

FIT3161: Advanced Computer Science Project 1
PM Case Study

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Group: MCS15

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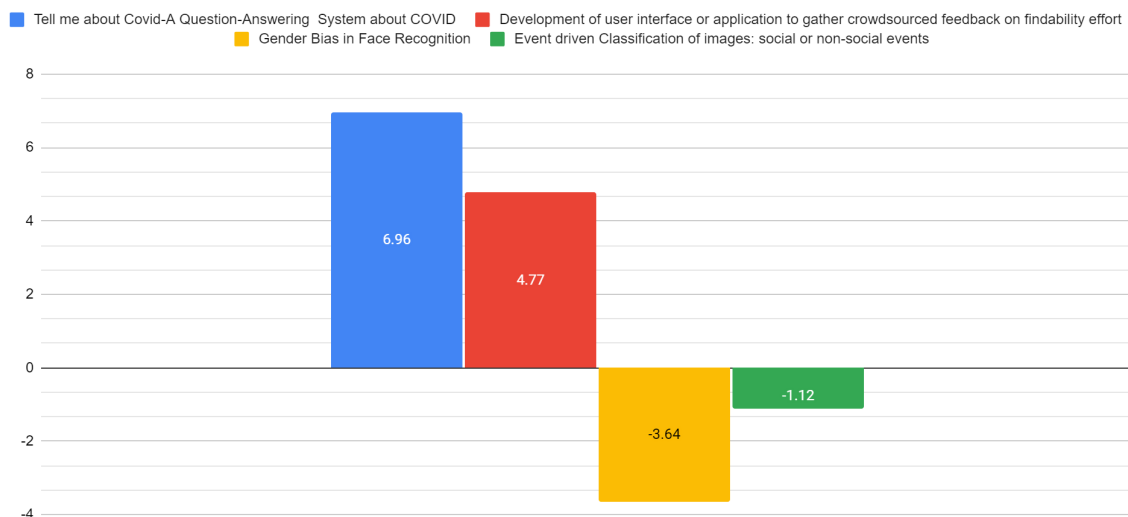
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Case 1.1

Weighted Scoring Model for <<Case Study 1>>					
Created by: Yi Sen, Wai Han, Nawwaf, Yeonsoo	Date: 7/4/2022				
Criteria	Weight	<<Tell me about Covid-A Question-Answering System about COVID>>	<<Development of user interface or application to gather crowdsourced feedback on findability effort>>	<<Gender Bias in Face Recognition>>	<<Event driven Classification of images: social or non-social events>>
Can be implemented by end of Semester 1, 2022	15	2	1	-7	-6
Has strong customer support	5	9	-3	9	2
Provides positive NPV	10	2	2	-2	-2
Provides technical training to an advanced comp sc student	37	10	7	-5	-3
Reliability of the algorithm	33	7	6	-3	3
Weighted Project Scores	100%	6.96	4.77	-3.64	-1.12

Weighted Scoring Model



Memo

Labels:

- Project A - <<Tell me about Covid-A Question-Answering System about COVID>>
- Project B - <<Development of user interface or application to gather crowdsourced feedback on findability effort>>
- Project C - <<Development of user interface or application to gather crowdsourced feedback on findability effort>>
- Project D - <<Event driven Classification of images: social or non-social events>>

In the process of creating the weighted scoring model, a few criteria were carefully considered and compiled when evaluating between the project choices. Our weightage is created out of 100%. Meanwhile, the scores for the projects would be out of 100 as well. The scores can be either positive or negative.

Can be implemented by end of Semester 1, 2022

We gave this criteria a weight of 15%. Despite the project being only at its inception phase, and no implementation is needed for this semester, we believe that this criteria is important as we could decide to start implementing the project within the semester. There is a slight possibility that we could enter the implementation phase due to our group's efficiency in completing this semester's tasks. The supervisor may sense our passion and enthusiasm and guide us with the implementation. For this criteria, we decided that Project A would be the most likely out of the four to be implemented quickly due to its nature of being a backend system. We gave Project B a lower score compared to Project A as it involved both the frontend and backend aspects. Project C and D were given negative scores as they were data science projects which meant that they would involve artificial intelligence or machine learning. We believe that those were long processes that required much more detailed and extensive planning before implementation could begin, compared to Project B and Project C.

Has strong customer support

This criteria was given a weightage of 5%. We believed that regardless of the projects chosen, customer support was mandatory, as we believed that no software or product is self-sustainable. This criteria's weightage was the lowest among all the criterias because despite it being valid criteria, it is not the most important factor when evaluating the projects. This is because when evaluating the projects, other factors such as interest in the project, or the project's algorithm would be more important than customer support. After all, customer support is only important after the product or software has been deployed, not when the product or software is being created. With that in mind, we believe that Project A and Project C are equal in terms of having strong customer support. Project A would definitely require human resources to assist the system, as questions that are out of the system's capability to send an automated response to would definitely arise occasionally. On the other hand, we believe that a gender bias system in Project C would require human assistance, especially in this modern day and age where the LGBT community exists. Both genders may possibly have features of the other, which may not be identifiable by artificial intelligence. Project D was given a low score as we believe that events classification would not be as confusing as human gender recognition. Finally, Project B was given a negative score due to its nature of being just an interface or application which

collects feedback. We believe that customer support should not be an important factor in a system that only gathers feedback.

Provides positive NPV

We gave this criteria a 10% weightage as we believe that despite it being more of a factor that comes into play after the software or product has been deployed, it is still more important than customer support, as it would provide financial value. We believe that NPV is important for products, as it can help to determine the product's worth. We believe that Project A and Project B would have high NPV due to them being systems that would require regular interaction with humans. On the other hand, we believe that face recognition and event classification systems would not be of interest to the public, and thus not being able to generate a high NPV.

Provides technical training to an advanced comp sc student

This criteria was given a weight of 37%. We believe that this criteria is a bit more important compared to the final criteria, and thus we gave this criteria a slightly higher weightage compared to the final criteria. This criteria has the most weightage out of all the criterias because we believe that a final year project should be something that is in line with a student's major. Therefore, we believe that Project A and Project B are highly related to advanced computer science, while Project C and Project D are totally unrelated, as they are data science projects.

Reliability of the algorithm

This criteria has a weightage of 33%. We believe that having a reliable algorithm in a product or software is pivotal in ensuring its success after deployment. Therefore, we believe that it is the second most important criteria when evaluating the projects. Project A and B are advanced computer science projects, and thus we believe that they will have algorithms that are stable. On the other hand, Project D has a lower score compared to Project A and B because we believe that classification is not as stable. Finally, Project C was given the lowest score because we believe that facial recognition for gender is going to be extremely difficult in this modern day and age. For example, men and women can both put on makeup and may look like the other gender.

Case 1.2

1.0 Introduction/ Background

Coronavirus disease is an infectious disease caused by the SARS-CoV-2 virus. Many people might not have the appropriate knowledge, acceptance, and perception of Covid. Our business goal is to provide a Q&A system for this virus. Our team believes that our Q&A system can provide useful information related to covid, and ensure the information is accessible to everyone.

2.0 Business Objective

Our main business objective is to provide useful information relating to Covid. Our social objective of this project is to improve everyone's knowledge, acceptance, and perception of Covid. Our human objective in this project is to create more job opportunities and also the development of human resources

3.0 Current Situation and Problem/Opportunity Statement

In late 2019, a virus named SARS-CoV 2 emerged from Wuhan, China, and resulted in a world pandemic soon later. The disease was officially named Covid-19 by the World Health Organization. This virus transmits via droplet or contact transmission and if there is a lack of strict infection control or without proper protective equipment you'll get infected really easily. Currently, there are no definitive treatments for this disease so all we can do is to take the vaccines approved by the World Health Organization, practice social distancing and follow proper standard operating procedures.

Most vaccinated people that are infected with the Covid-19 virus do not require any special treatment because they would only experience mild to moderate respiratory illness and they will recover easily. People who are older or those with underlying medical conditions would need to be extra careful because they can be seriously ill and require medical attention. Anyone can get sick from Covid-19 and become seriously ill or die from this disease. Furthermore, they would be quarantined at home, where there would be no access to professional medical advice. Hence, most people would go online to enquire about treatment. Our system aims to provide support to those who need information regarding Covid-19.

4.0 Critical Assumption and Constraints

Our primary constraint is that our project has to be completed by the end of 2022. We will be racing against time and on the other hand, we also have to get approval from our supervisor for the algorithm that we are using. By November 2022, we would be focusing solely on trying to answer general questions about covid. Our team might not have enough time to create a Q&A system that can answer in-detailed questions. Regardless, our team will ensure that the basic set

of functionalities will be implemented within the time constraint given. The advanced features will be explored later on if there is excess time.

5.0 Analysis of Option and Recommendation

There are three options for addressing this opportunity:

1. Update existing Q&A system and add in information relating to covid. This could be done by just collecting relevant findings of covid and uploading them into the database
2. Can make use of Python libraries and Q&A system engines which are readily available.
3. Explore and research more software that is more suitable to be used for Q&A system

Based on discussions with our project supervisor, we believe that option 2 is the best option.

6.0 Preliminary Project Requirements

The main features of the Q&A system include the following:

1. Access to the latest information about Covid. Users must be able to search for information about Covid, read the user guide on how to use our system, and see how to apply some of the information in real life.
2. Preprocessing and storing covid data in the databases (e.g. NoSQL) so that our system can provide accurate information to our users.
3. Access to technical tools, languages, and software for our project. (e.g: Python, Java)
4. Able to provide accurate answers when our users key in their enquires
5. Access via the web, tablet, or mobile
6. Other features suggested by the users if they add value to the business.
7. A chat component to help users that are facing any trouble or for users to enquire more detailed questions for Covid

7.0 Budget Estimate and Financial Analysis

The entire project's preliminary estimate of costs is about RM140000. This estimation includes advertising fees, buying a database system, and also the maintenance fee for the following years. The projected benefit is that students are allowed to publish their work as their research if the project meets all the requirements of the school. Doing so can benefit the student's future career and this would be the ROI for our project.

8.0 Schedule Estimate

The supervisor would like to see the project completed by November 2022, but there is some flexibility in the schedule. We also assume that the new system will have a useful life of at least five years.

9.0 Potential Risks

This project carries several risks. The foremost risk is a lack of interest in the new system by our own team members and our external clients. User inputs are crucial for populating information into this system and realizing the potential benefits of using the system. Besides that, there are some algorithm risks when providing information for example biased logic, inappropriate modeling techniques, coding errors, and so on, but the features of this system all use proven technologies. Furthermore, the main risk in our case is investing the time and money into this project and not realizing the projected benefits.

10.0 Exhibits

Exhibit A: Financial Analysis

Discount Rate	8%		
Assume the project is done in November 2022	Year		
	0	1	Total
Costs	140000	40000	
Discount factor	1	0.93	
Discounted costs	140000	37037	177037
Benefits	0	200000	
Discount factor	1	0.93	
Discounted benefits	0	186185	186185
Discounted benefits - costs	-140000	148148	
Cumulative benefits - costs	-140000	8148	<- NPV
	Payback in Year 1		
Discounted life cycle ROI ----->	112%		
Assumptions			
Costs	# hours		
PM(500 hours, \$50/hour)	25000		
Staff (1500 hours, \$70/hour)	105000		
Outsourced software and services	10000		
Total project costs (all applied in year 0)	140000		
Benfits			
# consultants	400		
Hours saved	40		
\$/hour profit	10		
Benefits from saving time	160000		
Benefits from 1% increase in profits	40000		
Total annual projected benefits	200000		

Case 2.1

There are many software development models, such as the iterative, spiral, V model, and others (Stoica, Mircea, et al., 2013). The models that will be analyzed are Agile and Predictive, due to their usage in recent years.

The Agile model has been widely used in the IT industry for approximately 20 years now (Kaur, Jajoo, et al., 2015). Its high usage is no surprise as this adaptive approach (Stoica, Mircea, et al., 2013) can be used on small scale development projects, large scale software development projects, testing projects, and software maintenance projects, with Serrador and Pinto's article (2015) stating that project success improves through the implementation of Agile. The scrum framework implements roles, ceremonies, meetings, and artifacts (Kaur, Jajoo, et al., 2015). Its benefits are heavily correlated with the agile manifesto values (Gustavsson, 2016). Despite emphasizing minimal documentation and close interaction with clients, developers may be stressed over the short iteration time frame, consequently causing adverse effects on the product (Stoica, Mircea, et al., 2013).

The Predictive approach is most appropriate for projects that have a detailed plan and have a complete list of characteristics and tasks. Furthermore, such an approach depends on the requirement analysis, and it also emphasizes documentation in orientation and clarification of the project (Stoica, M., Mircea, M., & Ghilic-Micu, B. 2013). The advantage of using predictive modeling is that everything is easy to plan in detail because the initial user requirements would be fixed (Mario Špundak, Mixed Agile/Traditional Project Management Methodology – Reality or Illusion?. 2014). The disadvantage of this modeling is that requirements may arise after initial requirement gathering and it will be difficult to return to the design stage (Stoica, M., Mircea, M., & Ghilic-Micu, B. 2013).

Each model has its benefits and drawbacks. Hence, it is important to identify factors such as the type of project, the importance of frequent client communication, and the volatility of user requirements.

Case 2.2

Despite being unique in their own way, agile and predictive models have their benefits and drawbacks when implemented during projects. The agile model is flexible in the sense that it only focuses on future tasks that are clear (Stoica, Mircea, et al., 2013). On the other hand, the nature of predictive models are having constraints that are well defined (Špundak, 2014). Essentially, projects that have product requirements would benefit more from a predictive model, while an agile model would be more suitable for projects with less detailed planning. The lack of planning in an agile model is offset by frequent and open communication with clients, leading to minimal documentation, despite potentially tiring developers due to multiple meetings and iterations (Stoica, Mircea, et al., 2013). On the other hand, predictive models emphasize documentation and well-defined requirements before the project begins, consequently allowing developers to be unconcerned about meetings with clients (Stoica, Mircea, et al., 2013). This also means that predictive models can be planned in detail from the start of the project, therefore being more robust than an agile model as the project can be run smoothly without any changes (Špundak, 2014).

Nevertheless, the usage of predictive models is very situational, ideally when team members are unable to come to a consensus on different approaches, inexperienced members, or if the project manager does not frequently contact the team members (Špundak, 2014). On the other hand, an agile model is able to be implemented on various types of projects, such as small scale development projects, large scale software development projects, testing projects, and software maintenance projects (K. Kaur, A. Jajoo and Manisha, 2015). Regardless, both models have their own advantages. An agile model has increased productivity and speed for projects due to the nature of the project being flexible. The team would have better cooperation due to well-defined product requirements (Gustavsson, 2016). On the other hand, a predictive model consists of structured design and documentation which is easy to be used. Besides that, project coordination is clear as the stages that are carefully implemented have expected results and an evaluation process (Stoica, Mircea, et al., 2013). The management styles of the two models are different as well, with predictive models implementing a command and control management style with formal communication, while an agile model uses a more modern approach that embraces informal communication and leadership (Stoica, Mircea, et al., 2013). However, agile models have a few drawbacks, most noticeably requiring developers to have a changing mindset to embrace the nature of the model's adaptability. Besides that, it is reported that agile models have unclear processes, therefore making it difficult for the team to understand the benefits of the projects while in the early stages, which may consequently lead to demotivation and a lack of communication and stakeholder engagement (Gustavsson, 2016).

Case 2.3

The agile and predictive models are clearly unique in their own way. Regardless, our team cannot use both methodologies to approach our project. After much discussion among our supervisors and our group members, we have come to a consensus on the methodology that would be used for our project. The approach that would best suit our project would be the predictive life cycle model. The primary reason why we chose this model was that all the project requirements would be given beforehand. There would not be any changes or emergent requirements, and the project team would not have to consult the client multiple times as there is no client to consult. In addition, based on our findings we have concluded that agile SDLC is better suited for small and medium-scale projects, and traditional SDLC is for projects on a larger scale (Stoica, M., Mircea, M., & Ghilic-Micu, B. 2013). Hence, we have decided to use traditional SDLC because our project is considered a large-scale project. In a nutshell, the predictive model approach would fit our project better, and our team would also apply some agile methodologies to our project. We plan to implement an altered version of frequent scrum daily stand up meetings, where weekly meetings would be held instead to keep the team up to date of the progress made by each team member and whether they would require assistance should they come across a block that would impede their progress further. We believe that if we were to apply this altered agile methodology, it could significantly improve the speed of progress made during each stage of the project.

Reference List

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Case 3.1

Project Title: Tell me about Covid-A Question-Answering System about COVID

Date: 8/4/2022

Prepared by: Yi Sen, Wai Han, Nawwaf, Yeonsoo

Project Justification:

The product will provide useful information relating to Covid. Besides that, it will improve everyone's knowledge, acceptance, and perception of Covid. Furthermore, the product will create more job opportunities and also the development of human resources.

Product Characteristics and Requirements:

In-scope:

- Access to the latest information about Covid. Users must be able to search for information about Covid, read the user guide on how to use our system, and see how to apply some of the information in real life
- Access to reliable databases. So that our system can provide accurate information to our user's
- Access to technical tools, languages, and software for our project. (e.g: Python, Java)
- Able to provide accurate information when our users key in their enquires
- A "Live Support" feature to help users that are facing any trouble or for users to enquire more detailed questions for Covid

Out-of-scope:

- Other features suggested by the users if they add value to the business
- Access via web, tablet, or mobile
- Detailed search option for finding COVID-19 information
- Automated update on latest COVID-19 information

Constraints:

- Project has to be completed by the end of 2022
- Have to get approval from our supervisor for the algorithm that we are using
- Team might not have enough time to create a Q&A system that can answer in-detailed questions

Assumptions:

- Our primary constraint is that our project has to be completed by November 2022.

- We will be racing against time and on the other hand, we also have to get approval from our supervisor for the algorithm that we are using.
- By November 2022, we would be focusing solely on trying to answer general questions about covid.
- Our team might not have enough time to create a Q&A system that can answer in-detailed questions.

Summary of Project Deliverables

Project management-related deliverables:

1. Project Scope Statement
2. Business case document
3. Work Breakdown Structure
4. Requirement Traceability Matrix

Product-related deliverables: research reports, design documents, software code, hardware, etc.

1. Software codes of the system
2. Database server system
3. Design Rationale documents

Project Success Criteria:

1. The project meets all 'Required' requirements within 2022.
2. Project supervisor accepts the final product.
3. More than 7 users out of 10 users are satisfied with the contents of consumer-level answers
4. More than 5 users out of 10 users are satisfied with the contents of expert-level answers
5. Each inquiry process takes a maximum of 10 seconds
6. Project's total cost is less than RM140000 on completion

Case 3.2

REQUIREMENTS TRACEABILITY MATRIX						
Project Name:	Tell me about Covid-A Question-Answering System about COVID					
Project Manager Name:	Kim Yeon Soo					
Project Description:	The Epidemic Question Answering (EPIC-QA) track challenges teams to develop systems capable of automatically answering ad-hoc questions about the disease COVID-19, its causal virus SARS-CoV-2, related corona viruses, and the recommended response to the pandemic.					
ID	Priority	Requirements	Assumption(s) and/or Customer Need(s)	Category	Source	Status
1	High	Datafication of possible expert-level questions on COVID-19	Gathered many possible questions by automated / manual research on COVID-19	Required / Functional	Project Supervisor	Open
2	High	Datafication of possible consumer-level questions on COVID-19	Gathered many possible questions by automated / manual research on COVID-19	Required / Functional	Project Supervisor	Open
3	High	Detailed analysis on the possible expert-level questions on COVID-19	Req ID. 1 is complete and the data for questions are ready	Required / Functional	Project Supervisor	Open
4	High	Detailed analysis on the possible consumer-level questions on COVID-19	Req ID. 2 is complete and the data for questions are ready	Required / Functional	Project Supervisor	Open
5	Medium	Development of efficient automatic methods to update the latest COVID-19 information in the system	-	Optional / Non-functional	Project Supervisor	Open
6	Medium	Adding a detailed search option for COVID-19 information	Req ID 5. should be completed	Usability / Non-functional	Project Supervisor	Open
7	High	Configure a Database server that stores the latest COVID-19 information	-	Required / Functional	Project Supervisor	Open
8	High	Development of an algorithm that automatically provide expert-level answers for users' questions	Req ID. 1,3 should be completed	Required / Functional	Project Supervisor	Open
9	High	Development of an algorithm that automatically provide consumer-level answers for users' questions	Req ID. 2,4 should be completed	Required / Functional	Project Supervisor	Open

10	Low	A chat component to help users that are facing any trouble or for users to enquire more detailed questions for Covid	-	Availability, Usability / Non-functional	Project Supervisor	Open
11	Low	Adding support for web, tablet and mobile	-	Availability, Usability / Non-functional	Project Supervisor	Open