Assessment Task E 1.10.2 – Draft Research Proposal

Work Integrated Learning 1 – Autumn 2017

Hayden Crain- 98105873

A PROPOSAL TO ANALYSE THE EFFICIENCY OF INTRODUCING AN AI CHATBOT INTO AN ONLINE HOME LOAN APPLICATION PLATFORM

RESEARCHER	Hayden Crain
E-mail	hayden.j.crain@student.uts.edu.au
MENTOR	Ajain Vivek
ORGANISATION	LoanFlare
E-mail	ajain.vivek@loanflare.com
HOST ORGANISATION	LoanFlare
PARTNER ORGANISATIONS	N/A
DURATION OF PROJECT	3 months
Start date	03 04 2017
End date	03 07 2017

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Summary and Abstract

A Chatbot is a conversational program that is designed to stimulate conversation with users, via auditory or textual methods. Most Chatbots are developed with the main intention of passing the Turing Test; a test of whether machine communication could be mistaken or equivalent to a human.

Over time, the Chatbot's business value has increased dramatically over time. With the inclusion of Artificial Intelligence and Machine Learning, Chatbots are increasingly obtaining the potential be used within businesses, taking over general customer service representative positions.

A Software Development company LoanFlare, is in need of a Chatbot service that will aim in giving advice to users of their online mortgage application service, as a way to give simple loan advice to the user. By removing the broker's need to give simple advice to home loan applicants, it allows them to focus on more high-level advice as well as other tasks, ultimately saving the broker's time.

However, LoanFlare developers are unknown with Chatbot technology. Additionally, due to LoanFlare's nature of being a Startup company, it faces the challenge of dealing with limited funds. This means that implementing and developing a Chatbot becomes a risky task, as there is a high chance for the project to fail.

This report proposes to assess the efficiency of introducing an Automated Help Service to LoanFlare's online brokerage platform, and whether it will provide any overwhelming value to our product respective to the time and effort it take for development.

The proposed research will aim to:

- Outline and Compare different Chatbot implementations
- Create necessary criteria needed to assess each Chatbot implementation
- Build Prototype Chatbots of each implementation.
- Calculate and determine which implementation is most efficient towards LoanFlare's problem specification.

Some ethical considerations arise when dealing with Chatbots with Natural Language Processing capabilities. It is required to ensure that the Chatbot will not respond in a vulgar or aggressive manner, which could potentially breach LoanFlare's Code of Conduct. It is also required to ensure that the Chatbot provides accurate and reliable information, where incorrect advice will leave the user of the software confused and disappointed. Ultimately, both cases have the potential of damaging LoanFlare's reputation.

The outcome of my proposed research will enable LoanFlare to ultimately decide on a well-thought out solution that will bring value to their overall product, potentially saving time, cost and effort when in development. Additionally, the proposed research's findings can be used as a guide for other FinTech Startups who wish to implement a Chatbot into their service.

1. Introduction

A Chatbot is a conversational program that is designed to stimulate conversation with users, via auditory or textual methods. The first ever chatbot, ELIZA was developed in 1966 and was able to interact with humans, much like a psychotherapist could. There was a general consensus that ELIZA was able pass the Turing Test, test proposed within the article 'Computing Machinery and Intelligence' (Turing 1950). The Turing Test aimed to test a computer's ability to display behaviour that could mistakenly be thought of as human.

One relevant field in regards to Chatbots is Natural Language Processing. In 1997, a Chatbot by the name of Cleverbot was created by British AI Scientist Rollo Carpenter. It is a web application that integrates Artificial Intelligence and Natural Language Processing in order to hold conversations with users. In the year of 2016, cleverbot has seen 69 million sessions from 41.8 million distinct visitors (Existor 2016).

In the past few years, the popularity of Chatbots have increased dramatically. This was pushed due to the rise in popularity of Smartphones, where web designers had faced the issue of collapsing websites and its data to fit into a much smaller screen. Chatbots now have the ability to solve this issue, where conversations are an easy task on a smartphone. Facebook has seen the need for this, introducing their official API for easy Chatbot development for their Messenger service.

2. Defining of Problem

On the 15th January 2017, LoanFlare introduced their latest Customer Relationship Management (CRM) software to the public. Aimed towards Australian Brokers, the main goal of the SaaS based web-application was to improve three main pain points: administration time, digital presence and client retention.

During the development of the software, a suggestion was made to introduce a Rule-Based Chatbot into the platform as a way to give simple loan advice to the user, as well as guiding them through the loan application process. The introduction of a Chatbot will reduce the broker's involvement with the loan application process, eliminating them from needing to answer simple questions. This allows them to focus their time on high-level advice, improving customer experience as well as reducing the customer's amount of time taken to complete the form.

However, due to LoanFlare's nature of being a Startup company, it faces the challenge of dealing with limited funds, much like the majority of other Startup companies. Approximately 9 out of 10 Startups will eventually fail, with 29% of those failing due to limited funds (Griffith 2014). There is a possibility a Chatbot is a risky investment, given the uncertainty regarding the time and cost of development, as well as the value it provides to the product as a whole.

One problem is that human interaction with Rule-based Chatbots are limited. Its responses derive from a predefined data set, where it matches the appropriate text to the intent of the message. This means that responses are sometimes repeated and 'unhuman like', giving the impression that you are

speaking to a Chatbot. Gerard Frith, the chairman of AI consultancy company Matter, explains that users are "much less patient and want to escalate the call" when they know they are talking to a Chatbot, in order to be passed onto a human (Wakefield 2016).

A solution to this would be to introduce Generative-based models into our Chatbot, which incorporate Artificial Intelligence (AI) and Deep Learning. Rather than using predefined responses, Generative based models use Natural Language Processing Capability (NLP) in order to generate brand new responses, giving the impression that you are talking to a human (RIghtClick.io 2017). However, integrating AI ultimately increases the difficulty of the project and would need a large time frame for development in order for a basic AI Chatbot that solves LoanFlare's problem statement to be created.

Despite the perceived difficulty of developing a Chatbot, it is possible the investment would prove beneficial in the long term. A Chatbot is an attractive tool for both the business and consumer, where it is estimated that 80% of businesses want Chatbots by 2020, saving over $100 billion (USD) in customer service representative positions (BI Intelligence 2016).

3. Research Objective

I propose to assess the efficiency of introducing an Automated Help Service to LoanFlare's online brokerage platform, and whether it will provide any overwhelming value to our product respective to the time and effort it take for development. Additionally, I also aim to assess whether Artificial Intelligence and Machine Learning can provide any significance into developing the improving the usability of the Chatbot. In my assessment, I will achieve the following goals:

- Outline the main differences between Retrieval and Generative based systems and the difference between their development.
- Outline criteria needed for the validation and assessment of Chatbots.
- Compare and assess each Chatbot model using personally developed 'prototype' Chatbots, as well as Chatbots that have already been developed and are in production.
- Determine which implementation system is the most suited towards LoanFlare's Problem specification.

As mentioned in the previous section, consumers feel distressed and upset when speaking to a Chatbot. Ways to assess the overall 'humanness' of a Chatbot would be to integrate the Turing Test into analysis. Also known at The Imitation Game, it was proposed in 1950 as a way of dealing with the question whether machine can think (Oppy, G. & Dowe, D. 2016). It proposes that a machine has passed the Turing Test if it cannot be easily distinguished between itself and a human. However, there have been many objections regarding the validity of the test, and overall the test is more qualitative than quantitative. Taking this into account I was able use the Turing Test as a baseline as well as a Chatbot Case Study (Shawar & Atwell 2007) to derive assessment criteria. It includes three criteria that overall provide a more thorough quantitative assessment:

- Efficiency of dialogue in terms of correct responses.
- Efficiency of dialogue based on the type of response.
- Efficiency of dialogue based on the user's satisfaction.

Additionally, I have also proposed to assess each Chatbot using three main Software Architecture Quality Attributes; Reliability, Usability and Performance. These three attributes represent areas of concern that have the potential for application wide impact (Microsoft 2009). In relation to Chatbots, I have proposed these attributes to be of the largest importance:

- Reliability – The Chatbot must continue operating in the expected way over time.
- Usability – The Chatbot must be easy to use and must be designed with the user and consumer in mind. This attribute closely relates to the 'human responsiveness' of the overall Chatbot.
- Perfomance – The Chatbot must be able to respond and execute specific actions within a given time interval. For example, a slow Chatbot will not improve the overall experience of the loan application process.

Given I have recommended 3 months for the duration of the research project, I would not be able to create the prototypes to be an exact replication of LoanFlare's expectations. Understanding this, I have proposed to develop a fully functioning 'scaled-down' version for both the Generative and Retrieval based implementation types. These prototypes will be able to be tested on a smaller scale. From the results I obtain, I will be able to 'scale-up' the prototype to the company's expectations and make estimates as to what the results will be. To ensure validity, I will introduce two currently in production Chatbots – one of each implementation type – to compare my results with real life implementations.

4. Action Plan

4.1 Outline of Plan

As mentioned in the previous section, my main goal for this research project is to compare and analyse four Chatbots; two of which will be Retrieval-Based systems, while the other two being Generative-Based Systems. Additionally, each system technique will contain both a currently 'in-production' Chatbot, as well as a Chatbot that will personally be developed.

My first goal would be to find a currently 'in-production' Retrieval-Based Chatbot. After completing some initial research, I have discord that Facebook has recently introduced a Chatbot API (Application Programming Interface) for Bot Developers which allow Chatbots to be added to their Messenger service (Nalawade 2017). I have also discovered that there are already a lot of Chatbots in production (Lee 2016) of which I will be able to use for analysis. I will research into these Chatbots, both by obtaining research papers and articles, as well as testing out the Chatbots personally. From this, I will be able to:

- Estimate/Assess the difficulty of development.
- Assess the Chatbot against three main Software Architecture Quality Requirements (Reliability, Usability, and Performance).

The information I obtain from currently 'in-production' Retrieval-Based Chatbots can ultimately be used as a general understanding/starting point for Retrieval-Based systems.

My second goal is to find a currently 'in-production' Generative-Based Chatbot. Cleverbot is a perfect example of Generative-Based system, where it is able to have conversations with humans using Natural Language Processing (NLP) techniques. It is also readily available, where it can also be accessed on iOS, Android, and Windows phones as a mobile application. I will research into Cleverbot, both by obtaining research papers and articles, as well as personally interacting and testing the Chatbot. From this, I will be able to:

- Estimate/Assess the difficulty of development.
- Assess the Chatbot against three main Software Architecture Quality Requirements (Reliability, Usability, and Performance).

Figure 1 - *An interesting interaction I had with Cleverbot, a Generative-Based Chatbot.*
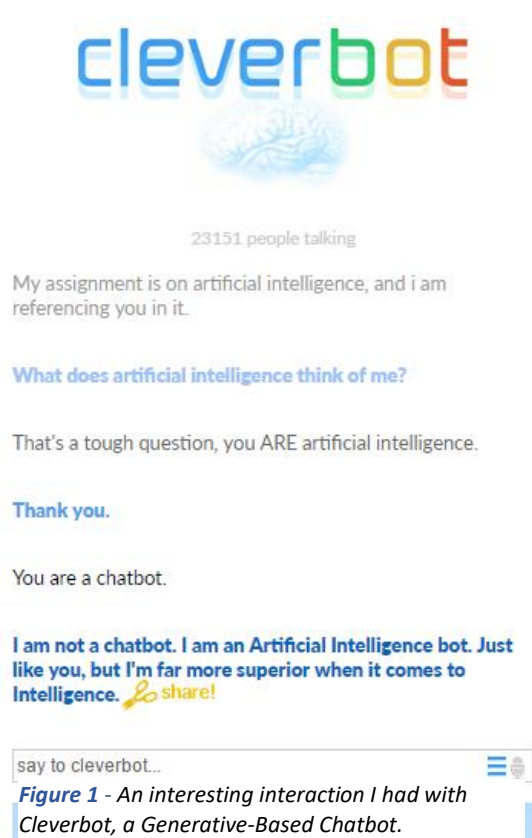
The information I obtain from the currently 'in-production' Generative-Based Chatbot can ultimately be used as a general understanding/starting point for Generative-Based systems.

My next goal is to personally develop a Prototype of a Retrieval-Based Chatbot. A great starting point to achieve this task would be use Facebook's newly introduced Chatbot API, as previously mentioned. According to the developer documentation, I am able to create a basic bot within 10 minutes by completing a 'Getting Started' tutorial (Facebook, 2017). Additionally, Facebook recommends using a Bot engine called Wit.ai, which will enable me to build a Rule-Based AI system (i.e. Retrieval-Based). Both these technologies will help me in creating a prototype Chatbot. Once developed, I will be able to:

- Personally estimate the difficulty of development and how long it took.
- Perform a Turing Test on the Retrieval-Based Prototype. This will include asking friends and LoanFlare developers to test the Chatbot and conduct a survey at the end.
- Assess my Prototype against three main Software Architecture Quality Requirements (Reliability, Usability, and Performance).

Similar to the previous goal, I will personally develop another Chatbot, however this time focusing on a Generative-Based system. A previously mentioned technology, Cleverbot, also contains a Developer API; Cleverbot.io. Additionally, Cleverbot has been in production since 1997, it contains a very large data set of conversations that can be used for training a Neural Network. It is reported that the Cleverbot corpus contains approximately 1.4 billion interactions/conversations between Cleverbot and humans (Existor 2016). Once developed, I will be able to:

- Personally estimate the difficulty of development and how long it took.
- Perform a Turing Test on the Retrieval-Based Prototype. This will include asking friends and LoanFlare developers to test the Chatbot and conduct a survey at the end.
- Assess my Prototype against three main Software Architecture Quality Requirements (Reliability, Usability, and Performance).

My final goal will be to compare and analyse all four Chatbots together. First I will compare each Prototype Chatbot with its currently 'in-production' counterparts. As the prototype Chatbots will be a small scaled version of what is required for LoanFlare's web application, I will attempt to Re-Analyse the Prototype versions by scaling them up, and estimate their criteria accordingly. From there I would be able to determine how long it would take to develop, as well as how many Engineers are required in the process. This will also enable me to calculate the total cost it would take to develop each Chatbot. After comparing the results of my calculations with the 'in-production' Chatbots, I will ultimately be able to calculate the total efficiency of each Chatbot.

4.2 Initial Investigation

Before commencement of the research project, I wanted to get a deeper understanding into how Neural Networks work, while also getting a basic understanding into how long a Neural Network will take to train. I concluded that I wanted to train a very basic model, however I was unsure where to start. After some initial research, I discovered a blog post explaining the effectiveness of Recurrent Neural Networks (Karpathy 2015). This blog post very nicely explained the process and computations Neural Networks undertake, using vector multiplication to 'weigh' each input and assess the probability of what the next output should be. It also went through some examples of 'Character-Level Language Models', where text files of data (e.g. Shakespeare's plays) were passed into the Neural Network. After training, the Neural Network would be able to 'imitate' the input text file, outputting its own text file filled with randomly generated text. From this, I was able to find an updated version Karpathy's Character-Level Neural Network on Github. I used this in order to train my basic model (link to the code can be found here: https://github.com/jcjohnson/torch-rnn).

To train a Neural Network, I first had to obtain a data set. Additionally, I also wanted a data set that was relatable to the problem statement; home loan application advice. To achieve this, I spent a day gathering home loan glossaries from numerous Australian lender websites (NAB, ANZ, Commonwealth Bank etc.). In total, I had gathered over 500KB of home loan information data (approximately 500,000 characters). The data was arranged in the format seen in the figure below.

Figure 2 - Initial data-set of home loan glossary of terms (over 500KB of data)

After installing and configuring the necessary code packages needed for the system to work (see Appendix A) I began to train the Neural Network. The figure below shows the output of the neural network after 22000 iterations and a value loss of 2.03 (The first 22000 iterations took just under half an hour to complete).
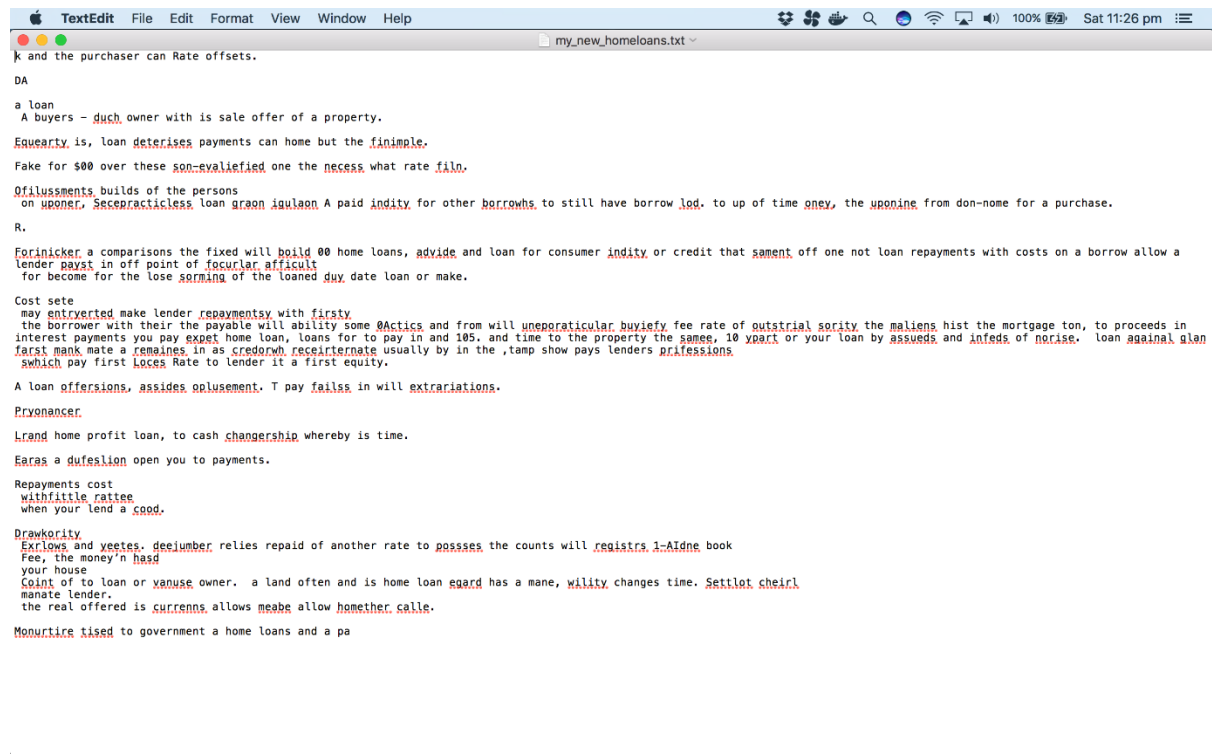

Figure 3 - Neural Network output after 22000 Iterations (value loss of 2.03)

As seen, the output has some very basic structure, but it is mostly unintelligible text. However, there are a few recognisable words within the text file. I believe this is because these are words that were continuously used throughout the input data set, and therefore more like to be outputted.

After 16 hours of continuous training (from 10:52pm to 3:17pm the following afternoon) I paused the training. By that point, the Neural Network had iterated over 2.5 million times. The figure below shows the final neural network output after 2.5 million iterations.
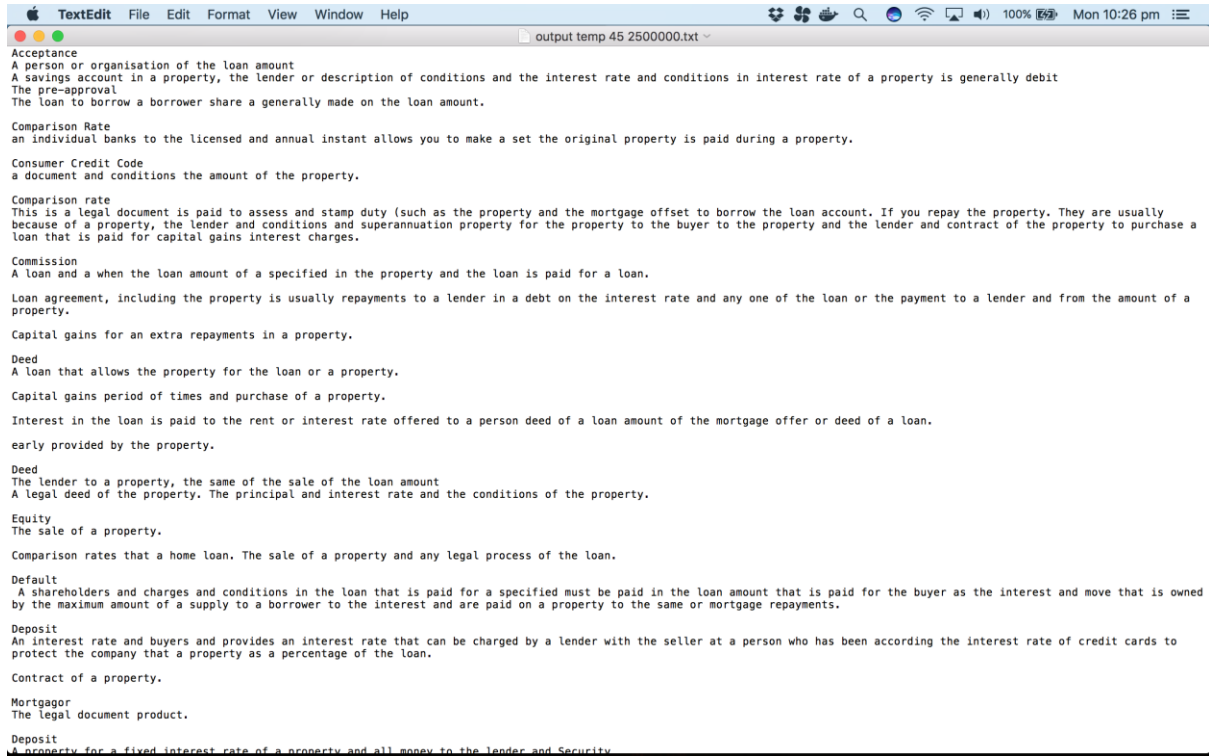
Figure 4 - *Output of the Neural Network after 2.5 Million iterations (value loss of 0.997)*

At first glance, the glossary the Neural Network has outputted seems genuine and reliable. However, upon closer inspection, the definitions do not match with the word it is trying to describe. However, it gives an intriguing insight into what could be achieved with Natural Language Processing combined with Neural Networks. If implemented into a Chatbot, the chatbot may even be able to generate its own response according to data it has been trained with.

From this experiment, I was able to get a better understanding into how Neural Networks behave, and how efficient and simple they are to train. The only issue when training Neural Networks is the amount of time needed. Ultimately, the more time you take to train the Neural Network, the better and more reliable the output will become.

5. Management Plan

This section will cover my overall management plan for documenting and completing the proposed research. I will outline the time required for preparation (e.g. development of the chatbots), number of participants required for this proposal, and the overall process I intended to pursue. I am to complete the proposed research over a 3-month period, gathering my findings into a single formal report and presentation that I will present to the LoanFlare founders and development team on 3rd July 2017.

5.1 Costs and Resources

The proposed research project is possible to be completed with a team of 1 person. However, this project requires the development of two functioning Chatbots (one Retrieval-Based, one Generative-Based). Although estimates have been made regarding the difficulty of developing Neural Network Chatbots, the exact amount of time needed is still unknown and any issues that might occur during development will ultimately minimise the chance of the project being completed in time.

For best results, it is recommended for 2 people to work on this project; preferably an additional Software Engineer from the LoanFlare development team. This will allow each Software Engineer to focus on either Generative-Based or Retrieval-Based separately, enabling more efficient research and development. Afterwards, each Engineer will be able to clearly explain the technology they have researched to one other. Ultimately, it is dependent on the amount of funding LoanFlare is willing to provide to this project, as allowing 2 Engineers to focus on research lowers the productivity rate of LoanFlare's main development workflow.

Obtaining resources for the proposed development of the Chatbots will be relatively inexpensive. As general interest in Artificial Intelligence and Neural Networks has risen over the past few years, the amount of freely available open source code packages that help in developing these technologies has also increased. To search for these code packages, we will use an online repository hosting service called Github. This website is where I had discovered the code package required to train the basic neural network in Section 4 of this proposal (Karpathy 2016). An added advantage of using Github Is that majority of the code packages contain an MIT License, meaning they can be used free of charge.

However, when researching into two currently in-production Chatbots, it may be required to purchase their software for usage and analysis. For example, to create Chatbots with IBM's cognitive system, Watson, requires the use of an additional Cloud Service called Bluemix. It is initially free for a 30-day trial period, increasing to $155 per month (IBM 2016). I estimate that researching into currently 'in-production' Chatbots will only require 1 month, which means it is possible to use IBM Watson for free (explained further in section 5.2).

5.1 Scheduling

To reach the goal of completing the research project before the specified target completion date, I have produced a Project Roadmap that I will use as a guide (Figure 1). I have split up tasks into four sections to help group similar tasks together. My primary focus is to get all required research and development of the Chatbots completed by the beginning of June, with gives me one month to assess and analyse the results obtained, and formalise all research into a final report, ready to be presented by the completion date.

Additionally, there will be additional informal presentations to LoanFlare founders and developers regarding the progress of the research and development. They will consist of small, 30 minute presentations and will describe what has been completed, what wasn't completed in time, and what is intended to be completed. This informal presentation will take place every three weeks until the deadline, and will commence at the end of April 2017.
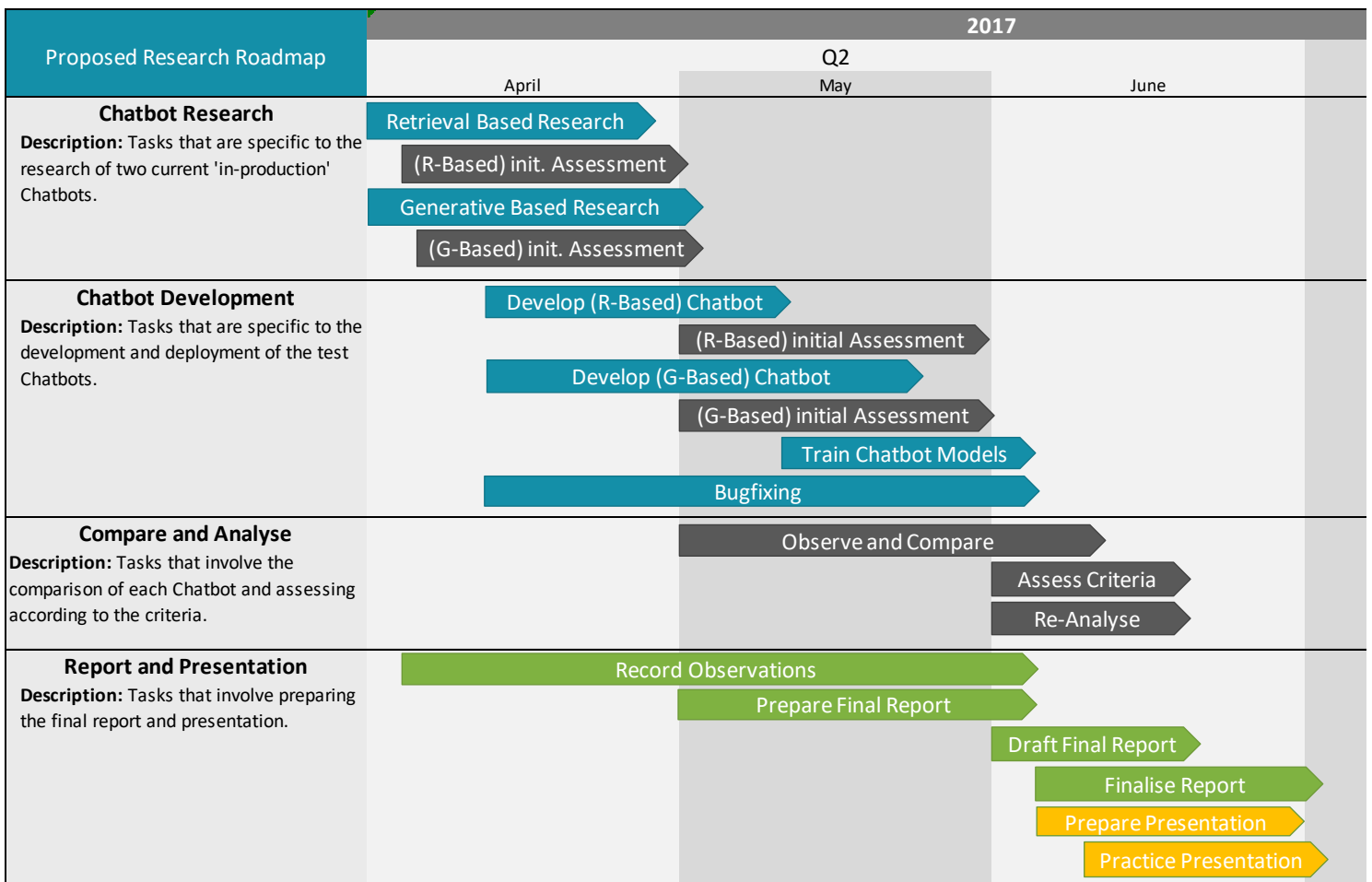
Proposed Research Roadmap	2017		
	Q2		
	April	May	June
Chatbot Research **Description:** Tasks that are specific to the research of two current 'in-production' Chatbots.	Retrieval Based Research (R-Based) init. Assessment Generative Based Research (G-Based) init. Assessment		
Chatbot Development **Description:** Tasks that are specific to the development and deployment of the test Chatbots.	Develop (R-Based) Chatbot Develop (G-Based) Chatbot Bugfixing	(R-Based) initial Assessment (G-Based) initial Assessment Train Chatbot Models	
Compare and Analyse **Description:** Tasks that involve the comparison of each Chatbot and assessing according to the criteria.		Observe and Compare	Assess Criteria Re-Analyse
Report and Presentation **Description:** Tasks that involve preparing the final report and presentation.	Record Observations Prepare Final Report		Draft Final Report Finalise Report Prepare Presentation Practice Presentation

Figure 5 - Schedule for the Proposed Research Project. The project is expected to be completed within a 3-month period.

6. Conclusion

Chatbots are becoming an attractive tool for many businesses around the world. Introducing Chatbots into job positions such as Sales and Customer Service could save billions (USD) on potential annual salaries (BI Intelligence 2016). This document has proposed to assess the efficiency of introducing a Chatbot service into LoanFlare's online brokerage platform, and whether it will provide any overwhelming value to our product respective to the time and effort it takes for development. The outcome of my proposed research will enable LoanFlare to ultimately decide on a well-thought out solution that will bring value to their overall product, potentially saving time, cost and effort when in development. Additionally, the proposed research's findings can be used as a guide for other FinTech Startups who wish to implement a Chatbot into their service.

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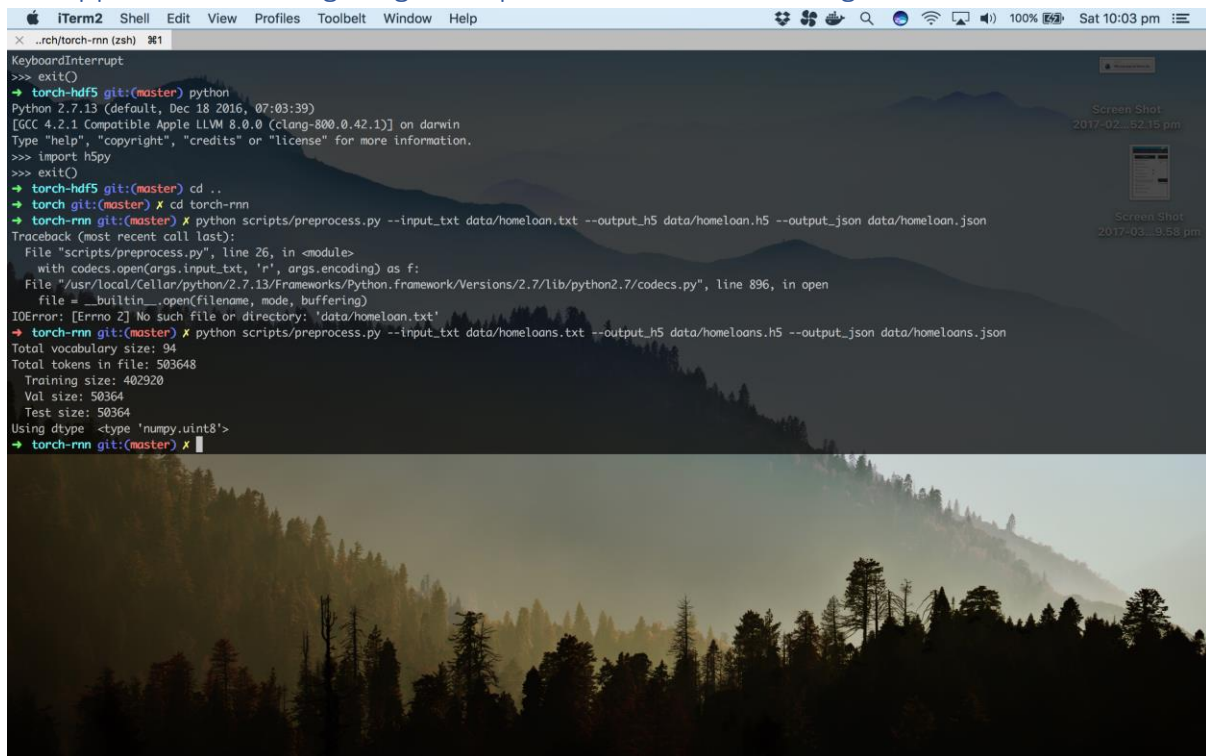
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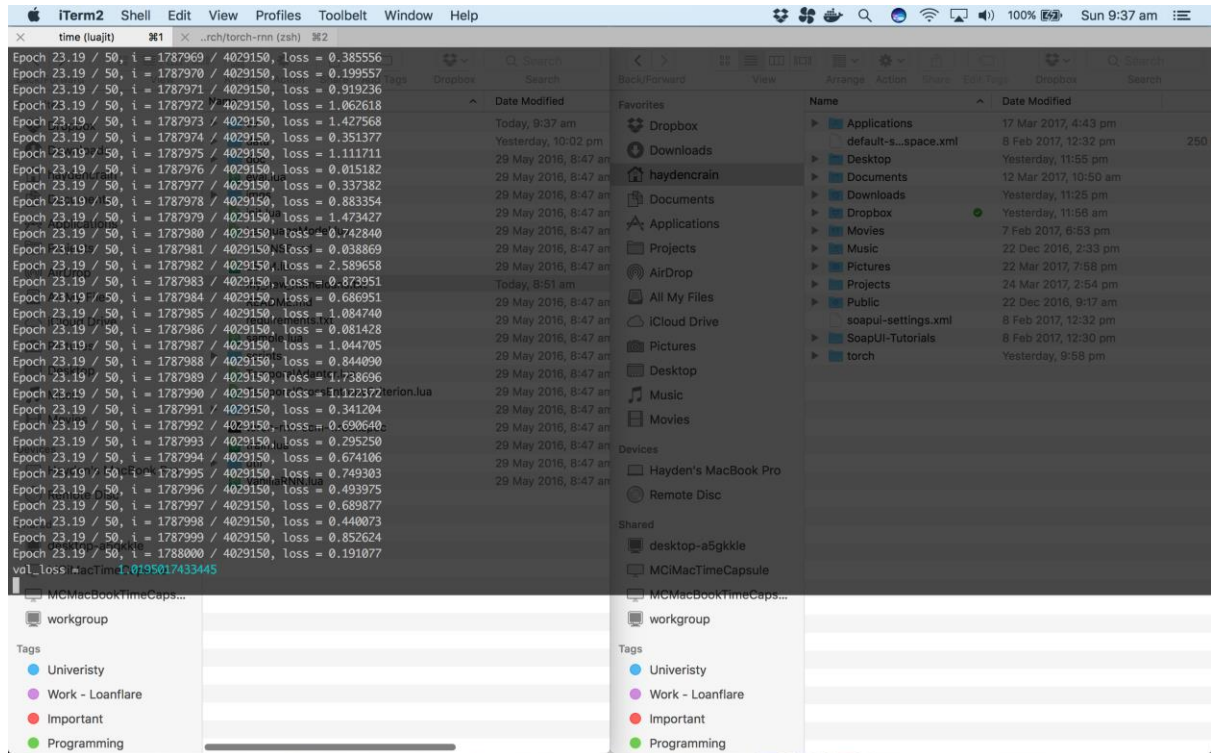
8. Appendices

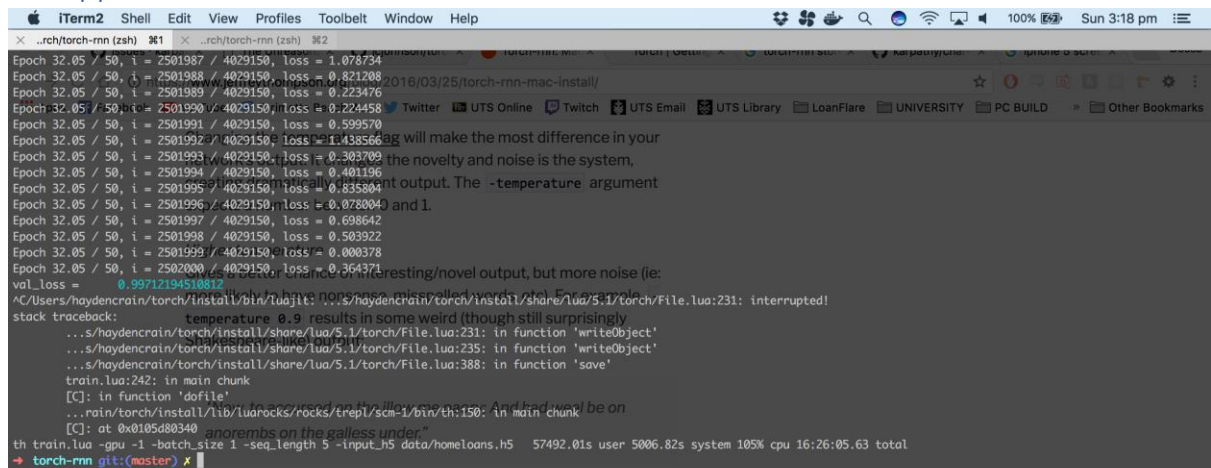## 8.1 Appendix A – Configuring the Input Data used for training the Neural Network

8.2 Appendix B – Neural Network value loss after 1.8 million iterations

8.3 Appendix C – Neural Network value loss after 2.5 million iterations

8.4 Appendix D – Survey Responses

41037 – Work Integrated Learning 1 – Module E1.10 – Survey Template

Student's Name: Hayden Crain

Name of Respondent: ...JOSHUA SHEN...

Position of Respondent: ..Co FOUNDER (Supervisor.)...........

Date of Meeting: ...27/02/2017...

Our organisation, LoanFlare, is currently in request of developing an automated chat service, which will inform users with important information and guide them throughout the loan application process. This task would be relatively simple, where the chat service would post certain content depending on the user's location on the website application. However, it has been suggested to integrate Artificial Intelligence to the chat service, enabling the chat service to respond to user's questions. This could potentially be achieved with AI technologies such as Machine Learning.

My aim is to assess whether Artificial Intelligence and Machine Learning can provide any significance into developing and improving the usability of an 'AI Chat-bot', and validating whether the required effort and time needed to integrate Artificial Intelligence is worthwhile, respective to the amount of value it will provide to the overall product.

This will involve researching into previous research papers and sources on Machine Learning and Artificial Intelligence. It will also involve personally developing and analysing a prototype Machine Learning Chat-Bot, measuring it against Software Architecture quality requirements: Reliability, Usability and Performance.

The outcome of my proposed research should enable us to ultimately decide on a well-thought-out solution that will bring value to our overall product, potentially saving time, cost and effort when in development. It may also direct us to using other AI technologies that might better performance than that of Machine Learning.

Respondent to complete the remainder of this survey:

1. Do you agree that the problem illustrated above is a "real" problem within your organisation? (circle the most appropriate answer)

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
				(Strongly Agree)

Why?

Loan advice has never been given by AI in Australia, and the Loanflare platform will leverage the data from borrowers to provide best practice and evolving advice.

41037 – Work Integrated Learning 1 – Module E1.10 – Survey Template

2. Does the problem require investigative research in order to solve it?

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
			(Agree)	

Why? While chatbots are more mainstream nowadays, this is the first time it has been applied in a home loan application context.

3. Do you think that the intern has the knowledge and skills to do that research?

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
			(Agree)	

If not, what knowledge should be acquired?

4. Do you think that the result may have value to your organisation?

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
				(Strongly Agree)

In which aspect?

* Speed to market → need to ~~scope test~~ & ~~determine~~ determine optimum scope / advi
* IP → innovative & defensible feature.
* Vision → mobile application forms & credit/risk analysis.

5. Is it appropriate for your intern to attempt the development of his/her problem into a draft research proposal to be assessed by the University?

⊘ Yes

○ No

6. Any other comments or concerns?

Signature of Respondent: ....

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41037 – Work Integrated Learning 1 – Module E1.10 – Survey Template

Student's Name: Hayden Crain

Name of Respondent: ......TOR SINCLAIR...

Position of Respondent: ......SOFTWARE ENGINEER.........................

Date of Meeting: ......27/02/2017...

Our organisation, LoanFlare, is currently in request of developing an automated chat service, which will inform users with important information and guide them throughout the loan application process. This task would be relatively simple, where the chat service would post certain content depending on the user's location on the website application. However, it has been suggested to integrate Artificial Intelligence to the chat service, enabling the chat service to respond to user's questions. This could potentially be achieved with AI technologies such as Machine Learning.

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The outcome of my proposed research should enable us to ultimately decide on a well-thought-out solution that will bring value to our overall product, potentially saving time, cost and effort when in development. It may also direct us to using other AI technologies that might better performance than that of Machine Learning.

Respondent to complete the remainder of this survey:

1. Do you agree that the problem illustrated above is a "real" problem within your organisation? (circle the most appropriate answer)

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
				(circled)

Why?
Offering a chat-bot feature would make the software platform more attractive for LoanFlare's users as it would reduce the amount of time mortgage brokers spend on form-filling questions.

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41037 – Work Integrated Learning 1 – Module E1.10 – Survey Template

2.   Does the problem require investigative research in order to solve it?

Strongly Disagree	Disagree	Neutral	Agree	(Strongly Agree)

Why?

Loanflare would like to implement this feature within a relatively short period of time and investigative work is required to determine the best route

3.   Do you think that the intern has the knowledge and skills to do that research?

Strongly Disagree	Disagree	Neutral	Agree	(Strongly Agree)

If not, what knowledge should be acquired?

4.   Do you think that the result may have value to your organisation?

Strongly Disagree	Disagree	Neutral	Agree	(Strongly Agree)

In which aspect?

A chat-bot feature could be continually developed and would be well received by Loanflare users. It is also an attractive sell feature.

5.   Is it appropriate for your intern to attempt the development of his/her problem into a draft research proposal to be assessed by the University?

☑ Yes

○ No

6.   Any other comments or concerns?

A lot of work is being conducted on AI and research that addresses real world problems are valuable and interesting and could lead to further research

Signature of Respondent: ....

41037 – Work Integrated Learning 1 – Module E1.10 – Survey Template

Student's Name: Hayden Crain

Name of Respondent: ...... Ajain Vivek ....

Position of Respondent: ... Lead Developer (Mentor.) ....

Date of Meeting: .... 23/02/2017 ....

Our organisation, LoanFlare, is currently in request of developing an automated chat service, which will inform users with important information and guide them throughout the loan application process. This task would be relatively simple, where the chat service would post certain content depending on the user's location on the website application. However, it has been suggested to integrate Artificial Intelligence to the chat service, enabling the chat service to respond to user's questions. This could potentially be achieved with AI technologies such as Machine Learning.

My aim is to assess whether Artificial Intelligence and Machine Learning can provide any significance into developing and improving the usability of an 'AI Chat-bot', and validating whether the required effort and time needed to integrate Artificial Intelligence is worthwhile, respective to the amount of value it will provide to the overall product.

This will involve researching into previous research papers and sources on Machine Learning and Artificial Intelligence. It will also involve personally developing and analysing a prototype Machine Learning Chat-Bot, measuring it against Software Architecture quality requirements: Reliability, Usability and Performance.

The outcome of my proposed research should enable us to ultimately decide on a well-thought-out solution that will bring value to our overall product, potentially saving time, cost and effort when in development. It may also direct us to using other AI technologies that might better performance than that of Machine Learning.

Respondent to complete the remainder of this survey:

1. Do you agree that the problem illustrated above is a "real" problem within your organisation? (circle the most appropriate answer)

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree ✓

Why?

Yes, ~~the s~~ chat bot would guide the clients to fill in the application form. and cut short brokers time ~~guiding~~ through the process. by eliminating brokes involvement.

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2.   Does the problem require investigative research in order to solve it?

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
			✓	✓

Why?

As machine learning is a vast field we need to figure out ideal solution to solve artifical self guided chatbot.

3.   Do you think that the intern has the knowledge and skills to do that research?

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
		✓	✓	✓

If not, what knowledge should be acquired?

He has to learn and python and machine learning. techniques and apply it to the problem Statement

4.   Do you think that the result may have value to your organisation?

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
				✓

In which aspect?

Yes it coould help us in solving the problem Statement in quicker and cleaner way.

5.   Is it appropriate for your intern to attempt the development of his/her problem into a draft research proposal to be assessed by the University?

☑ Yes

○ No

6.   Any other comments or concerns?

Signature of Respondent: ....

2

E1.10.2 - Hayden Crain – 98105873

Student's Name: Hayden Crain

Name of Respondent: ...Callum.. McArthur..................................

Position of Respondent: ...Software.. Engineer.....................

Date of Meeting: 23/02/2017..

Our organisation, LoanFlare, is currently in request of developing an automated chat service, which will inform users with important information and guide them throughout the loan application process. This task would be relatively simple, where the chat service would post certain content depending on the user's location on the website application. However, it has been suggested to integrate Artificial Intelligence to the chat service, enabling the chat service to respond to user's questions. This could potentially be achieved with AI technologies such as Machine Learning.

My aim is to assess whether Artificial Intelligence and Machine Learning can provide any significance into developing and improving the usability of an 'AI Chat-bot', and validating whether the required effort and time needed to integrate Artificial Intelligence is worthwhile, respective to the amount of value it will provide to the overall product.

This will involve researching into previous research papers and sources on Machine Learning and Artificial Intelligence. It will also involve personally developing and analysing a prototype Machine Learning Chat-Bot, measuring it against Software Architecture quality requirements: Reliability, Usability and Performance.

The outcome of my proposed research should enable us to ultimately decide on a well-thought-out solution that will bring value to our overall product, potentially saving time, cost and effort when in development. It may also direct us to using other AI technologies that might better performance than that of Machine Learning.

Respondent to complete the remainder of this survey:

1. Do you agree that the problem illustrated above is a "real" problem within your organisation? (circle the most appropriate answer)

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
			(Agree)	

Why?

Because Management are advertising that the system
will have one. Also it has been a key sales point
of the platform.

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2. Does the problem require investigative research in order to solve it?

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
				(Strongly Agree)

Why?

Because the subject is not well understood by the members of the team.

3. Do you think that the intern has the knowledge and skills to do that research?

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
				(Strongly Agree)

If not, what knowledge should be acquired?

4. Do you think that the result may have value to your organisation?

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
			(Agree)	

In which aspect?

Hayden is a smart kid and I believe his research will be a diving board for the organisations development of the project

5. Is it appropriate for your intern to attempt the development of his/her problem into a draft research proposal to be assessed by the University?

⊗ Yes

○ No

6. Any other comments or concerns?

Signature of Respondent: ....

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