

Annie: Anime Fan Assistant App

**A Capstone Project Proposal
Presented to the Faculty of the
Information and Communications Technology Program
STI College Lipa**

**In Partial Fulfilment
of the Requirements for the Degree
Bachelor of Science in Information Technology**

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EXECUTIVE SUMMARY

The digital age has brought about many great inventions and ideas. Through the years of constant innovation and development, society has achieved wonderful feats and has greatly improved millions of lives around the world. Through the use of technology, the main emerging technologies today which has a huge potential of providing benefits for people is Machine Learning (ML) and Artificial Intelligence (AI). Although these technologies are relatively new, many engineers around the world has already developed tools and services that capitalizes on this. Another change that the digital age has brought, is the ease of sharing Digital Media like movies and shows through the use of the Internet. With this, many forms of media for entertainment has emerged. One of these entertainment medias is Anime which is one of the most popular entertainment medias today. The purpose of this research is to use the Machine Learning and Artificial Intelligence to make Anime more accessible for fans as well as to improve their overall experience. The sytem will help anime fans to get anime recommendations, and find the title of animes through computer vision. The system will also automatically create a calendar for the users based on their MyAnimeList profile, the system also features a small mini game that will help users to learn the japanese writing systems Kanji, hiragana and katakana. The main programming languages that will be used is Python for the Artificial Intelligence, Typescript for the API development and the web client, C# for the desktop client and Dart for the mobile client.

APPROVAL SHEET

This capstone project proposal titled: **Annie: Anime Assistant Deep Learning AI** prepared and submitted by **Jose Jerome V. Lalunio, Gerald A. Corpus**, and **John Wendel L. Estrella**, in partial fulfillment of the requirements for the degree of Bachelor of Science in **Information Techonology**, has been examined and is recommended for acceptance and approval.



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May 2022

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- The Proponents

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INTRODUCTION

Project Context

In today's day and age, there have been a lot of innovations and existing technologies that can help to improve our lives and make your tasks easier. One of these innovations is the rise of artificial intelligence and bots. According to the Google Trends, the public interest for Machine Learning and Artificial intelligence has been on the rise for the past Seven(7) years. This technology holds a lot of promise and the researchers think that it would be really helpful to find a way to utilize this technology to make the lives or tasks of people easier or at least the proponents could get a target demographic and the proponents can figure out a project that would specifically help that demographic.

Another technological advancement that is observed nowadays is the rise of social media, social networking sites and general messaging platforms like Facebook, Twitter, Discord, Instagram and many other platforms. These technologies are quickly gaining traction and popularity which makes it more promising and interesting. One specific platform that caught the interest of the proponents is Discord, according to the statistics in Google Trends, Discord had a huge spike in popularity in the past three years. It is a huge messaging platform geared toward online communities with a lot of possible integrations and it also has a publicly available API that could be used for free. Which is why the proponents intend to take advantage of this.

Through the years, anime has been making its way to the mainstream media. In fact, many anime titles today have even surpassed several live action movies in terms of revenue and popularity. According to Google's keyword statistics, there is an average of 1 million to 10 million average monthly searches for anime all around the world. One of the most recent

and certainly hyped series today, “Demon slayer” even made it’s way to the box office top grossing films with its 495 million USD worldwide gross making it the highest-grossing film of 2020 According to Kyodo in his article in thejapantimes.co.jp (2021), not to mention it was released in the middle of the pandemic during which many other films barely even made any success because of the economic recession and quarantine. This goes to show how much traction the anime community is gaining and how large the community itself has become overtime.

One common problem for anime fans online is the fact that there are so many shows out there and sometimes it can be difficult to find the shows that they like. Another problem that the anime community often complains about is the difficulty in finding the titles of the shows that they see online. A lot of people post memes or anime images online without including the title for the anime that are in the image that they posted. Because of this, many people who are interested in the show struggle in finding the title of the show. Lastly, according to the lists from AniDB.net about 45 shows are released every season. Because there are four seasons in the Japan and many different titles of animes are released every season. finding shows to watch can be tedious and keeping track of their airing dates can also be a hassle. This system can help alleviate these problems.

The project is an assistant app for Anime fans which will be made available for multiple platforms, the target platforms will be Web, Android, Windows and Linux. Lastly, there will also be a bot that will be available in Discord. The machine learning models will primarily be used for the Discord bot, because the Discord bot can only receive text messages and attachments from the user, the API has no way to understand what the user wants on it’s own. The models are meant to help the API to understand the user’s messages by recognizing the intention of the user through an intention recognition model as well as recognizing titles the anime titles that are included in the user’s messages using an anime title

recognition model.

To take advantage of the popularity of the online messaging platforms and social media as well as the current popularity of anime and the advancements that society have had with artificial intelligence, the proponents intend to make an application that uses artificial intelligence that serves as an assistant for anime fans. The goal of the project is to make an app that will help anime fans to find anime series that they love or to discover series they might enjoy through recommendations. According to Justyna Kot (2019) integrating with your application could provide many advantages such as increased functionality and greater visibility.

Purpose and Description of the Project

One of the functionalities of the system will be a reverse image search which helps the app to recognize the title of an Anime using a screenshot of the anime, this could help users to identify the title of any anime or manga as long as they have a screenshot of it. For this reverse image search, the system will rely on a third party application that provides a reverse image search called saucenao.

Another functionality of the bot is Anime recommendations, by giving the system information about the user's watch history, the system can curate a list of recommendations that it thinks the user will like. For this recommendation feature, the proponents will develop a program that will get the top 20 most recently watched animes of the user and take the genres of those animes and rank them based on how often they appeared in the user's watch history. This program will then save these ranked genres in the database so that the system can reference them anytime the user asks for a recommendation without having to go through the process again and again. This way, when the users asks for a recommendation, the system will go through the recommendation forums of users from MyAnimeList and create a list of animes that other people recommended, rank them based on the genres that are in the user's watch history and then filter out the shows that the user have already watched before sending them to the user as recommendations. In cases where the user have already watched all of the titles that are in the recommendations, the system will repeat the process in a different list of animes. The system will do this process after the user connects their MyAnimeList account for the first time. Furthermore, to account for the changes in the preferences of users, the list of genres that the system ranked will be refreshed every season. In addition, the user will have the ability to request for a specific genre or a specific list of genres, in this case the system will prioritize the genres that the users requested specifically.

The system will also have the ability to track the schedules of airing shows that the user wants to watch. This way, the user can easily see the release schedules for the anime series that they are watching, and also see the upcoming anime series for the current season. Furthermore, the system will also be able to add or remove shows from the user's watchlist or put the show on hold whenever the user instructs it to do so.

In a survey done in MyAnimeList, out of 100% of the survey participants, 71% of the fans expressed interest in learning Japanese. Although 15% of the respondents reported that they gave up on it, 26% of them says they are learning but currently on hold and 27% are actively learning Japanese while 3% have successfully learned it. Since many anime fans nowadays are trying to learn Japanese, There will also be a mini game that users can play. There will be a Kanji quiz feature where the bot can send Kanji characters and the users will have to identify them, this could help people to learn Japanese easier, There will also be Kanji and Kana quizzes to help users learn Kanji, Hiragana and Katakana. Hiragana is the formal Japanese writing system while Katakana is the language system that Japanese use to write foreign words. Kanji are Japanese symbols that represent words and it is also the most complicated in all three of Japanese writing systems.

For the Discord bot, the system will have an intention recognition model which will help it identify what the user wants to do by taking the message that the user sent to the bot and processing it through Natural Language Processing (NLP) with the help of the Natural Language Toolkit (NLTK) library as well as the TensorFlow library in Python.

As a part of the calendar feature, the proponents will also train a model to extract the anime title from the user's message. For the purpose of simplicity, the proponents will use NLP and will simply use a standard feed-forward approach using the NLTK and Tensorflow package that is available in Python, The data set that will be used is a list of anime titles

which will be collected from MyAnimeList through their public API. This model will take the text input of the users and recognize which part of the input is an anime title. This will be useful for the features that include adding or dropping shows from the user's watchlist. For example, if the user says "Add Naruto to my watchlist" the system will use the intention recognition to identify the intention of the user, in this case the intention of the user is to add an anime to their watchlist. After the system knows that the user wants to add an anime to their watchlist, the system will then send the input to the anime title recognition model which will then recognize that the anime the user wants to add is "Naruto". The system will then make the necessary actions to add this anime to the user's watchlist. This anime title recognition model will be used on the following intentions: "add to watchlist", "remove from watchlist", "mark the show as complete" and "put a show on hold".

The users will also have the ability to set a link where they want to watch a specific anime. For this feature, the system will use Regular expressions to figure out which part of the user's message corresponds to a link. The system will use this link to create a play button that the user can click which will redirect them to the link that they added.

Objectives of the Study

To help anime fans to find anime series that they love or to discover series they might enjoy through recommendations.

- The bot will have the ability to create a list of recommendations by analyzing the watchlist and watch history of the user.

To help anime fans recognize anime shows by analyzing screenshots of it.

- The bot will have the ability to recognize anime titles based on screenshots provided by the users. This way, the bot can help the users to find the anime that they are looking for.

To provide a calendar for seasonal animes that the users want to watch.

- The system can automatically create a calendar for all the airing shows for the season and plot all of the series that the users want to watch. This way the users can easily keep track of the shows that they love as well as manage their watchlist.

Help anime fans to learn more about Kanji and Kana.

- Since many anime fans out there wants to learn japanese, the system will also have a little mini-game that let's them take quick quizzes to help them recognize japanese characters.

Scope and Limitations of the Study

The project will be an assistant app for anime fans, and it will have features such as anime screenshot recognition, anime recommendations and an anime seasonal schedule/calendar which will include features to add or remove a show to/from the user's watchlist as well as putting it on hold or marking it as completed. In addition, the system will also have a mini-game called kanji-kana quiz where the users can take quizzes where they will have to recognize Kanji and Kana characters so that they can learn more about Japanese writing systems.

The machine learning model that the proponents will develop for the intention recognition will use a standard feed-forward approach with two(2) hidden layers with 20 neurons for each hidden layer. For the data-set, the proponents will conduct a survey among anime fans to find out what phrases they would use to interact with Annie. The proponents will use the TensorFlow python library to train the model. As for the title recognition model, the proponents will also use a standard feed-forward approach with two (2) hidden layers, but with 50 neurons for each hidden layers. For this, the proponents will also utilize the built in neural network functions of the TensorFlow library for Python. The data-set that will be used to train this for this model will be collected from MyAnimeList.net. The dataset will include approximately 45,459 anime titles together with their alternative titles, note that this number is not final because more animes are being released every season and so there is a possibility that this number will rise during the development phase. The metric that the proponents will use for these text classification models is "Classification accuracy". This measures the accuracy of the model by dividing the number of correct predictions by the total number of predictions and multiplying the quotient by 100.

The system will also have genre classification that will use Multinomial

Naive Bayes Algorithm to identify anime genres that are included texts. This genre classification will be used for the features that require identifying genres such as the recommendation feature. This system will only include the major Genres Action, Adventure, Comedy, Drama, Slice of Life, Fantasy, Magic, Supernatural, Horror, Mystery, Psychological, Romance, Sci-Fi and Sub-genres Cyberpunk, Game, Ecchi, Demons, Harem, Josei, Martial Arts, Kids, Historical, Hentai, Isekai, Military, Mecha, Music, Parody, Police, Post-Apocalyptic, Reverse Harem, School, Seinen, Shoujo, Shoujo-ai, Shounen, Shounen-ai, Space, Sports, Super Power, Tragedy, Vampire, Yuri, Yaoi. The data that will be used for this text classification will be collected from MyAnimeList.net.

Due to the differences in image qualities as well as image resolutions, it is near impossible to get 100% similarity on screenshots. This shouldn't be problem though since even if the similarity isn't 100% it is still likely that the results will be accurate since the bot will choose the results that have highest similarity. Atleast 80% or above similarity guarantees accurate results. Another limitation is the fact that the bot will inevitably struggle to recognize screenshots which have really low resolution, as well as images that have been cropped, filtered, or edited in anyway. Furthermore, the bot will also struggle to recognize fan-arts of animes and will likely return incorrect results. To increase probability that the bot will give correct results, the user needs to make sure that the image is not edited, not a fan-art or has atleast 360p quality.

The Anime recommendation system will ask the user to link their MyAnimeList account so that the system can read the user's watch history which it will then use to determine what animes to recommend. If the user does not have a MyAnimeList account or refuses to link their MyAnimeList account, the system will not be able to automatically detect the user's preferred genres and the user will be asked to input what genres they want the system to recommend to them.

For the Anime calendar feature, the user will need to link their MyAnimeList account so that the system can read the user's "plan to watch" list and display them in the calendar. If the user does not have a MyAnimeList account or refuses to link their MyAnimeList account, the calendar feature will still be available for them but they will only be able to see the airing dates of the shows and the other features namely "add to watchlist", "remove from watchlist", "mark the show as complete" and "put the show on hold" will not be available to them.

Another limitation is about the mini-game "kanji-kana quiz", to keep the game simple and easy to understand since it's meant only as a mini-game. The quiz will only be a simple kanji-kana character recognition quiz and will not have a comprehensive language course.

The Kanji quiz part of the kanji-kana quiz will only include single character Kanji with On'yomi readings. According to Krisada Hemsoe from jlptutor.com N3 level is considered enough to be able to converse in Japanese. For this reason as well as to keep the quiz from becoming too difficult for the users, the number of characters that will be included will only be up to the standard of N3 level of the the Japanese-Language Proficiency Test (JLPT). There will be three quiz difficulties, easy, medium, and hard. The easy level quiz will be based on N5 level, the medium level will be based on N4 level and the hard level will be based on N3 level standards.

Due to the fact that there is a time difference between when the show is aired in Japan and when it is released for international viewers, which may be delayed by licensing and translations or adding subtitles. There may be instances where the bot says that the episode has been aired but it is still not available on international streaming platforms depending on which streaming platform the user is using and how long the delay is between the releases of the streaming platform and the release in Japan.

REVIEW OF RELATED LITERATURE/SYSTEMS

Review of Related Literature

In the article How an AI-based “Super Teaching Assistant” could revolutionize learning, Sachin Waikar (2020) Stated that while significant technological advancements may favor those with the most access, his team anticipates a far more inclusive process for developing their system, one that involves specific design for students from various backgrounds and locations. "The system can assist train new teachers, amplifying its effects and lowering the barrier to creating scaled human-centered education," he argues. As a result, the tool may contribute to a more equitable world in which more students have access to high-quality, skills-focused education.

According to Viet Le, Tej Bhadur, et al., (2020). Customers should be informed that they are being tracked. Conversing with an AI who isn't human by demonstrating that CAs can send compelling messages, they found that deceiving customers into thinking they're talking with a human isn't always essential or desired. The focus should be on using anthropomorphism to achieve better human similarity by signaling things like identity, small conversation, and empathy, all of which have been demonstrated to increase user compliance. Providers should design dialogs as carefully as they design the user experience when using CAs, especially chatbots. Apart from focusing on dialogs that are as near to human-to-human as feasible, providers can use and test a range of additional tactics. AI-based CAs are becoming increasingly popular in a variety of scenarios, and they have the potential to provide significant benefits. There are numerous chances to save time and money. Many users, however, continue to have problems. Interactions with chatbots that were disappointing (e.g., high failure rates), which could lead to skepticism, hostility to technology, which could inhibit users to comply with it. The

chatbot makes suggestions and requests. In the research, the researchers created a web-based AI application to demonstrate how Machine Learning, Python, and JavaScript. Approaches may improve user experience. Adherence to a chatbot's request for customer service feedback As a result, our research is just the beginning. In order to gain a better grasp of how AI-based CAs may improve user compliance by employing machine learning and emphasizing the purposes of machine learning and artificial intelligence, such as the necessity to maintain consistency in the context of internet commerce customer service and markets.

According to Sudhakar Reddy M, et al. (2020) An intelligent virtual assistant (IVA) or intelligent personal assistant (IPA) may be a software agent which will perform tasks or services for a private supported commands or questions. Sometimes the term "chatbot" is used to refer to virtual assistants generally or specifically accessed by online chat. In some cases, online chat programs are exclusively for entertainment purposes. Some virtual assistants are ready to interpret human speech and respond via synthesized voices. Users can ask their assistants questions, control home automation devices and media playback via voice, and manage other basic tasks like email, to-do lists, and calendars with verbal commands. The world's digitalization ensured that humans don't need to rely on others for assistance; instead, they can rely on a device that is significantly more efficient and trustworthy and Can meet their day-to-day requirements like computers, mobile phones, and other electronic device. Laptops and other electronic devices have become an integral part of our daily lives. To minimize the complexity of large programs by doing simple computations.

In an article published in June 2019 entitled "AI-Based Digital Assistants: Opportunities, Threats, and Research Perspectives, Alexander Maedche, et al. (2019) emphasized that. Artificial intelligence (AI) is becoming increasingly pervasive in our professional and personal lives. AI-based

digital assistants, which are already available in large numbers and for a wide range of uses, are an important field of application. AI-based digital assistant research dates back to Joseph Weizenbaum's well-known ELIZA in 1966. Parallel to this, major technology corporations like Microsoft, IBM, Google, and Amazon have been working on AI-based digital assistants for decades and have lately made them fit for the mass market. Empowered by recent advances in AI, these assistants are becoming part of our daily lives. AI-based digital assistants offer considerable benefits, but they also pose a risk. On the one hand, they are projected to replace humans in ordinary jobs, freeing up time and resources for more difficult tasks. According to IBM (2017), chatbots can help companies save 30% on customer support expenditures. On the other hand, because to its human likeness, Google's newly revealed advanced AI-based digital assistant, Duplex (Google AI Blog, 2018), has sparked a debate regarding potential misuses for deception and fraud. While AI-based digital assistants are becoming more common, most individuals are oblivious to their underlying design and algorithms (Frey & Osborne, 2017), resulting in serious issues and user aversion to their use (Dietvorst, Simmons, & Massey, 2015, 2018).

According to Regina Gubareva and Rui Pedro Lopes, (2020) in their paper “Virtual Assistants for Learning: A Systematic Literature Review”. Virtual assistants are becoming increasingly popular and practical. Technology contributes in a variety of ways, each with its own set of benefits. Virtual assistants are useful for task automation and offering assistance to students in time management, information access, and other areas. Facilitation of communication the technology is still being developed. It is still in its infancy. There are numerous factors that must be improved in order for virtual assistants to be effective in motivating and engaging students.

In a Study submitted in November 2019 entitled “Voice Assistants and

Smart Speakers in Everyday Life and in Education”, George Terzopoulos and Maya Stratzemi (2019), explained that Immersive learning technologies have the potential to modernize the educational system. New learning experiences can be provided by virtual reality, augmented reality, and voice assistants. Since voice assistants and smart speakers are only recently becoming more popular, research on this topic is limited. As smart speakers and voice assistants become more common in households, they will be the focus of attention in the next years. Because there are so many challenges, researchers are looking into how they might be employed effectively in the learning process. Because there are so many challenges, researchers are looking into how they might be employed effectively in the learning process. One of these issues is the lack of a wide range of languages, as voice assistants do not speak all of them. Furthermore, voice assistants lack many of the required security precautions and protection filters that students might employ in class. Teachers must be educated and motivated about the benefits of these gadgets before they can be used in the classroom. Although favorable outcomes for kids and instructors have been recorded in the majority of situations, the data is limited, fragmentary, and disorganized.

Related Studies and/or Systems

Taiga is a Windows-based open-source desktop application. It recognizes and synchronizes your progress with internet services based on the anime videos you view on your computer. It allows you to organize your anime collection, find new series to watch, share viewed episodes, and download new ones. In comparison to Annie, Taiga does not have a seasonal anime calendar instead it only has a list of animes that can be sorted by season and it also doesn't have a Reverse Image search and kanji-kana quiz that Annie has. However, Taiga features the ability to download anime from torrent sources which Annie will not be able to support due to copyright laws. Similarly to Annie, Taiga also has a MyAnimeList integration but it doesn't have a recommendation feature, and It only supports windows while Annie will support both web, mobile, and desktop as well as Discord.

MyAnimeList is an anime database and community which contains lists of animes together with details about them such as release dates, ratings synopsis etc. This site helps users to track their watch lists and interact with other people in the internet through it's online forums.

Kotobaweb is a discord bot which focuses on teaching Japanese, it features many games like Kanji, Hiragana and Katakana recognition games, shiritori which is a japanese traditional past time game, and stroke order which helps users to remember the strokes of different Kanji characters. Unlike Annie's Kanji-kana quiz, Kotobaweb's Quiz is more customizable. However, Since Kotobaweb focuses mainly on learning japanese, this bot does not have any of the features that Annie has related to anime.

AnymeX is an android application which acts as a MyAnimeList mobile client, It integrates with MyAnimeList.net to deliver the features of MyAnimeList in mobile. Additionally AnymeX has other features like searching anime discussions on

Reddit, displaying the remaining time before the next episode of an anime airs, bulk deleting shows from the user's list, and saving a list of the users's favorite anime characters. Just like Annie, Anyme has a MyAnimeList integration which means that it will also have all the show tracking feature that Annie has. However, Anyme will does not have a seasonal calendar, reverse image search and Kanji-Kana quiz that Annie has nor does it support multiple platforms as it only supports android.

Mal Client is a third-party app for managing anime and manga lists on MyAnimeList. This also supports various other features that MyAnimeList has. In comparison to Annie, Mal Client is only a mobile application which provides only the features that MyAnimeList has and nothing more. Whereas Annie has other features aside from the features that it supports from it's MyAnimeList integration like the seasonal calendar and the kanji-kana quiz. Annie is also cross-platform while Mal Client is only available on Android.

Synthesis

The project's purpose is to make it more convenient for anime fans to keep track of the shows they love and discover shows they might love. And because the project is cross-platform, it will have clients that support Windows, Linux, Web and Android. It will be more accessible for anyone who wants to use it. Specifically, the system will help users to get the title of anime shows just by providing a screenshot of the anime. The system can also automatically generate a calendar for the user and automatically update it by analyzing data from MyAnimeList and at the same time the system can also manage the user's watchlist. In addition to this, the system can analyze the user's watch history to create a list of recommendations for shows that the user might like. There will also be a mini game that will help users familiarize themselves with the Japanese writing system.

TECHNICAL BACKGROUND

Overview of Current Technologies to be Used in the System

A part of the system especially the backend will be using machine learning and artificial intelligence, the programming languages that will be used for the AI will be Python and will utilize the TensorFlow library. The API will be written in typescript and will be running on NodeJs and the database that will be used is PostGreSQL. The backend will be deployed in Microsoft's Azure Cloud server.

As for the front-end clients, the discord bot will be written in Python, the web app will be written in Typescript using React framework and will be styled using scss, the mobile app will be written in Dart using the Flutter framework. The desktop client for windows will be written in C# and the same client will be made available to linux using electron.

The machine learning model that the proponents will develop for the intention recognition will be a supervised machine learning model and will use a standard feed-forward approach with two hidden layers. As for the Anime title recognition model, the proponents will also use a standard feed-forward approach with two (2) hidden layers. The proponents will utilize the built-in neural network functions of the TensorFlow library for Python.

Calendar of Activities

In the 1st week of Capstone activities (February 14 -18), after we created a group, we conducted a brainstorming session in which we discussed various subjects for the Capstone activities. Each person contributes suggestions to the research that we were doing. We came up with a tree title after brainstorming ideas, and each participant prepared a presentation for the title proposal with the thesis supervisor.

The first meeting of team members with the thesis supervisor took place during the second week of Capstone activities (February 21 –25). Members offered the three titles that they had agreed on. Lalunio, Jerome presented this Annie's bot idea which is the first title that been agreed upon by the panels.

They discussed their chosen study subject throughout the 3rd week (February 28 – March 4). After that, we established a research approach for the panels. They also prepared a letter of consent for the system's chosen recipients. Lastly, they proposed the finalized research title and website name, and the contributors.

On the 4th week of doing a Capstone activity (March 7 – 11), they started to divide chapter 1 which is the Introduction, project context, purpose and the description, objectives of the study, and the scopes and delimitations of the study. They divided the portion of Chapter 1 so that each of the members contributed to making the documents. This week the leader gives the reserachers tasks so they can work together on the tasks that needs to be done.

They began working on Chapter 1, which is the introduction, during the 5th week of conducting a Capstone project (March 14–18). This week, they also held a meeting to discuss potential features and the language they'll use to build the system.

On the 6th week (April 19- April 24) of activities, each proponent has their own designated activities in creating the Chapter 2-Review of Related Literature/System. Proponents collect all the links of the articles and journals they have researched. Proponents also made some improvements with regards to their modules in Scope and Limitations of the study. Throughout the week, proponents spend time in reading the articles, and others are busy studying the language that they will be using.

For the 7th week of the activities (April 26 – May 01), proponents continued the Chapter 2 – Review of Related Literature/System, while creating the Chapter 3 – Technical Background. The main programmer of the proponents did the Resources, others did the Overview, and the group did the Calendar of Activities and Gantt Chart.

The proponents had the meeting with the thesis adviser on the 9th week (April 26 – May 01) for the checking of the two chapters which are the Chapter 1 – Introduction and Chapter 2 – Review of Related Literature/System. Thesis adviser finally approved the Chapter 1, but proponents must provide a short description with their objectives of the study, and proponents must provide an additional study with their Chapter 2.

Gantt Chart of Activities

MONTH	FEBRUARY				MARCH				APRIL				MAY				JUNE				JULY				AUGUST				SEPTEMBER				OCTOBER				NOVEMBER			
ACTIVITY																																								
Brainstorming																																								
Title Proposal																																								
Data Gathering																																								
Prototyping																																								
Introduction																																								
Project Context																																								
Purpose and description																																								
Objectives of the study																																								
Scope and Limitation of the Study																																								
Review of related Literature																																								
Related Systems and/or studies																																								
Synthesis																																								
Calendar of Activities																																								
Resources																																								
Appendix																																								
References																																								
Personal Technical Vitae																																								

Resources

Hardware

- **Development**

- CPU: AMD Ryzen 3 3200GE (4) @ 3.300GHz
- GPU: AMD ATI Radeon Vega Series / Radeon Vega Mobile Series
- Memory: 16 GB ram
- Storage: 100 GB rom

- **Deployment – Microsoft Azure Bs-series Virtual Machine**

- Ram: 0.5 GiB ram
- Temporary Storage: 4 GiB rom
- Number of Cores: 1
- Instance: B1ls

Software

- **Operating system**

- OS: Arch Linux x86_64
- Kernel: 5.17.3-arch1-1
- Shell: bash 5.1.16
- Desktop Environment: Plasma 5.24.4
- Window Manager: Kwin
- Terminal: Konsole

- **Development**

- Python
- Javascript
- Typescript
- Scss
- NodeJS
- Dart
- Flutter
- C#
- .Net Framework
- Electron
- Git
- Github
- Vim
- VsCode
- Visual Studio
- TensorFlow
- **Deployment**
 - Microsoft Azure
 - Discord
 - Replit

Appendix

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EDUCATIONAL BACKGROUND

Level	Inclusive Dates	Name of school/ Institution
Tertiary	2021	STI Lipa
Vocational/Technical	2018	Lcc SilverCrest
High School	2013	Manuel S. Enverga Institute
Elementary	2005	Matipunso Elementary School

PROFESSIONAL OR VOLUNTEER EXPERIENCE

Inclusive Dates	Nature of Experience/ Job Title	Name and Address of Company or Organization
October 2021	Flutter App Developer	RightValley, https://rightvalley.com/
February 2021	FullStack Developer	DyzStudios
January 2021	Intern	DyzStudios
December 2020	Flutter App Developer	Memory Lamp, https://github.com/MemoryLamp

Listed in reverse chronological order (most recent first).

AFFILIATIONS

Inclusive Dates	Name of Organization	Position
October 2021	RightValley	Freelancer
February 2021	DyzStudios	Full Stack Developer
December 2020	MemoryLamp	App Developer

Listed in reverse chronological order (most recent first).

SKILLS

SKILLS	Level of Competency	Date Acquired
Programming	Entry-level	November 2021

TRAININGS, SEMINARS, OR WORKSHOPS ATTENDED

Inclusive Dates	Title of Training, Seminar, or Workshop
	N/A

Listed in reverse chronological order (most recent first).

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EDUCATIONAL BACKGROUND

Level	Inclusive Dates	Name of school/ Institution
Tertiary	2021	STI COLLEGE
Vocational/Technical	2018	AMA LIPA
High School	2015	THE MABINI ACADEMY
Elementary	2011	S.C.M.R.M.S

PROFESSIONAL OR VOLUNTEER EXPERIENCE

Inclusive Dates	Nature of Experience/ Job Title	Name and Address of Company or Organization
month year	N/A	N/A

Listed in reverse chronological order (most recent first).

AFFILIATIONS

Inclusive Dates	Name of Organization	Position
month year	N/A	

Listed in reverse chronological order (most recent first).

SKILLS

SKILLS	Level of Competency	Date Acquired
Programming	entry-level	2021

TRAININGS, SEMINARS, OR WORKSHOPS ATTENDED

Inclusive Dates	Title of Training, Seminar, or Workshop
month year	

N/A

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Curriculum Vitae of
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EDUCATIONAL BACKGROUND

Level	Inclusive Dates	Name of school/ Institution
Tertiary	2021-2022	STI College Lipa
Vocational/Technical	-	-
High School	2016-2017	The Mabini Academy
Elementary	2012-2013	G.B. Lontok Memorial School

PROFESSIONAL OR VOLUNTEER EXPERIENCE

Inclusive Dates	Nature of Experience/ Job Title	Name and Address of Company or Organization
-	-	-

Listed in reverse chronological order (most recent first).

AFFILIATIONS

Inclusive Dates	Name of Organization	Position
-	-	-

Listed in reverse chronological order (most recent first).

SKILLS

SKILLS	Level of Competency	Date Acquired
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TRAININGS, SEMINARS, OR WORKSHOPS ATTENDED

Inclusive Dates	Title of Training, Seminar, or Workshop
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Listed in reverse chronological order (most recent first).