Universiti Teknikal Malaysia Melaka (UTeM)

Fakulti Teknologi Maklumat dan Komunikasi (FTMK)

BITI 3533 Artificial Intelligence Project Management

Semester 01 2022/2023

Project Report

Group G

Group Members	Matric No.
1. LEE YUN KANG (Leader)	B032010390
2. KISHWANTH A/L HARI KRISHNAN	B032010185
3. MOHAMMAD IRSYAD BIN MOHD SHAHRIL	B032010242

PROJECT OVERVIEW

A. DEFINING THE PROJECT

Project Summary

Chatbots have been gaining popularity over the years and can be seen on almost every website we visit. They are being increasingly used by businesses for customer support and are predicted to improve customer service for many industries in the coming years.

In our current world today, many of them are facing stress, loneliness, anxiety, depression, and boredom in difficult times. Most of them are not consulting a therapist or counsellors and just keeping their problems within themselves. Hence, this project enables the users to communicate with the chatbot to identify their problems and provide a solution for it.

In our chatbot system, the data will be trained first to help the system recognize and classify the similar texts or messages. For example, the words 'good', 'best', 'better' have the same meaning. So, the chatbot had to be trained first by using the Natural Language Processing (NLP) technique and together with Deep Learning (DL) techniques to ensure it gives the correct results although the words are synonym.

Customer: AITech Inc.

Project Name: ARTIFICIAL INTELLIGENCE CHATBOT ASSISTANT

Team Members:

- LEE YUN KANG B032010390
- KISHWANTH A/L HARI KRISHNAN B032010185
- MOHAMMAD IRSYAD BIN MOHD SHAHRIL B032010242

Objectives:

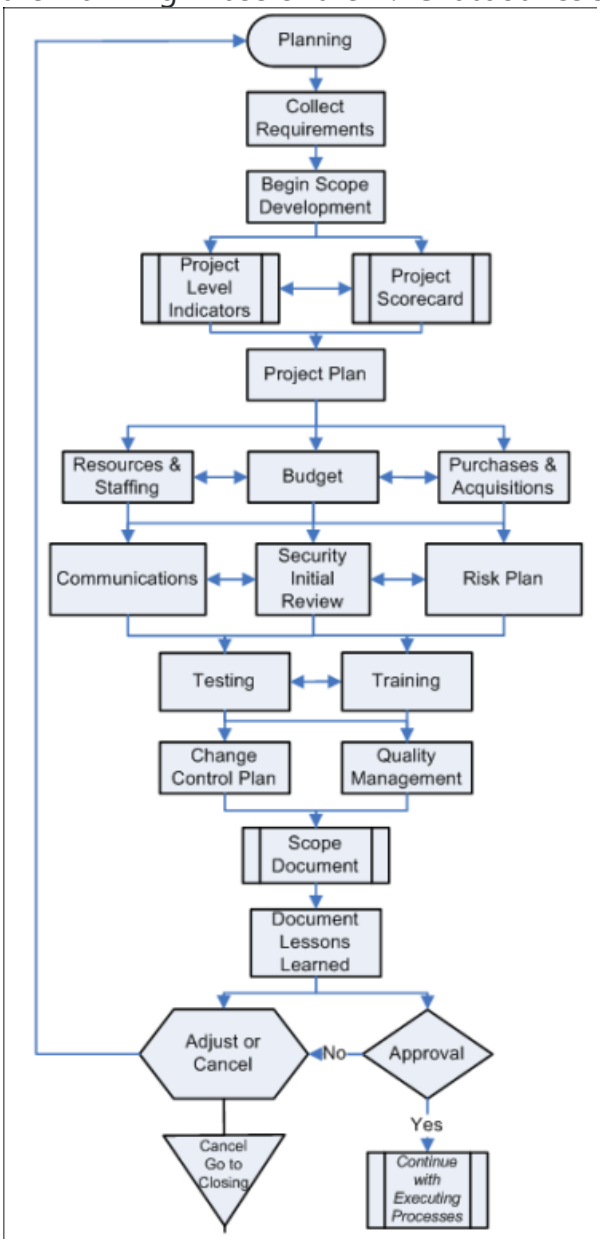
- To develop a chatbot that are designed to give people an automated way to communicate with the company.
- To provide useful information regarding the types of issues faced.
- To develop a system that is able to improve the customer service in the future.

B. PLANNING THE PROJECT

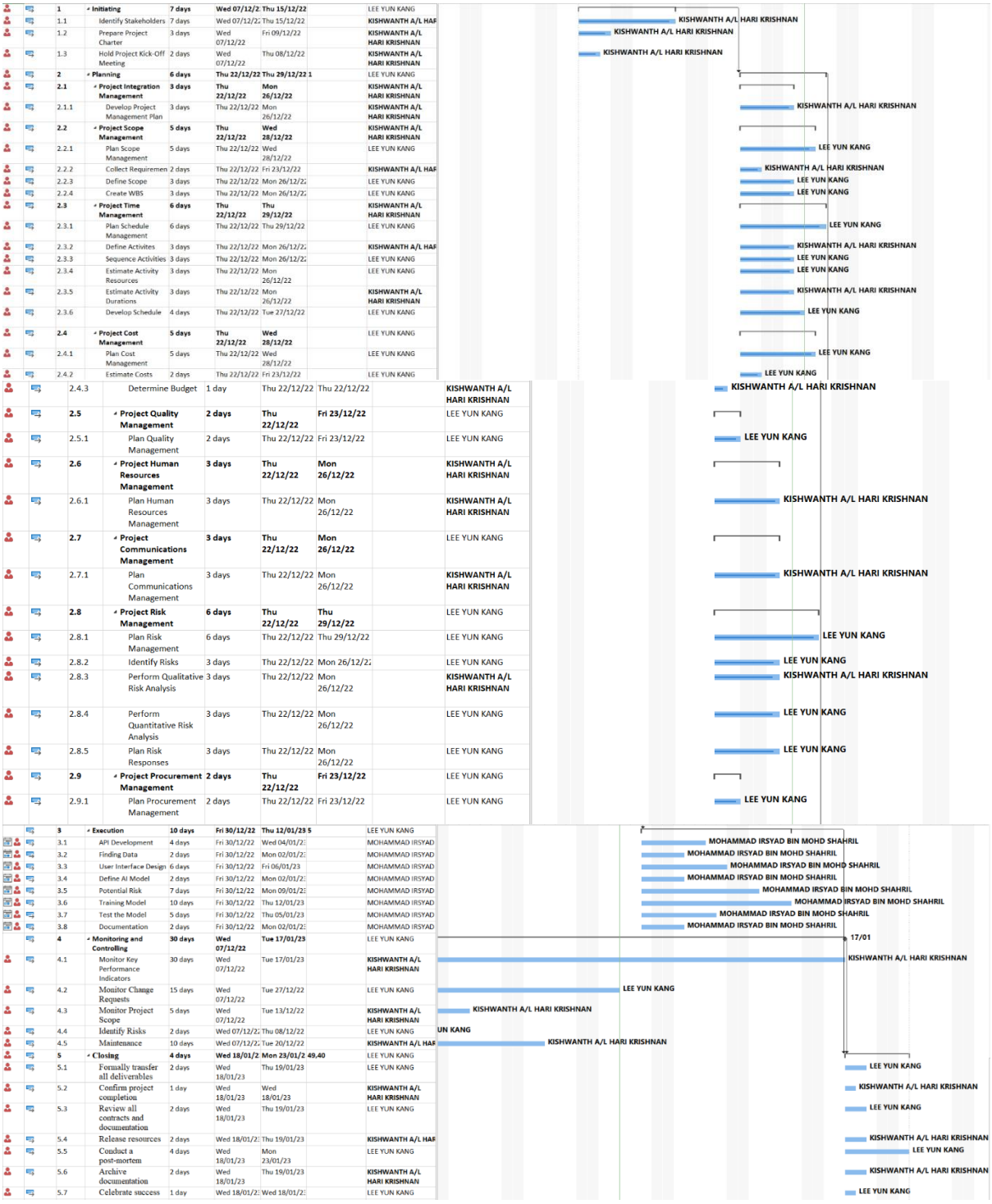
Project Management Life Cycle

The project management lifecycle is a step-by-step framework of best practices used to guide a project from its beginning to its end. It provides project managers a structured way to create, execute, and finish a project. This project management process generally includes four phases which are initiating, planning, executing, and closing. The project management life cycle is illustrated and documented using a Gantt chart, which enables AITech Inc workers to adhere to the rules and occasionally hit the milestone. The tasks and duties of each member, including the project manager, are divided into many modules by the project life cycle WBS. Based on the WBS that was created, each member has a specific job to play at each point of the lifecycle.

The Flowchart for the Planning Phase of the A.I Chatbot Assistant Project :

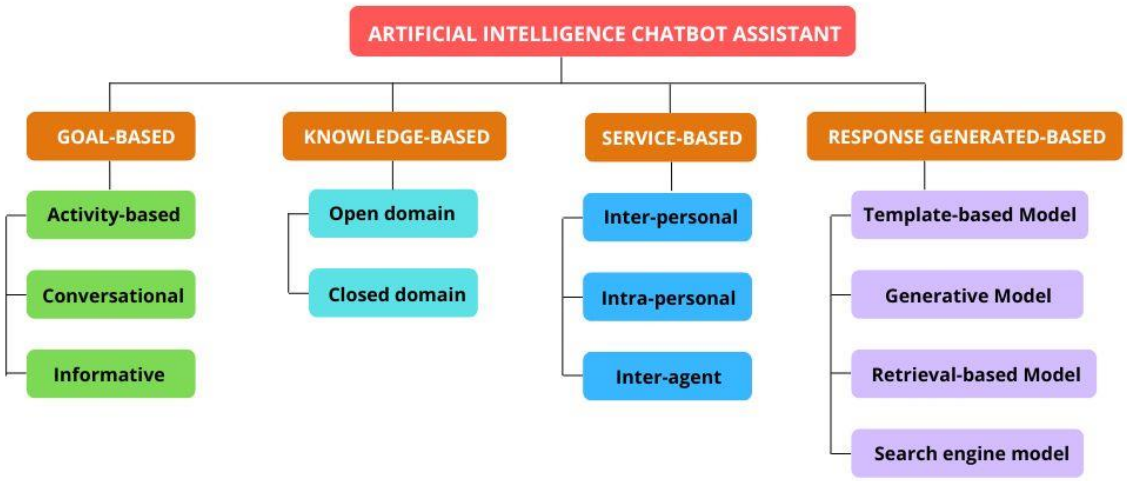


The Project Management Work Breakdown Structure (WBS) is shown in the Gantt Chart below:



	1	**Initiating**	**7 days**	**Wed 07/12/2**	**Thu 15/12/22**			LEE YUN KANG
	1.1	Identify Stakeholders	7 days	Wed 07/12/2	Thu 15/12/22			**KISHWANTH A/L HAF**
	1.2	Prepare Project Charter	3 days	Wed 07/12/22	Fri 09/12/22			**KISHWANTH A/L HARI KRISHNAN**
	1.3	Hold Project Kick-Off Meeting	2 days	Wed 07/12/22	Thu 08/12/22			**KISHWANTH A/L HARI KRISHNAN**
	2	**Planning**	**6 days**	**Thu 22/12/22**	**Thu 29/12/22**	1		LEE YUN KANG
	2.1	**Project Integration Management**	**3 days**	**Thu 22/12/22**	**Mon 26/12/22**			**KISHWANTH A/L HARI KRISHNAN**
	2.1.1	Develop Project Management Plan	3 days	Thu 22/12/22	Mon 26/12/22			**KISHWANTH A/L HARI KRISHNAN**
	2.2	**Project Scope Management**	**5 days**	**Thu 22/12/22**	**Wed 28/12/22**			**KISHWANTH A/L HARI KRISHNAN**
	2.2.1	Plan Scope Management	5 days	Thu 22/12/22	Wed 28/12/22			LEE YUN KANG
	2.2.2	Collect Requiremen	2 days	Thu 22/12/22	Fri 23/12/22			**KISHWANTH A/L HAF**
	2.2.3	Define Scope	3 days	Thu 22/12/22	Mon 26/12/2			LEE YUN KANG
	2.2.4	Create WBS	3 days	Thu 22/12/22	Mon 26/12/2			LEE YUN KANG
	2.3	**Project Time Management**	**6 days**	**Thu 22/12/22**	**Thu 29/12/22**			**KISHWANTH A/L HARI KRISHNAN**
	2.3.1	Plan Schedule Management	6 days	Thu 22/12/22	Thu 29/12/22			LEE YUN KANG
	2.3.2	Define Activites	3 days	Thu 22/12/22	Mon 26/12/2			**KISHWANTH A/L HAF**
	2.3.3	Sequence Activities	3 days	Thu 22/12/22	Mon 26/12/2			LEE YUN KANG
	2.3.4	Estimate Activity Resources	3 days	Thu 22/12/22	Mon 26/12/22			LEE YUN KANG
	2.3.5	Estimate Activity Durations	3 days	Thu 22/12/22	Mon 26/12/22			**KISHWANTH A/L HARI KRISHNAN**
	2.3.6	Develop Schedule	4 days	Thu 22/12/22	Tue 27/12/22			LEE YUN KANG
	2.4	**Project Cost Management**	**5 days**	**Thu 22/12/22**	**Wed 28/12/22**			LEE YUN KANG
	2.4.1	Plan Cost Management	5 days	Thu 22/12/22	Wed 28/12/22			LEE YUN KANG
	2.4.2	Estimate Costs	2 days	Thu 22/12/22	Fri 23/12/22			LEE YUN KANG
	2.4.3	Determine Budget	1 day	Thu 22/12/22	Thu 22/12/22			**KISHWANTH A/L HARI KRISHNAN**
	2.5	**Project Quality Management**	**2 days**	**Thu 22/12/22**	**Fri 23/12/22**			LEE YUN KANG
	2.5.1	Plan Quality Management	2 days	Thu 22/12/22	Fri 23/12/22			LEE YUN KANG
	2.6	**Project Human Resources Management**	**3 days**	**Thu 22/12/22**	**Mon 26/12/22**			**KISHWANTH A/L HARI KRISHNAN**
	2.6.1	Plan Human Resources Management	3 days	Thu 22/12/22	Mon 26/12/22			**KISHWANTH A/L HARI KRISHNAN**
	2.7	**Project Communications Management**	**3 days**	**Thu 22/12/22**	**Mon 26/12/22**			LEE YUN KANG
	2.7.1	Plan Communications Management	3 days	Thu 22/12/22	Mon 26/12/22			**KISHWANTH A/L HARI KRISHNAN**
	2.8	**Project Risk Management**	**6 days**	**Thu 22/12/22**	**Thu 29/12/22**			LEE YUN KANG
	2.8.1	Plan Risk Management	6 days	Thu 22/12/22	Thu 29/12/22			LEE YUN KANG
	2.8.2	Identify Risks	3 days	Thu 22/12/22	Mon 26/12/2			LEE YUN KANG
	2.8.3	Perform Qualitative Risk Analysis	3 days	Thu 22/12/22	Mon 26/12/22			**KISHWANTH A/L HARI KRISHNAN**
	2.8.4	Perform Quantitative Risk Analysis	3 days	Thu 22/12/22	Mon 26/12/22			LEE YUN KANG
	2.8.5	Plan Risk Responses	3 days	Thu 22/12/22	Mon 26/12/22			LEE YUN KANG
	2.9	**Project Procurement Management**	**2 days**	**Thu 22/12/22**	**Fri 23/12/22**			LEE YUN KANG
	2.9.1	Plan Procurement Management	2 days	Thu 22/12/22	Fri 23/12/22			LEE YUN KANG
	3	**Execution**	**10 days**	**Fri 30/12/22**	**Thu 12/01/23**	5		LEE YUN KANG
	3.1	API Development	4 days	Fri 30/12/22	Wed 04/01/2			MOHAMMAD IRSYAD
	3.2	Finding Data	2 days	Fri 30/12/22	Mon 02/01/2			MOHAMMAD IRSYAD
	3.3	User Interface Design	6 days	Fri 30/12/22	Fri 06/01/23			MOHAMMAD IRSYAD
	3.4	Define AI Model	2 days	Fri 30/12/22	Mon 02/01/2			MOHAMMAD IRSYAD
	3.5	Potential Risk	7 days	Fri 30/12/22	Mon 09/01/2			MOHAMMAD IRSYAD
	3.6	Training Model	10 days	Fri 30/12/22	Thu 12/01/23			MOHAMMAD IRSYAD
	3.7	Test the Model	5 days	Fri 30/12/22	Thu 05/01/23			MOHAMMAD IRSYAD
	3.8	Documentation	2 days	Fri 30/12/22	Mon 02/01/2			MOHAMMAD IRSYAD
	4	**Monitoring and Controlling**	**30 days**	**Wed 07/12/22**	**Tue 17/01/23**			LEE YUN KANG
	4.1	Monitor Key Performance Indicators	30 days	Wed 07/12/22	Tue 17/01/23			**KISHWANTH A/L HARI KRISHNAN**
	4.2	Monitor Change Requests	15 days	Wed 07/12/22	Tue 27/12/22			LEE YUN KANG
	4.3	Monitor Project Scope	5 days	Wed 07/12/22	Tue 13/12/22			**KISHWANTH A/L HARI KRISHNAN**
	4.4	Identify Risks	2 days	Wed 07/12/2	Thu 08/12/22			LEE YUN KANG
	4.5	Maintenance	10 days	Wed 07/12/2	Tue 20/12/22			**KISHWANTH A/L HAF**
	5	**Closing**	**4 days**	**Wed 18/01/2**	**Mon 23/01/2**	49,40		LEE YUN KANG
	5.1	Formally transfer all deliverables	2 days	Wed 18/01/23	Thu 19/01/23			LEE YUN KANG
	5.2	Confirm project completion	1 day	Wed 18/01/23	Wed 18/01/23			**KISHWANTH A/L HARI KRISHNAN**
	5.3	Review all contracts and documentation	2 days	Wed 18/01/23	Thu 19/01/23			LEE YUN KANG
	5.4	Release resources	2 days	Wed 18/01/2	Thu 19/01/23			**KISHWANTH A/L HAF**
	5.5	Conduct a post-mortem	4 days	Wed 18/01/23	Mon 23/01/23			LEE YUN KANG
	5.6	Archive documentation	2 days	Wed 18/01/23	Thu 19/01/23			**KISHWANTH A/L HARI KRISHNAN**
	5.7	Celebrate success	1 day	Wed 18/01/2	Wed 18/01/2			LEE YUN KANG

Next, for the Artificial Intelligence Chatbot Assistant, the system's work breakdown structure (WBS) are represented as below. The technical element of the project is broken down into a number of modules using this WBS, including goal-based, knowledge-based, service-based, and response-generated-based modules :



Scope

The creation of a work breakdown structure (WBS) allows for the mapping of all required tasks and the development of the process, with the WBS being maintained and approved.

In this Artificial Intelligence Chatbot Assistant project, we need to identify the scope of the project. Chatbots are now based on Natural Language Processing (NLP). Businesses are researching Natural Language Processing (NLP) to be able to send accurate responses to users' inquiries. The goal is to allow users and Artificial Intelligence to communicate naturally and understand complex requests. This would mean that customer service agents would be able to focus on other tasks while the AI takes care of customers' queries.

Risk Identification Chart For Quality, Cost and Time

Control Element	What is likely to go wrong?	How and when will I know?	What will I do about it?
Quality (Low quality standards, poor design, materials, and craftsmanship, and insufficient product quality assurance)	1. The chatbot lacks transparency. 2. Not understanding customer emotion and intent.	Quantitative key performance indicators allows to evaluate the effectiveness of the chatbot and the way it's used by its target user.	Measure the chatbot's activity volume which evaluates the number of interactions, from the time a user asks a simple question until a constructive dialogue takes place. This indicator helps answer two key questions. Is your chatbot being used frequently? Is the number of users increasing?
Cost (Estimating errors; inadequate productivity, cost, change, or contingency)	The project management's budget does not match the cost estimates made during the planning phase.	When there is not enough money set aside for the administration and mitigation.	Reduce and balance the project costs overall to support a low phase budget.
Time (Fallback error response or failure message, is triggered when the chatbot doesn't understand the user's question)	1. Project not able to reach the milestone set as described in the Gantt Chart. 2. Bot failure and customer frustration are often brought about by not making it clear to a customer that they are interacting with a bot and not a human agent.	When the product is faulty even at closing phase. When the problem will be encountered during the project excution and monitoring phase.	To prevent being stuck in the problem loop, ask the other team members for assistance and swap their work or job to another one.

Responsibility Assignment Matrices (RAM)

Resource Responsibility P - Primary Responsibility A - Approval Authority S - Supporting Responsibility (Contributor or Reviewer) I - Information Only	Project Manager	Procurement Manager	Risk Manager	Administrative Manager	Financial Analyst	Project Scheduler	Quality Manager	Stakeholder Coordinator	Technical Manager	Implementation Manager	Test Manager	Operations Manager	Cust Support Manager	Executive Steering
Project Initiation														
Project Charter	P	A	S	A	P	P	I	S	S	I	I	I	S	I
Research	P	A	I	I	S	I	I	I	S	P	I	S	I	I
Projections	P	A	I	I	P	I	I	I	S	P	I	S	I	I
Stakeholders	P	S	I	S	P	I	I	P	I	I	I	I	S	I
Guidelines	P	P	S	A	P	I	I	I	S	S	I	I	I	I
Project Initiation	P	A	A	S	S	A	I	I	P	S	I	S	I	I
Project Planning														
Collect Requirements	A	S	S	P	A	S	S	I	S	I	I	I	I	I
Scope and Goal	P	S	A	A	A	A	S	I	I	I	I	I	I	I
Create WBS	A	I	A	P	I	S	S	I	S	I	A	I	S	I
Verify Scope	A	I	S	S	I	S	P	I	A	A	I	I	S	I
Control Scope	I	I	P	S	I	I	P	I	S	S	A	I	S	I
Project Execution														
Status and Tracking	I	P	P	P	I	I	P	I	I	A	P	A	P	S
KPI	P	P	S	A	I	S	P	S	I	S	P	P	P	S
Monitoring	A	P	S	P	I	S	P	I	S	S	S	P	I	S
Forecasts	A	A	S	A	S	S	P	I	I	S	I	S	I	S
Project Updates	A	A	S	S	I	S	P	I	A	P	A	A	I	S
Chart Updates	A	A	S	A	I	P	P	P	I	S	I	I	I	S
Project Monitoring and Controlling														
Stakeholder Review	P	A	I	S	I	I	P	P	I	I	A	P	I	P
Debug Issues	A	P	S	P	I	I	A	I	I	I	P	S	I	P
Support Plan	A	P	P	S	S	I	A	I	I	I	I	I	I	P
Managing Cost	A	P	P	A	P	I	A	A	I	I	I	I	I	P
Project Closing														
System Maintenance	A	A	P	P	I	I	A	A	A	I	A	I	I	I
Evaluation	P	P	I	P	P	I	A	P	I	I	S	I	I	A

Roles	Person In Charge	Responsibilities
Project Manager	Lee Yun Kang	For all sorts of tasks related to the project office administration, the project manager is responsible to the project director. The project manager helps in the creation of the master project schedule and all other project work plans, as well as develops, directs, and monitors daily internal activities that support the project office. The project manager for the A.I Chatbot Assistant will need to determine who we may approach with our concept and who is most likely to accept it. Project Manager also need to check and make sure all the initiation and planning documents such as Work Breakdown Structure (WBS) and Gantt chart are constructed in a clear and complete form. The development, maintenance, and adherence to the Project Office infrastructure and supporting methodology such as processes, procedures, standards, and templates that are in accordance with OSI Best Practices and policies are the responsibility of the Project Manager. The A.I Chatbot Assistant Project also needs to keep on monitor the project in making sure that the progress follows the project scope and requirement. If any problem arises, the project manager must work on a solution.
Procurement Manager	Kishwanth A/L Hari Krishnan	The Procurement Manager oversees and manages the generation of the RFP or RFO and other solicitation documents. The procurement manager is in charge of integrating all the parts, guaranteeing consistency and continuity throughout the whole procurement process, and adhering to procurement standards, rules, and regulations. Other departments of the project office may be given responsibility for particular sections. This involves coordinating contract negotiations, planning and monitoring the procurement calendar, supervising the production of the RFP or RFO, and managing the review of proposals and offers as well as vendor selection. The project's contract, policies, and deadlines must be discussed with each member by the procurement manager. Additionally, the

		procurement manager must make sure that no employee uses corporate funds to purchase any linked items. The procurement manager must approve all expenses.
Risk Manager	Mohammad Irsyad Bin Mohd Shahril	In the project, the risk manager is in charge of managing and tracking risks as well as risk mitigation and contingencies. The risk manager also keeps an eye on the risk management practises of the prime contractor to make sure they don't harm the project. The Risk Manager manages and tracks potential and active risks, maintain the risk management tool and documentation information, leads risk identification sessions for the project, monitors prime contractor risk management efforts, and participates in division-level risk management activities for risks that cross project boundaries or are beyond the project's control. The project's risks must be listed in full. For example, in our A.I Chatbot Assistant project, data theft is possible if a chatbot does not properly protect customer data using methods like encryption. Attackers can also hack into systems and cause a chatbot to spread malware or ransomware to users' devices. Consequently, this issue will be listed, and potential solutions will be explored by the team. Unexpected issues could arise at any stage of this project. Therefore, the risk manager must record every danger so that they can avoid it and take precautions to ensure that specific issue won't arise.
Administrative Manager	Mohammad Irsyad Bin Mohd Shahril	The Administrative Manager leads the cost management effort, including sponsoring cost budgeting and tracking activities, facilitating communication on financial status, and ensuring the project cost tool and supporting documentation is maintained. The Administrative Manager also directs the administrative staff, plans tool and service training, ensures that the administrative staff follows processes and policies, and supervises the administrative staff. Additionally, the administrative manager delivers reports, suggestions, and updates on the project budget and expenditures, such as planned & actual reports, starts corrective action, and plans actions for re-planning. After each process in A.I Chatbot Assistant project, the administrative manager needs to list out every possible thing that can be presented in the

		documentation form. For example, the activity report and any cost-related documents. This job is crucial to reduce time and financial waste and to ensure that everyone and everything follows the documentation's standard operating procedure.
Financial Analyst	Kishwanth A/L Hari Krishnan	The Administrative Manager and Financial Analyst work together to assist cost management, which includes sponsoring cost budgeting and monitoring activities, promoting communication on financial status, and ensuring the project cost tool and related documents are kept up to date. The financial analyst also supports project evaluations, helps validate projects, and aids in cost evaluations based on projects. In order to ensure that the project stayed within budget, it also covered and identified the key issues in project evaluation.
Project Scheduler	Lee Yun Kang	The Project Scheduler's job is to coordinate and manage the inputs to the plan, which includes monitoring progress against the project schedule, merging and figuring out how the project schedule is dependent on other schedules, and monitoring progress on the schedule of the prime contractor and the schedules of the counties. In order to prevent system development from getting out of control and to reduce unexpected risk brought on by delays or interruptions in the progress, the project scheduler's job is to design the progress flow and track it.
Quality Manager	Mohammad Irsyad Bin Mohd Shahril	A Quality Manager must take complete responsibility during the planning, implementation and execution, testing, and evaluating phases to guarantee that the quality product required is achievable. It is possible to provide a better analysis of the needs of the sector by looking at the inspection data. As they go over everything, exceptional quality managers must be well-versed in their merchandise. As there will be numerous teams in various divisions, strong leadership is also crucial. For the sake of maintaining the relationship, quality managers must also be capable of managing staff lines and interacting with customers in a professional manner.
Stakeholder Coordinator	Kishwanth A/L Hari Krishnan	The ability to establish and maintain business relationships with stakeholders is a requirement for the role of stakeholder coordinator, also known as stakeholder manager, as doing so will open up options for engagement techniques. Stakeholder engagement rules established by the company should be followed by the business unit to enable for the achievement of equality principles and stakeholder satisfaction.

Technical Manager	Lee Yun Kang	The development of project management is completely under the control of the technical manager. The project's outcome will depend on how attentively any technicalities and potential problems are handled. To successfully complete the deliverable at any cost, it is necessary to provide clear guidance and direction. Technical managers must oversee periodic system testing in order to take into account any assessments or enhancements and to offer solutions for resolving any unforeseen problems.
Implementation Manager	Lee Yun Kang	The project's implementation component will be overseen by the implementation manager, who will also provide leadership in terms of organising, coordinating, and planning implementation operations. The Implementation Manager is in charge of overseeing all information technology resources allocated by the Project Manager in addition to managing the implementation strategy, organisational change management, production support, IT training, defect or problem tracking, and Maintenance & Operation. The implementation manager will organise SOWs and communicate directly with contractors to ensure that technical tasks are carried out in a manner that meets all objectives and expectations. On the A.I Chatbot Assistant system project, the implementation manager will serve as a communication bridge between the project manager and the system developer. This will involve transferring guidance from the manager and assisting in overseeing the developer's work.
Test Manager	Kishwanth A/L Hari Krishnan	The role of the Test Manager is to oversee the system testing for the Prime Contractor. The Manager works along with the Quality Management team to develop test scenarios and data that accurately reflect "real-world" situations for the system. Additionally, the Test Manager is in responsible of scheduling interface testing when necessary with other organisations (county, state, and federal). The process for reporting issues and finding solutions is also planned, monitored, and evaluated by them.
Operations Manager	Mohammad Irsyad Bin Mohd Shahril	The new system's operations must be coordinated and monitored by the Operations Manager. The project's operations manager must approve all solutions to problems that arise throughout the process. The operation manager has the authority to determine whether to improve the system's hardware or software, for instance, if they are having problems extracting the fingerprint feature from an image or building the model for facial recognition. Additionally, the operation manager is in charge of

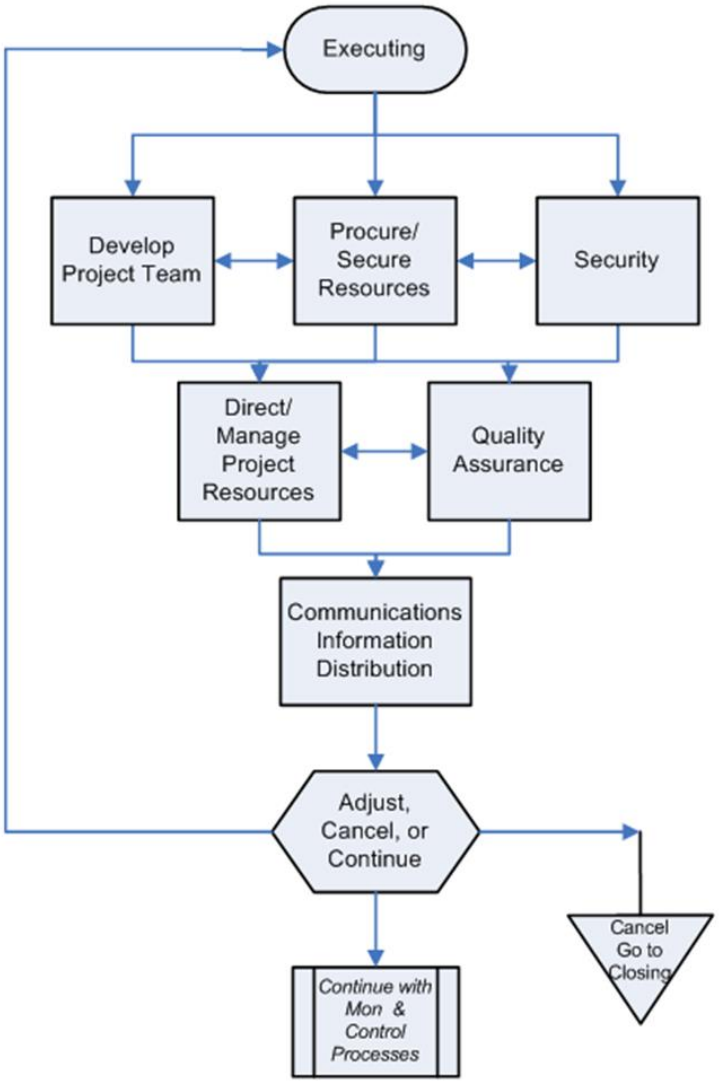
		both operations and management. Making sure everyone on the team is performing their duties properly is the responsibility of the project's operation manager for the A.I Chatbot Assistant project.
Customer Support Manager	Lee Yun Kang	In addition to managing M&O Contractor support activities, the Customer Support Manager is in charge of assisting clients with special requests or issues. The customer support manager is in charge of keeping an eye on contractor performance metrics and service standards while also expressing the viewpoint and priority of the client. The project's support manager must work with clients to resolve issues and respond to common inquiries. For instance, a conversation on social media, the phone, or email. This role is essential since it gives clients a sense of importance and welcome.
Executive Steering Committee	Kishwanth A/L Hari Krishnan	The project's stakeholders are handled by the Executive Steering Committee, which makes sure that the functionality and deliverables are satisfied as specified in the project initiation documents and subsequent project management plans. This committee offers high-level project guidance, gets regular project status reports, and addresses and resolves any problems, risks, or request for changes. The Executive Steering Committee must also make decisions regarding the financial administration of our project. He evaluates his progress in relation to the specific goals, benchmarks, and deliverables of each work page.
Office of Technology Services (OTech) Representative	Mohammad Irsyad Bin Mohd Shahril	The OTech Representative serves as a point of interaction between the Project Office and the OTech in defining the services that are necessary, helping the project determine whether certain services are feasible, providing cost estimates, planning, and other technical assistance to help the project make educated data centre decisions. This position is crucial since it will aid our business in deciding which technology and stack to prioritise. We can only check the risk management and assessibility once the technological stack and requirements have been established. OTech is so crucial to ensuring the right technology stack and cost in a corporation.

This chatbot was built in TensorFlow using the new sequence to sequence (NMT) model, with certain rules integrated seamlessly.

Cleverbot's core was built on the NMT model, which has been adapted to meet the needs of a chatbot. Because of changes to the tf.data API in TensorFlow 1.4, as well as numerous other changes since TensorFlow 1.12, this ChatLearner version only supports TensorFlow versions 1.4 through 1.11. If you need to support TensorFlow 1.12, simple updates can be made to the tokenizeddata.py file.

Project Design and coding

Project Execution



During the project execution phase, our team performs the actual work. As a project manager, it is your responsibility to design effective workflows and closely monitor the team's progress. Execution of project are necessary actions to be taken that ensures activities in the project plan meet their goal. This includes procuring any new hardware, software and introduce procedures during the allocated operations. This is where most resources are allocated among all project phases. Many project sponsors and customers focus on the reliability of the product of the project. Hence, it is important to keep track of change requests and prepare to update project plan in documents as each step taken will affect the total outcome.

Potential Risk

This lists the potential risk that most likely be overlooked during execution. As such, the allocated team must keep these in mind.

1. Lack of encryption during customer-chatbot communication (-, n.d.)
2. Insufficient protocols
3. Security vulnerabilities of hosting platform used by chatbot
4. Lack of employee education
5. Lack of answers from chatbot
6. Overlooking a plan to scale may cause short-lived product (How to Overcome the Top Seven Risks of Your First Chatbot Project, 2022)
7. The server traffic must be optimum
8. Failing to fulfil end user's requirement For this small project, Abu would monitor closely all team members to ensure the project does not stray from objectives and produce the desired outcome. Abu would make use of his excellent communication and networking skill to inquire input from other people in the firm free of charge. He would make sure that everyone understands what we are developing and how it would help them in their endeavour.

Training model

Training model is a dataset that is used to train the machine learning algorithm. Currently, the team has yet figured out the most suitable training model for the chatbot project. Thus, a team is formed to try-and-run several recommended already made chatbot model and is given a week. At the same time, our expert communicator, Abu, knows a few of his friends has experiences on this and will attempt to make contact.

Training
During the training, I really suggest you to try playing with a parameter (colocate_gradients_with_ops) in function tf.gradients. You can find a line like this in modelcreator.py: gradients = tf.gradients(self.train_loss, params). Set colocate_gradients_with_ops=True (adding it) and run the training for at least one epoch, note down the time, and then set it to False (or just remove it) and run the

training for at least one epoch and see if the times required for one epoch are significantly different.

Other than those, training is straightforward. Remember to create a folder named Result under the Data folder first. Then just run the following commands:
cd chatbot python bottrainer.py

Good GPUs are highly recommended for the training as it can be very time-consuming. If you have multiple GPUs, the memory from all GPUs will be utilized by TensorFlow, and you can adjust the batch_size parameter in hparams.json file accordingly to make full use of the memory. You will be able to see the training results under Data/Result/ folder. Make sure the following 2 files exist as all these will be required for testing and prediction.

To train the model:

```
    @staticmethod
    def _get_learning_rate(perplexity, pre_lr, train_epoch):
        # Check the number of epochs used to reach the perplexity of 32 and then 16. If it takes
        # too many or too less, it may suggest that the model is too small or too big compared
        # with your training data (and vocab size, sequence length, etc.)
        new_lr = round(pre_lr * 0.96, 6)
        if train_epoch >= 55:
            return 9.6e-5
        elif train_epoch >= 50:
            return 1e-4
        elif perplexity <= 16.0:
            return max(min(new_lr, 4e-4), 1e-4)
        elif perplexity <= 32.0:
            return max(min(new_lr, 6e-4), 4e-4)
        else:
            return max(min(new_lr, 8e-4), 6e-4)


if __name__ == "__main__":
    from settings import PROJECT_ROOT

    corp_dir = os.path.join(PROJECT_ROOT, 'Data', 'Corpus')
    res_dir = os.path.join(PROJECT_ROOT, 'Data', 'Result')
    bt = BotTrainer(corpus_dir=corp_dir)
    # bt.train(res_dir, last_end_file='basic-50', last_end_epoch=50, last_end_lr=1e-4)
    bt.train(res_dir)
```

```
def train(self, result_dir, target="", last_end_file=None, last_end_epoch=0, last_end_lr=8e-4):
    """Train a seq2seq model."""
    # Summary writer
    summary_name = "train_log"
    summary_writer = tf.summary.FileWriter(os.path.join(result_dir, summary_name), self.graph)

    log_device_placement = self.hparams.log_device_placement
    num_epochs = self.hparams.num_epochs

    config_proto = tf.ConfigProto(log_device_placement=log_device_placement,
                                  allow_soft_placement=True)
    config_proto.gpu_options.allow_growth = True
```

```
class BotTrainer(object):
    def __init__(self, corpus_dir):
        """
        Constructor of the BotTrainer.
        Args:
            corpus_dir: The folder to save all the training related data.
        """
        self.graph = tf.Graph()
        with self.graph.as_default():
            tokenized_data = TokenizedData(corpus_dir=corpus_dir)

            self.hparams = tokenized_data.hparams
            self.train_batch = tokenized_data.get_training_batch()
            self.model = ModelCreator(training=True, tokenized_data=tokenized_data,
                                      batch_input=self.train_batch)
```

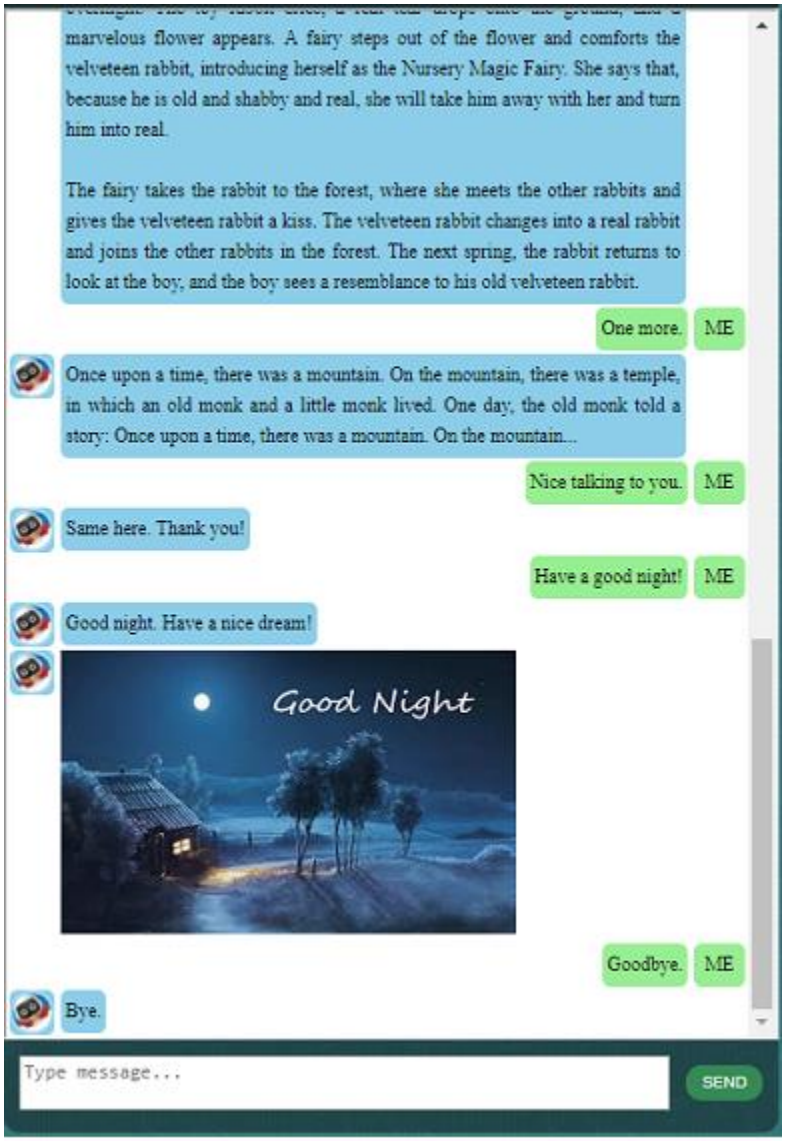
1.basic.data-00000-of-0000 2.basic.index

```
if __name__ == "__main__":
    from settings import PROJECT_ROOT

    corp_dir = os.path.join(PROJECT_ROOT, 'Data', 'Corpus')
    res_dir = os.path.join(PROJECT_ROOT, 'Data', 'Result')
    bt = BotTrainer(corpus_dir=corp_dir)
    # bt.train(res_dir, last_end_file='basic-50', last_end_epoch=50, last_end_lr=1e-4)
    bt.train(res_dir)
```

User Interface (UI) Design

Our expert graphic designer, Lee, and expert web designer, Yun Jin, will collab to create the UI for the chatbot for the visitor to see and a dashboard for the admins. Currently, there are no clear picture as to what functionality the UI need to have apart from the customer point of view: “clean and green” is what the client’s quote.

This team will attempt to realize the client's vision and an array of recommendations will be presented during the next meeting.



Finding Dataset

The challenge of developing an AI-powered chatbot is that a requires a huge amount of data (Industry Knowledge How to Collect Chatbot Training Data for Better CX, 2022). The goal is to create the most accurate response according to what the client's need. To do so, the CEO and Abu will have to attend the board meeting and relay the company's policy and business understanding. A team of three will be responsible for finding dataset for the machine learning algorithm for natural speech and business-related Q&A. The dataset must be compatible with the model, however. That is why during the try-and-run model, this team will be responsible for natural speech for the time being. The data will be collected from various social media and mostly the company's recorded customer services. Abu will attempt to acquire the recordings during the board meeting.

Dataset used in this project:


```
{
  "aug1_repeat_times": 3,
  "aug2_repeat_times": 5,
  "batch_size": 256,
  "batch_size_infer": 1,
  "beam_width": 5,
  "bos_id": 1,
  "bos_token": "_bos_",
  "eos_id": 2,
  "eos_token": "_eos_",
  "init_op": "uniform",
  "init_weight": 0.1,
  "keep_prob": 0.9,
  "length_penalty_weight": 0.0,
  "log_device_placement": true,
  "max_gradient_norm": 5.0,
  "num_buckets": 5,
  "num_epochs": 60,
  "num_layers": 2,
  "num_units": 1024,
  "pass_hidden_state": true,
  "random_seed": 0.1,
  "source_reverse": true,
  "src_max_len": 50,
  "src_max_len_infer": null,
  "tgt_max_len": 50,
  "tgt_max_len_infer": 50,
  "time_major": true,
  "unk_token": "_unk_",
  "unk_id": 0
}
```

Conversational Data Set

1.The data is divided into two sets: the first was handcrafted, and the samples were created in order to maintain a consistent role of the chatbot, who can thus be trained to be polite, patient, humorous, philosophical, and aware that he is a robot, but pretending to be a 9-year-old boy named Papaya; the second set was cleaned from some online resources, including scenario conversations designed for training robots, Cornell movie dialogues, and cleaned Reddit datum.
2.The training data set is divided into three categories: two will be augmented/repeated during training at different levels or times, while the third will not. The augmented subsets are used to train the model with rules to follow as well as some knowledge and common sense, while the third subset is simply used to assist in training the language model.
3.This repository contains a cleaned subset of Reddit data (about 110K pairs). Based on all of the included data files, the vocab file and model parameters are created and adjusted. If you require a larger set, scripts to parse and clean Reddit comments can be found in the Corpus/RedditData folder. To use those scripts, you must first download a torrent of Reddit comments from this torrent link. Normally, a single month's worth of comments suffices (can generated 3M pairs of training samples roughly).
4.The data files in this data set have already been preprocessed with the NLTK tokenizer and are ready to feed into the model using TensorFlow's new tf.data API.

```
cd webui
cd server
python chatservice.py
```

Testing

We provide a simple command interface as well as a web-based interface for testing and prediction. It should be noted that the vocab.txt file (as well as files in the KnowledgeBase for this chatbot) is required for inference. Use the following command interface to quickly see how the trained model performs:

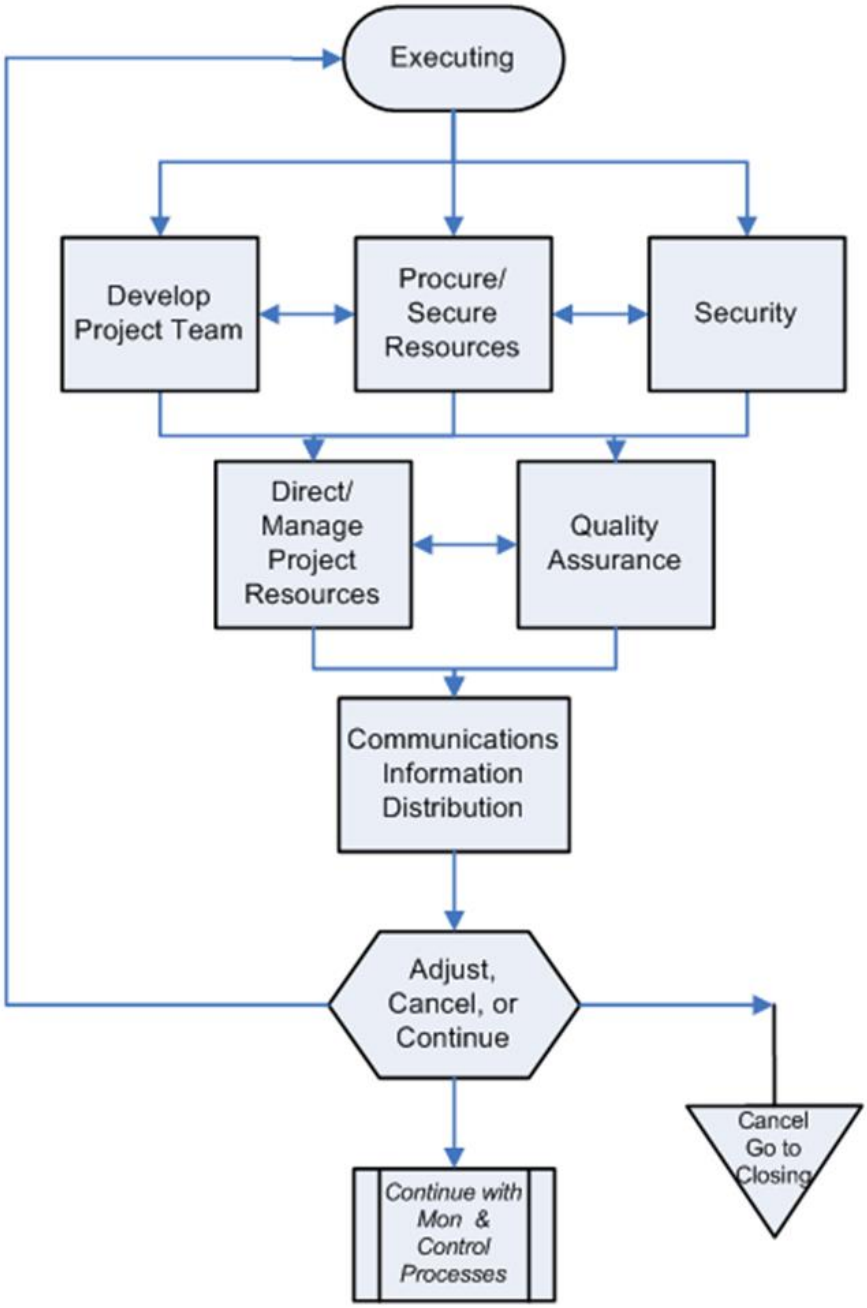
cd chatbot python botui.py

```
import codecs
import json
import os
import tensorflow as tf


class HParams:
    def __init__(self, model_dir):
        """
        Args:
            model_dir: Name of the folder storing the hparams.json file.
        """
        self.hparams = self.load_hparams(model_dir)

    @staticmethod
    def load_hparams(model_dir):
        """Load hparams from an existing directory."""
        hparams_file = os.path.join(model_dir, "hparams.json")
        if tf.gfile.Exists(hparams_file):
            print("# Loading hparams from {} ...".format(hparams_file))
            with codecs.getreader("utf-8")(tf.gfile.GFile(hparams_file, "rb")) as f:
                try:
                    hparams_values = json.load(f)
                    hparams = tf.contrib.training.HParams(**hparams_values)
                except ValueError:
                    print("Error loading hparams file.")
                    return None
            return hparams
        else:
            return None
```

Test the Model

Finally, testing the model is a crucial moment-of-truth. Naturally, the team that develops the coding and integrating does a lot of testing. However, Erica and her team will be in charged in testing the model in the real world. She will find volunteers to try the model and conduct a survey of how “clean and green” it feels to the users. Any important pointers will be noted down and if there is anything to improve the team will resend back to the coding team and apply any changes.

Monitoring and Controlling

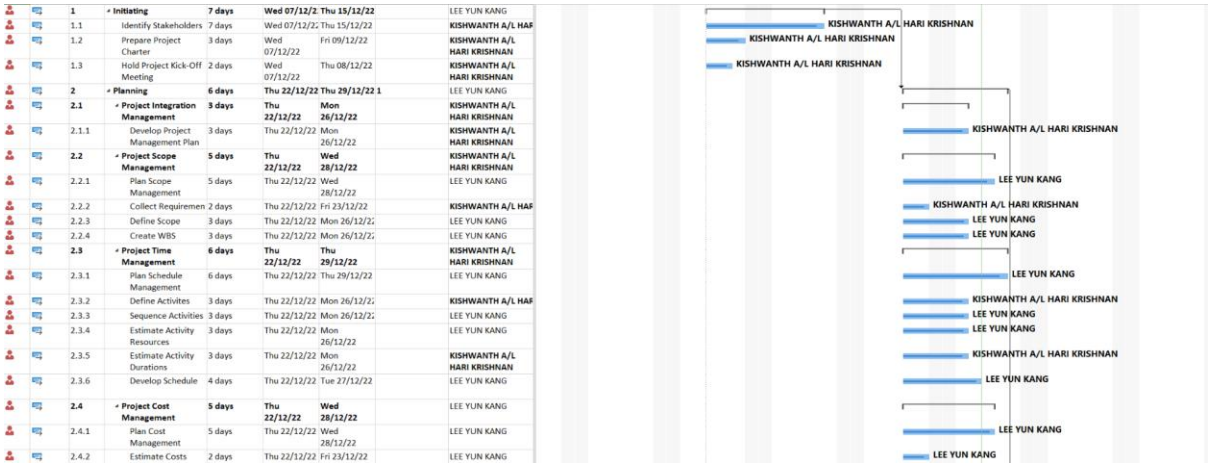


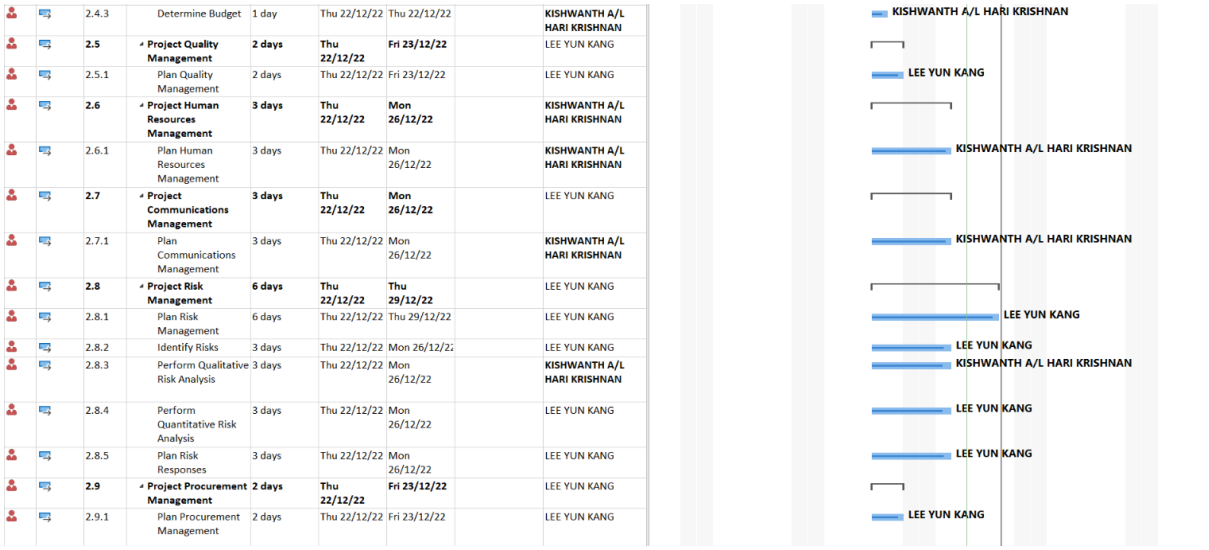
The fourth phases of the project management process are not consecutive. The project monitoring and control phase runs concurrently with project execution, ensuring that project objectives and deliverables are achieved. Project monitoring and control seamless execution of tasks, and helps improve efficiency and productivity of the project. Monitoring allows you to control the project including completing the project on time. The process of monitoring and controlling a project permits managers to establish effective project timelines, including scope, budget, and schedule. This data can then be utilised throughout the project's lifecycle to track its progress.

Cost estimation

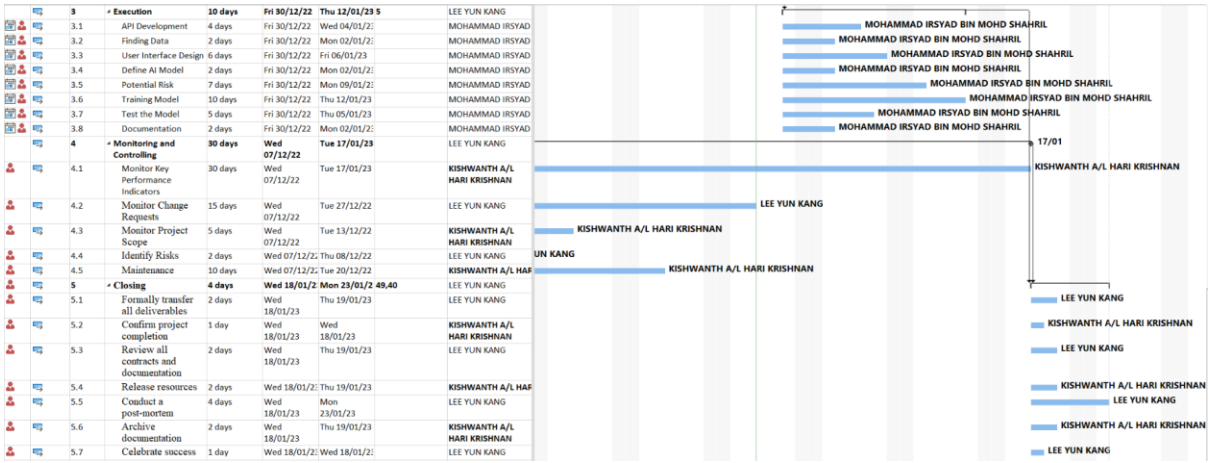
Task	Hours	Cost
Implementation of a chatbot	100	RM18 000
Conceptual design	52	RM 1 400
Preliminary design	12	RM 1 600
Final design	6	RM 2 000
Survey		RM 6 000
Salaries		RM 4 000
Supplies		RM 900
Rent		RM 1 400
Licensed software		RM 1 800
Device		RM 2 500
Storage		RM 400
Error logging and uptime monitoring setup	12	RM 600
Conversation history persistence	16	RM 700
Integrations with an existing system	150	RM 6 000
Administration UI	31	RM 1 600
	Total	RM 79 500

Gantt Chart





		2.4.3	Determine Budget	1 day	Thu 22/12/22	Thu 22/12/22	KISHWANTH A/L HARI KRISHNAN
		2.5	**Project Quality Management**	**2 days**	**Thu 22/12/22**	**Fri 23/12/22**	LEE YUN KANG
		2.5.1	Plan Quality Management	2 days	Thu 22/12/22	Fri 23/12/22	LEE YUN KANG
		2.6	**Project Human Resources Management**	**3 days**	**Thu 22/12/22**	**Mon 26/12/22**	KISHWANTH A/L HARI KRISHNAN
		2.6.1	Plan Human Resources Management	3 days	Thu 22/12/22	Mon 26/12/22	KISHWANTH A/L HARI KRISHNAN
		2.7	**Project Communications Management**	**3 days**	**Thu 22/12/22**	**Mon 26/12/22**	LEE YUN KANG
		2.7.1	Plan Communications Management	3 days	Thu 22/12/22	Mon 26/12/22	KISHWANTH A/L HARI KRISHNAN
		2.8	**Project Risk Management**	**6 days**	**Thu 22/12/22**	**Thu 29/12/22**	LEE YUN KANG
		2.8.1	Plan Risk Management	6 days	Thu 22/12/22	Thu 29/12/22	LEE YUN KANG
		2.8.2	Identify Risks	3 days	Thu 22/12/22	Mon 26/12/2	LEE YUN KANG
		2.8.3	Perform Qualitative Risk Analysis	3 days	Thu 22/12/22	Mon 26/12/22	KISHWANTH A/L HARI KRISHNAN
		2.8.4	Perform Quantitative Risk Analysis	3 days	Thu 22/12/22	Mon 26/12/22	LEE YUN KANG
		2.8.5	Plan Risk Responses	3 days	Thu 22/12/22	Mon 26/12/22	LEE YUN KANG
		2.9	**Project Procurement Management**	**2 days**	**Thu 22/12/22**	**Fri 23/12/22**	LEE YUN KANG
		2.9.1	Plan Procurement Management	2 days	Thu 22/12/22	Fri 23/12/22	LEE YUN KANG



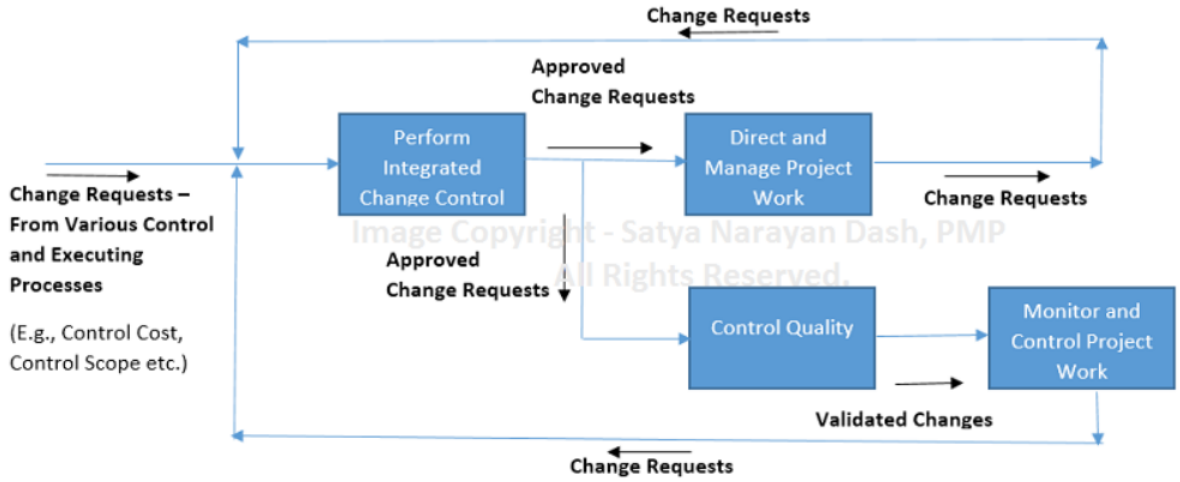
		3	**Execution**	**10 days**	**Fri 30/12/22**	**Thu 12/01/23 5**	LEE YUN KANG
		3.1	API Development	4 days	Fri 30/12/22	Wed 04/01/2	MOHAMMAD IRSYAD
		3.2	Finding Data	2 days	Fri 30/12/22	Mon 02/01/2	MOHAMMAD IRSYAD
		3.3	User Interface Design	6 days	Fri 30/12/22	Fri 06/01/23	MOHAMMAD IRSYAD
		3.4	Define AI Model	2 days	Fri 30/12/22	Mon 02/01/2	MOHAMMAD IRSYAD
		3.5	Potential Risk	7 days	Fri 30/12/22	Mon 09/01/2	MOHAMMAD IRSYAD
		3.6	Training Model	10 days	Fri 30/12/22	Thu 12/01/23	MOHAMMAD IRSYAD
		3.7	Test the Model	5 days	Fri 30/12/22	Thu 05/01/23	MOHAMMAD IRSYAD
		3.8	Documentation	2 days	Fri 30/12/22	Mon 02/01/2	MOHAMMAD IRSYAD
		4	**Monitoring and Controlling**	**30 days**	**Wed 07/12/22**	**Tue 17/01/23**	LEE YUN KANG
		4.1	Monitor Key Performance Indicators	30 days	Wed 07/12/22	Tue 17/01/23	KISHWANTH A/L HARI KRISHNAN
		4.2	Monitor Change Requests	15 days	Wed 07/12/22	Tue 27/12/22	LEE YUN KANG
		4.3	Monitor Project Scope	5 days	Wed 07/12/22	Tue 13/12/22	KISHWANTH A/L HARI KRISHNAN
		4.4	Identify Risks	2 days	Wed 07/12/22	Thu 08/12/22	LEE YUN KANG
		4.5	Maintenance	10 days	Wed 07/12/22	Tue 20/12/22	KISHWANTH A/L HAF
		5	**Closing**	**4 days**	**Wed 18/01/2**	**Mon 23/01/2 49,40**	LEE YUN KANG
		5.1	Formally transfer all deliverables	2 days	Wed 18/01/23	Thu 19/01/23	LEE YUN KANG
		5.2	Confirm project completion	1 day	Wed 18/01/23	Wed 18/01/23	KISHWANTH A/L HARI KRISHNAN
		5.3	Review all contracts and documentation	2 days	Wed 18/01/23	Thu 19/01/23	LEE YUN KANG
		5.4	Release resources	2 days	Wed 18/01/2	Thu 19/01/23	KISHWANTH A/L HAF
		5.5	Conduct a post-mortem	4 days	Wed 18/01/23	Mon 23/01/23	LEE YUN KANG
		5.6	Archive documentation	2 days	Wed 18/01/23	Thu 19/01/23	KISHWANTH A/L HARI KRISHNAN
		5.7	Celebrate success	1 day	Wed 18/01/2	Wed 18/01/2	LEE YUN KANG

Monitor Key Performance Indicators (KPIs)

Monitoring KPIs keeps project deliverables on track and performance up to date. Project managers use data on timelines, budgets, and quality to enable better decisions, make changes to avoid problems, and capitalize on opportunities. The process of development can be supervised through analysis coding lines.

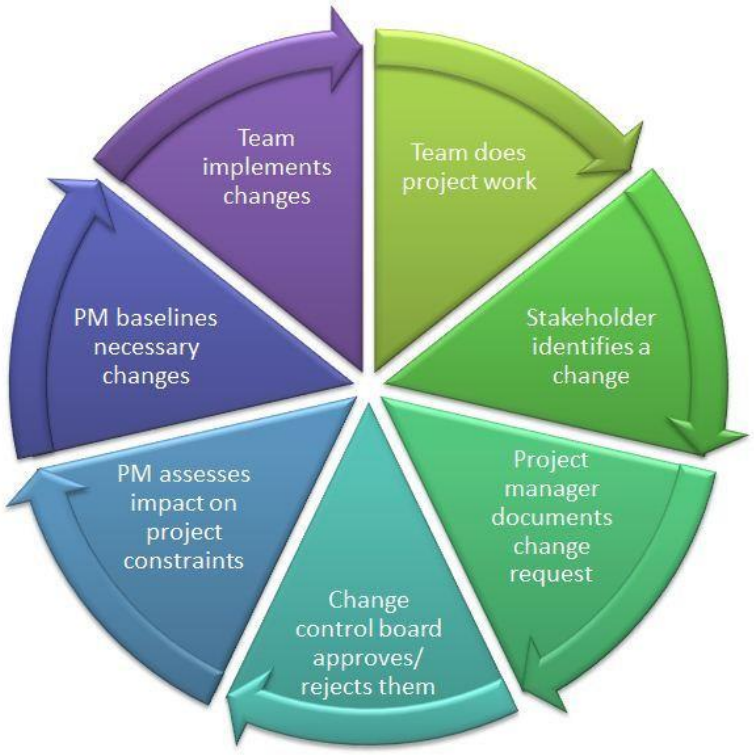
Monitor Change Requests

Measuring project performance data aids in determining whether the project is on track or whether adjustments are required. If the project is veering off course, a change request will be submitted and implemented to bring it back on track. For example, the training dataset may need to change if it can't meet the target performance. So the change requests need to be sent immediately to avoid delays to another process.



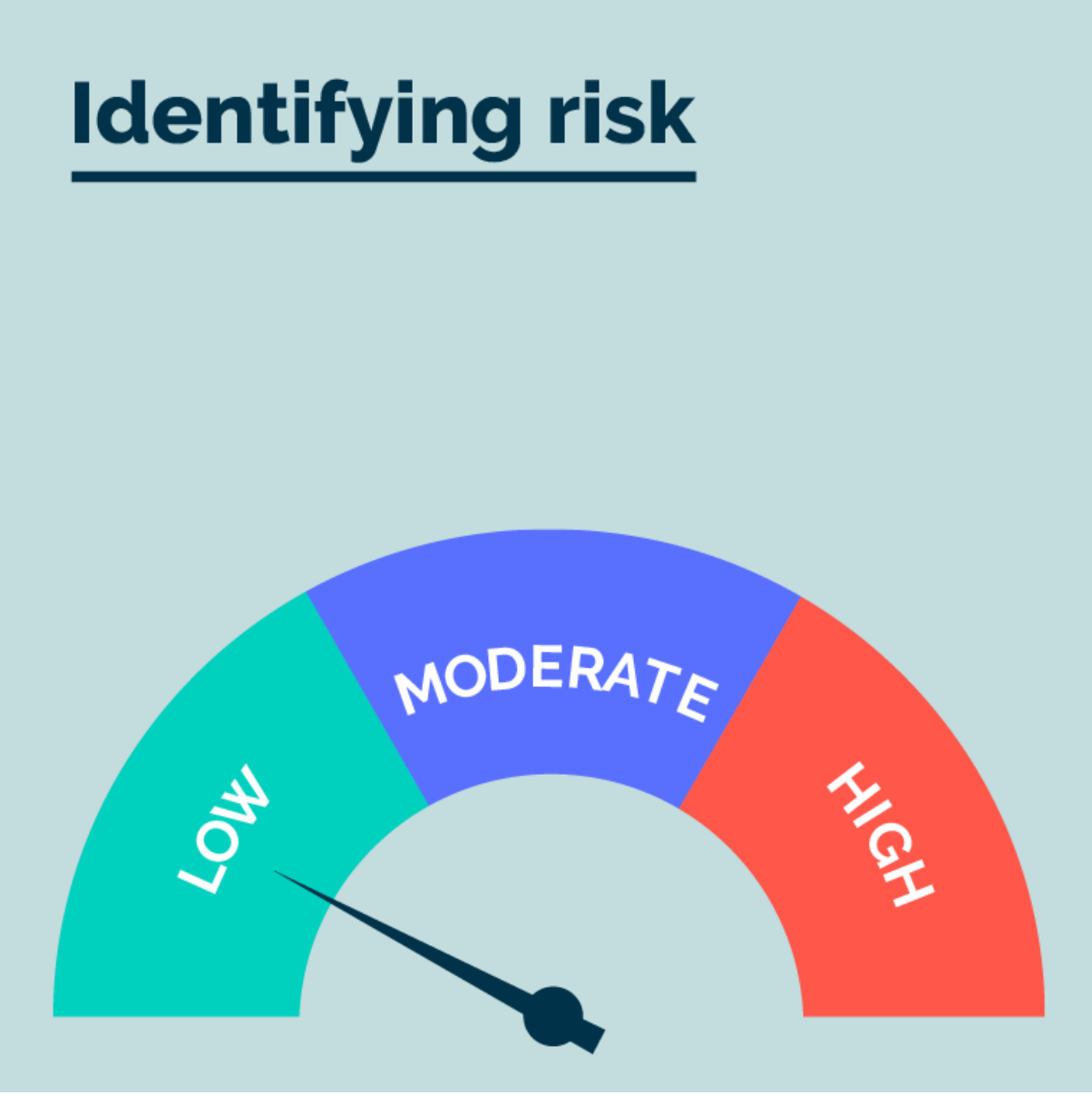
Monitor Project Scope

This stage ensures that any modifications to the project's scope are confirmed and recorded. You must update all pertinent papers, including the project scope statement and work breakdown structure. Additionally, you will need to assess any time and cost adjustments that may result from a change in approach due to a scope expansion. In this project it will be the boundaries of the ability of chatbot.



Identify Risks

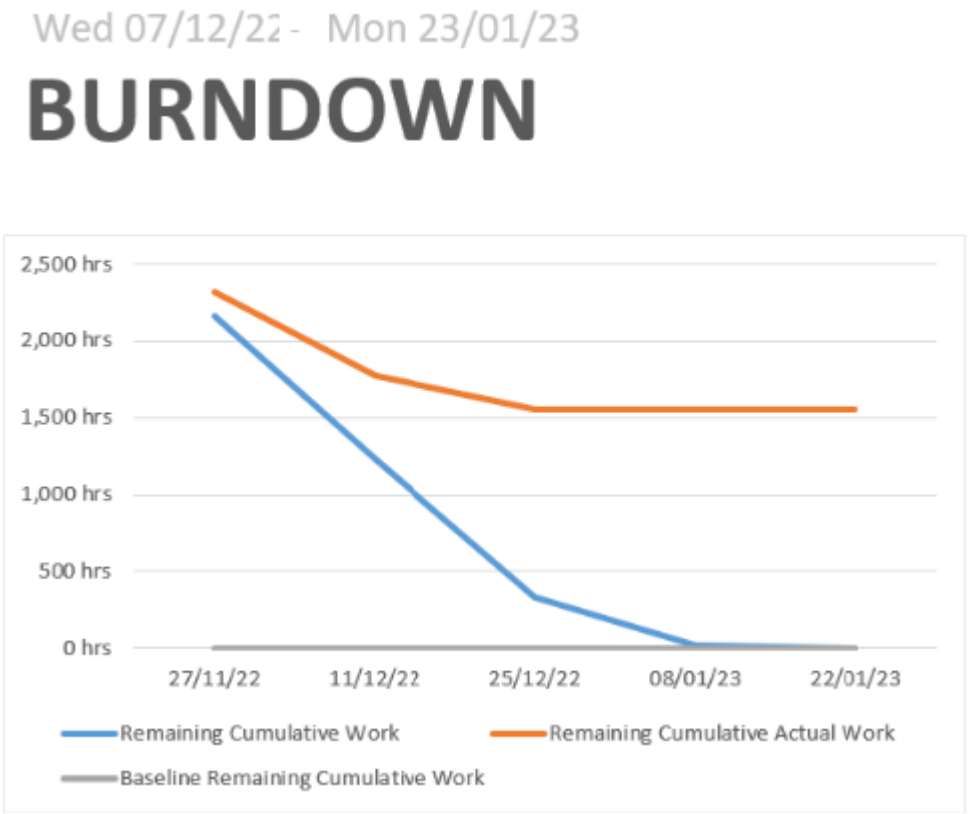
Ideally, risk identification should occur throughout the duration of a project, so that when risks arise, you have the necessary information to make the correct decision. For example, the risk of hiring senior or junior IT chatbot engineers is analysed.



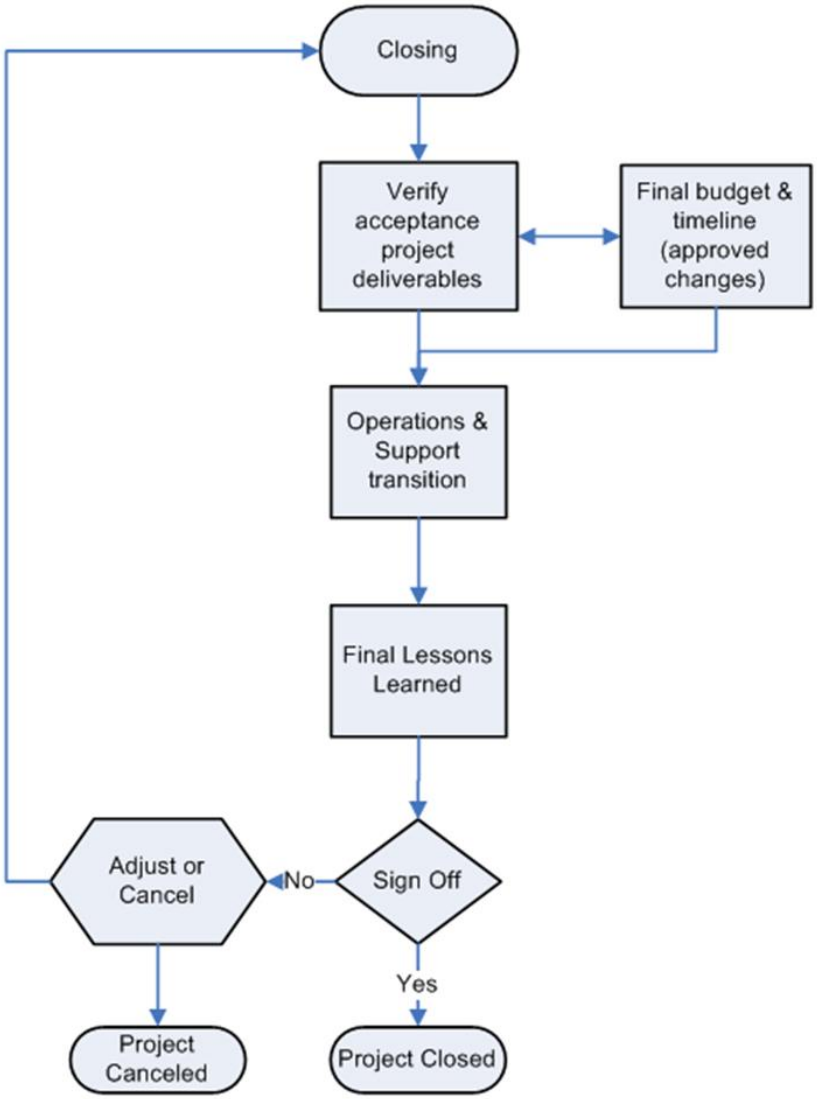
Maintenance

Maintaining consistent communication keeps projects on track and helps avoid costly misunderstandings. It is essential that stakeholders and team members receive all pertinent information promptly. Inform the update of the development chatbot process to them currently.

Work Supervision Result



Closing



This phase concludes the project management procedure. The project closing phase signifies the end of the project following the delivery of the final product. There are occasions when external talent is contracted for a certain project. The project manager is also responsible for terminating these contracts and submitting the relevant paperwork.Project completion is the final stage of a project. It occurs when the project manager confirms that the client, stakeholder, or customer has accepted the project's deliverables. If the project or product will continue after the project.

Formally transfer all deliverables

The first step to closing out the project is to finalize and transfer the project deliverables to the client. Go through the project plan to identify all deliverables and make sure they have been fully completed and handed off.

Confirm project completion

Next, validate that the project is finished. Before we can formally shut down a project, everyone involved must agree that it has been completed. To confirm the project's completion, collect official sign-offs from the project's stakeholders for the project's deliverables (i.e., all stakeholders must agree that you delivered on all components of the project plan). All the document have to formally signed off.

Review all contracts and documentation

Review all the project documentation to ensure all parties have been paid for the work and there are no outstanding invoices.

1. Customer Acceptance Form

Customer Acceptance Form

[Artificial Intelligence Chatting Robot]

This document is used to obtain the customer's sign-off once the project is complete.

Project: [Artificial Intelligence Chatting Robot]	
This document has been issued by: Leong Jun Yik	Date Issued: 30/12/2022

The Project Outcome has been measured against its acceptance criteria and has been formally accepted on behalf of the customer. The project may now be closed.

Affirm
On behalf of our organization, I, the undersigned, acknowledge and accept delivery of the work completed for this project. My signature confirms that I agree that this project has been completed. This project should not be worked on any further.
Recorded Shortfalls of the Final Project Outcome (if any):

Executive / Sponsor:	Signature: *Michelle Tang* Name: Michelle Tang Date: 28/12/2022
Senior User:	Signature: *Tan Wei Han* Name: Tan Wei Han Date: 28/12/2022
Project Manager:	Signature: *LEE YUN KANG* Name: LEE YUN KANG Date: 28/12/2022

2. Lessons Learned Document

LESSON-LEARNED REPORT

Project Name: Artificial Intelligence Chatting Robot

Project Sponsor: Shopee

Project Manager: Lee Yun Kang

Project Dates: 30/12/2022

Find Budget: RM 79 500

---

a. Did the project meet its scope, time, and cost objectives?
We accomplished the project's primary goals in the allotted time frame and without spending any extra time, energy, or money.

b. What were the project scope statement's success criteria?
The success criterion given by the customer is "automatically and jokingly react to users." The robot should analyze the user's message and respond accordingly. Aside from that, ensuring the budget is in control and not exceeded is also a success requirement.

c. What are the expected long-term outcomes? What can be done to further enhance sustainability of the project?
Executive Upskilling: Current upskilling efforts are focused on technology executives. However, all top business executives in the organizations such as all Cos, regional and country heads need to be trained on AI. They need to be specifically upskilled on aligning organization's strategic goals with AI vision, setting the AI agenda and direction for the organization, creating the right culture, and on evaluating ethical, legal and other non-technical implications such as workforce impact.

d. How could the project be improved?

Before beginning work on a project, thorough planning helps guarantee that every conceivable element and resource has been accounted for. A good project plan begins with an overview of the questions that must always be answered at the outset of any project; these questions help you identify defined and quantifiable project objectives. Identify the project team members and ensure that everyone is aware of their responsibilities. Then, implement tools that allow team members to report their progress and senior management to view the overall project's progress.

3. ORIGINAL AND ACTUAL BUDGET

Task	Overall Project Cost	Grant Request Amount
Implementation of a chatbot	RM18 000	RM18 000
Conceptual design	RM 1 400	RM 1 400
Preliminary design	RM 1 600	RM 1 600
Final design	RM 2 000	RM 2 000
Survey	RM 6 000	RM 6 000
Salaries	RM 4 000	RM 4 000
Supplies	RM 900	RM 900
Rent	RM 1 400	RM 1 400
Licensed software	RM 1 800	RM 1 800
Device	RM 2 500	RM 2 500
Storage	RM 400	RM 400
Error logging and uptime monitoring setup	RM 600	RM 600
Conversation history persistence	RM 700	RM 700
Integrations with an existing system	RM 6 000	RM 6 000
Administration UI	RM 1 600	RM 1 600
Total	RM 79 500	RM 79 500

4. Close Contract

CLOSE CONTRACT
AITech Contract Closure Notice
28/12/2022

This letter serves as official notification that the contracted work with Shopee(M) BHD has been completed. AITech Inc. has created a chatbot with artificial intelligence that can converse with users to alleviate stress, loneliness, and boredom during difficult times.

The project manager, Lee Yun Kang, has offered the following evaluation on the cooperation provided:

We were quite satisfied with Shopee(M)BHD's collaboration. The Shopee crew has provided full cooperation and is eager to communicate effectively with AITech Inc. so that the entire project may be completed quickly and effectively. We were ecstatic to collaborate with Shopee (m)BHD and eagerly anticipate our next opportunity to do so.

LEE YUN KANG

By: AITech Lee Yun Kang, Project Manager

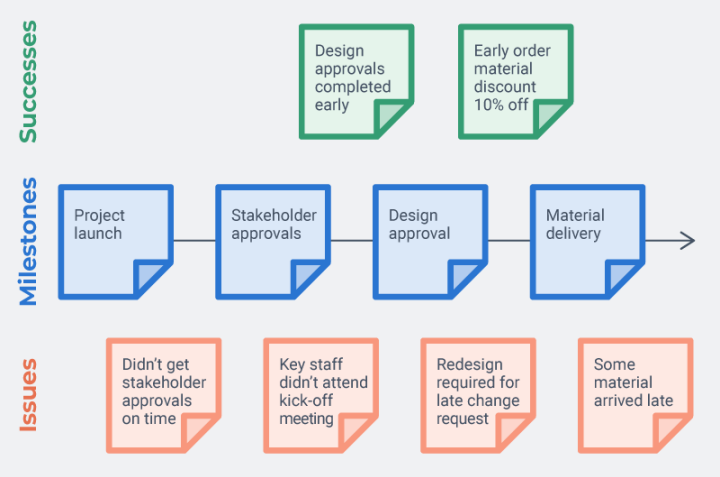
Date: 28/12/2022

Release resources

Declare all resources (suppliers, contractors, team members, and partners) released from the project. In order to free them up to focus on other projects, we should let them know that the project has concluded, confirm any remaining payments or commitments, and formally release them.

Conduct a post-mortem

When a project comes to a close, one of the most helpful things to do is to do a post-mortem or evaluation of the entire thing. Now is the moment to reflect on the project's accomplishments and setbacks in order to better plan for its future. The next step is to seek input on the project from the management team by means of a survey or meeting. Your responses, taken together, will provide a fuller picture of the project's success. (If your team is using the scrum technique, a sprint retrospective is the best way to collect this data.)



Archive documentation

Remember to take detailed notes on the project's success and areas for growth, so that this document can be used as a resource and the lessons learned can be applied to future endeavors. In addition to serving as a reference for the team in the future, thorough documentation ensures there is a record of all project-related activities, decisions, and actions should they be requested by legal, human resources, or upper management.

Celebrate success

In the end-of-project part, the duration of the party is one day. Celebration is to boost morale by recognising the team's efforts. Usually include all the stakeholder.