:

* Risk level of investments
* Trading strategies
* Individual stocks based on recommendations
* Bundled stocks in different, specified sectors

The importance of these details must be noted as the way they are analysed will allow the platform to calculate an accurate personalised investment strategy for each user based on their individual needs and goals. Making these details specific enough to gather the most valuable data, and the options as streamlined and precise as possible, is important as we want to give the platform the ability to make the most accurate predictions for each user possible and not skew it with unnecessary information.

The types of data that would be collected for the platform to make decisions:

* Current economic climates
* Developing political situations
* Social media trends
* Resource demands
* Weather forecasts and its possible impact on resources
* Financial strength of organisations and governments
* Logistical data
* Historical data

Determining the specific types of data that would be collected for this project is crucial as this directly affects how accurate its predictions on certain outcomes would be. It is extremely important to gather information on as many factors that could influence the stock market, from a multitude of different sources, as to try and achieve the most profitable outcomes possible. This also happens to present itself as one of the first risks that must be identified for this project. A key aspect of this project is not only being able to collect data from a wide variety of sources, but also being able to accurately identify what can be recognised as a reliable source. The internet is filled with unreliable content so one major task in making this project a reality will be the ability to distinguish reliable sources from unreliable sources. While we are currently able to identify this as a specific risk and task to be completed, given the time constraints we face, this is an avenue we will not be pursuing during this assignment.

Possible risks or problems that the project could face:

* Technical issues
* Associated costs
* Handling of sensitive financial data
* Laws and regulations around such a platform

Something important, to not only this project but to any project in general, is being able to identify possible risks and problems that could hinder performance, viability, or even operation. Along with the risk identified above with the collection of reliable data, we have been able to identify several risks that will need to be monitored and addressed as the project moves forward beyond this assignment. The risks that we have identified have been listed in detail in the appropriate section of this assignment however it must be noted that as any project progresses, more risks and problems would become evident and this is something that must be factored into developing a complex platform such as this.

**Features and User Interface**

After developing the core concepts of our idea, we were able to begin working towards building the list of features around the information we had put together. By extensively going over the stages in which a user would access and utilise our platform we were able to develop a specific way in which the user would be able to sign up and begin utilising the platform and all of its benefits. Having these ideas and structures in place, we were able to begin designing a comprehensive user interface for several stages of these features, giving a good visualisation of how we were intending our platform to be presented. (CHRIS, THIS IS WHERE YOUR EDITS FINISHED)

**Step 1.** The user will sign up to the platform, providing their email, mobile, and password. Upon completing these simple steps, the user will need to setup a two-factor authentication (2FA). This is an important aspect of our platform as security is crucial when dealing with financial transactions. The user will also need to follow KYC (Know Your Customer) procedures in order to prove their identity, this is typically required for stock or cryptocurrency exchanges, in order to attempt to reduce money laundering which is very important to creating and maintaining a legitimate, trustworthy, and reputable platform.

**Step 2.** After setting up an account and verifying their identity, the user will then be able to begin filling out their personal information. These details will include information such as their age, savings, debt, job, salary, and assets. This information can be used to recommend amount of savings to invest, which stocks may be best suited to their situation, certain commodities or cryptocurrencies to invest in, and can even factor into the AI's trading algorithm itself. For example, the AI may close trades and take profit sooner for someone who earns less, than for someone who earns more, minimising the chance of the trade rebounding and costing money that may not be able to be afforded by someone with less earnings.

**Step 3**. Depositing of funds into the user's account. This would be a simple process done via BPAY or OSKO.   
In order to make a deposit via OSKO:

* Sign into your bank
* Select make a payment
* Add new payee Select 'Pay Organisation ID'
* Input our organisation ID
* Write your account number in the description field

~~These methods of depositing funds are a safe way to track and monitor where they are being distributed from, creating a safe and secure way for the funds to be transferred by the user. Creating a level of safety around the handling of user funds is extremely important for a platform like this. Having any doubts about the secure nature in which funds would be handled would be an extremely negative blow to the success of such a project.~~

These methods of depositing funds are safe, secure, and allow us to keep track of where user funding is coming from. Creating a level of safety around the handling of user funds is extremely important for a trading platform, as any doubts about the platform's ability to handle funds correctly would have a negative impact on the project.

**Step 4.** Once funds have been transferred into the user’s account, they will then be recommended a series of premade stock bundles that have been compiled by the platform to best suit the user’s circumstances. The user will have the option to select one of these premade bundles of stocks recommended by the platform, but would also have the ability to customise their own bundle and choose exactly what they want to invest in. These options would not only cater to the user with no previous experience or knowledge, but also the user with an understanding or idea of the type of stocks they would be willing to invest in. There would be no limit to the number of stocks, commodities or cryptocurrencies that you can add to a bundle. The platform would take all your options into consideration while trading, making the best investment choices based on your preferences.

**Step 5.** The final stage of setting up a trading account on the platform will be for the user to create their trading plan. They would specify its name, determine their budget (requires funds), choose their specific type of trading, and finally choose the bundle that had been created previously.

There are several types of trading to choose from:

* Long term investments (2+ years)
* Medium term investments (3-12 months)
* Short term investments (1-12 weeks)
* Swing trading (1+ minute trades)
* Trend trading (buying/selling the trend)

All these options would be available on the platform and the user will be able to choose the style of trading that best suits their situation.

* For long term and medium investments, the AI would place more priority on data collected from news and reports.
* For short term investments, the AI balances news and reports as well as live trading algorithms.
* For swing trading and trend trading, it relies almost solely on live trading algorithms and very little on data collected from news and reports.

**Step 6.** Once all these stages have been finalised the platform will automatically begin working on the user’s behalf. If the user has selected one of the investment plans, it will buy in at what it thinks is the appropriate time and eventually sell when it has been deemed to be most profitable. If the options of either swing trading or trend trading are selected by the user, it will constantly buy and sell at the appropriate time.

By giving the users control over selecting certain aspects of the platform, it will create a level of comfort as they would be able to select aspects of trading that they comfortable with without having to worry about the stresses of buying and selling the stocks themselves.

Throughout these processes the platform will constantly be suggesting what it determines to be the most suitable path for the user to take given their individual circumstances, allowing the average person with no knowledge the ability to navigate the process. At the same time the platform will also give the user options to expand outside of these recommendations which would lend the chance for those with a bit more knowledge and experience in investing the ability to tailor their plan a bit more personally to their own ambitions and interests.

**Coding of Platform**

The coding of the AI is perhaps the most difficult task in this project idea. It is not something we planned to deliver, but nevertheless we have investigated how we might start developing this aspect of the project. As we are learners, we would likely start with something basic and evolve it over time as we learn more and become further advanced in this field.

We have taken the first step towards developing the AI, out of many thousands or tens of thousands. We followed a tutorial guide on creating a Python script that connects to the Alpaca brokerage house. There are several different brokerage houses to choose from, and which would be best suited to our platform would be something that needs to be looked at in the future.

The script allows us to query the brokerage house for stock data which can then be used with the AI model. The design in the tutorial has an object-oriented design where a 'TradingSystem' parent class contains the relevant code for core parts of the algorithm, but allows other classes such as a trading system for futures, margin, day trading, portfolio management, etc., to inherit and expand upon the parent's functionality. The algorithm that works for each different trading system will differ and may be trained differently than the others.

In practice, this is just a starting point to get our toes wet in this field. As we develop, a more comprehensive structure will need to be designed to allow our AI to function, but this is a good starting point. This modelling uses back propagation which we believe will be incredibly important for our project, as back propagation allows the AI to learn from itself and improve its accuracy.

This current script is able to run on our computers, but the AI algorithm we produce may need much more computing power and require 24/7 operation without interruption, so powerful cloud hosting will be required. We will likely need to code in recovery functions so the AI can resume what it was doing prior to a power outage or DDoS attack to the cloud facility.

This script in the tutorial ran at a much slower timeframe – looking for changes each day in the data, and after 7 days deciding whether it is a good time to buy or sell – however, we tweaked this to 3 seconds to demonstrate the buy / sell decisions sooner. In our AI, the timeframe will be decided by the AI and the range that it is able to choose from will depend on the type of trading strategy selected by the user. For example: "short term trading" may do hourly or daily updates, whereas "long term trading" may opt for daily or weekly updates, and "swing trading" may look at updates by the minute or even every few seconds.

There are various other tutorials and guides on building AI bots, which would be necessary for us to follow, allowing us to see alternative options and gain a greater understanding of the space. Afterwards, looking deep into actual machine learning and deep learning logic, understanding the core concepts and how it all functions, will be required in order to 'take off the training wheels' and actually start building the ground-breaking AI from the ground up.

We would need to spend months researching, and many more months laying out the logical and intricate design of how each of the algorithms function, and how the AI reads, processes and understands information, and then how that information affects the algorithms. The actual coding process for this platform could take several years, and the testing required would take a substantial amount of time as well.

We would also need to investigate the best language for our AI algorithm. Whilst Python is popular, it may not have the speed required, and R or C++ may be required.

https://medium.com/swlh/build-an-ai-stock-trading-bot-for-free-4a46bec2a18

**Stage by Stage Development and Release**

~~A key factor in developing a platform as intricate and involved as this one is being able to identify when too much is trying to be accomplished at once. By trying to develop too many aspects of this platform at once, we would leave ourselves vulnerable to problems and instability within the platform that would be extremely difficult to manage and rectify, simply due to the complexity of everything.~~

~~The smartest way to move this project forward successfully would be to initially develop and release it as a basic platform that performs the essential functions of what we are trying to establish. This would allow us to better handle any problems or oversights that may arise as we get further down the development process.~~

A key factor in developing a platform as intricate and involved as this one, is adopting an agile approach and focusing on delivering a basic feature (such as swing trading) and then improving it until it's working well and stable. We could then launch the platform with this feature and begin the process of on-boarding clients while we continue to work on the remaining functionality.

If we attempted to develop too many features at once, we would spread ourselves thin and be unable to launch the platform for an extended period of time, making us very vulnerable to potential financial difficulties.

Simplifying things like this allows us to better handle problems or oversights that may be discovered down the line in the development process.

As each stage is deemed to be successful and stable, we would be able to add more and more features, testing and releasing them with ease as we would always be able to roll back to the previous stage knowing that it remains stable. Trying to achieve everything at once could lead us down a path of issues and instability that would be very hard to recover from, jeopardising the chance of developing a successful platform.

~~For instance, we are looking to develop this as an automated trading platform, however in the future we could investigate incorporating more features in the realm of financial planning such as:~~

We are developing an automated trading platform; however, in the future we could possibly incorporate features in the realm of financial planning such as:

* Tax Tools
* Retirement Planning Tools
* Insurance Tools

~~While we are in such early stages of the project, we are unable to identify what stages would be achievable, and in what order, as further research would be needed to see what our overall scope would become. As we continue to develop our idea and the skills associated, we would begin to see what the best course could be in developing certain aspects of the platform. By identifying this as a key point of focus early on, it gives us the constant awareness of trying not to achieve too much at once, keeping us grounded and focused on the tasks at hand.~~

We are in the very early stages of a project that would take years to complete, so it is difficult to predict exactly how the overall scope of the project will pan out over the course of time. We may realise that a particular feature we planned on implementing isn't viable, or we may decide to focus our efforts on a different feature than initially planned, if doing so appears to be more beneficial.

As we progress, step by step, we will continue to refine our idea, learn the relevant skills, and steer the course of the project in what we see as the right direction.

Being aware of the complexity of our project from the outset, we have the constant reminder to keep focused on smaller tasks and features and to not try and achieve too much at once, overextending ourselves. We can continue learning more about agile development and DevOps and improve our methodology as we go on, but having this mindset from the beginning is incredibly important.

**Industry Professionals**

~~It would be incredibly naive for us to believe that we would be able to successfully develop a platform this advanced on our own, especially given the stage of our learning we are currently at.~~

It would be naive for us to believe that we would be able to successfully develop a platform this advanced on our own, especially given the current stage of our learning in this field.

~~The need to recognise the requirement of multiple industry experts must be acknowledged as development of this platform to completion (or release, as we believe this platform would be forever growing) would be impossible without a large team.~~

It is clear that the three of us would be unable to complete or release the platform (as it will be continually growing) without additional support. We would need to employ a number of industry experts in order to develop, maintain, and produce the platform.

Input would be required from such industry experts as:

* Data scientists – to employ their skills in both technology and social science to find trends and manage the data.
* Data analysts – to scrutinise information using data and then making key decisions by identifying different facts and trends.
* Machine learning engineers – to feed data into models and take responsibility for taking a theoretical data science model and scale it out to a production-level model.
* Software engineers – to design, develop and maintain the platform.
* Python web developers – to write the server-side web application logic.
* Web developers – To create and maintain the platforms front-end interface.

We would also need to employ the skills of field specific professionals to make the platform operate as accurately as possible.

* Financial consultants
* Political experts
* Social media experts
* Regulation experts

~~Without the assistance of these, and many more, industry professionals, this project would remain nothing more than a thought and idea.~~

Without the assistance of these industry professionals, this project would simply be too much for a three-man team to achieve in a reasonable timeframe.

**Overall Reflection**

Our main goal when choosing a project to pursue, was to create something that would be interesting, meaningful, and valuable to society. ~~should we be able to see it out to completion. While it was early on that we established that this would definitely be the type of project that we wouldn’t be able to see out to completion, we still had the drive and motivation to work on it and see what we could achieve in the short amount of time that we were afforded.~~

Early on we established that completing working code that demonstrates the AI capabilities would be outside of our capabilities at this stage of our learning, especially with the short time we are afforded for this assignment. However, we had the drive and motivation to work on it and see what we could achieve.

Through this journey we were able to really see how in-depth we would need to go to be able to make such a platform a reality, giving us a real insight into the IT industry and all the different facets that are required to get projects like this off the ground. While we would have loved to have developed a working model of our own, we simply did not have the time, nor the skills at this stage of our learning.

The overall objective of this project was to create a revolutionary financial investment & trading tool, which is web-based and easily accessed by anyone with a computer, making the ability to invest viable for anyone, regardless of their knowledge, and give users a chance to maximise their income in a way that was not previously available. The usage of AI removes the barriers that previously obstructed your average joe from entering the world of trading & investments; the AI handles everything – what to buy, how much to pay, and when to sell. It executes trades and performs much faster than a human ever could, not only making it easier for the user but giving them the edge over traditional trading solutions as well.

We believe that this would be a very beneficial platform to introduce into society, and although it would take quite some time and effort to produce, it could change the way people view trading & investments in the future, and be a life-changing platform for many people.

~~The intention to utilise the AI in such a way is due to the infinite superiority to calculate numbers and probabilities compared to humans. The speed that the information would be received by the AI would allow it to make quick decisions on the user’s behalf, giving them an edge compared to investors using traditional (human) solutions.~~