

Project Management Part 2

Mind Map and Project Management

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Introduction

Our team, MCS08 was given the project topic, Singing Video Generation with Music Separation which will be supervised by Dr Arghya Pal. Our goal in this project is to create a cutting-edge system capable of generating lifelike singing face videos synchronised with music. The reason for choosing this topic was due to strong interests and inspirations that developed while we were skimming through the project description of this topic.

To sum up, our team would generate a human singing face video by decomposing the input music into human voice and background music components then synchronising it with the provided song by ensuring accurate lip synchronisation between the human singing face and the vocals to generate a human singing face video with accurate lip synchronisation to the vocals. We believe that the project would benefit the entertainment industry and music artists. In the new era of being an Internet celebrity, some of them want to be famous but do not want too much exposure due to personal reasons. As for our project, it will benefit them by creating their own music video but with a virtual avatar singing so that they will remain anonymous but also giving entertainment to their viewer from the music video.

To ensure our group has a successful run in our project, a strong project management is required. Project management ensures that our tasks are organised, resources are allocated efficiently, and timelines are met. Besides that, it also drives us closer to the goal and mitigating any potential risk while completing the project. Hence, drawing a mind map can guide us immensely on how to start our project. It is a visual representation of information, concepts, and relationships. It starts with a central idea and then branches out into related subtopics and categories. Branches can further extend into more details, forming a hierarchical structure that visually represents the relationships between different elements. By using a mindmap, we are able to express how project management would affect and benefit us in relation to our project and break down the factors that impact project success in a short and concise manner.

Mindmap

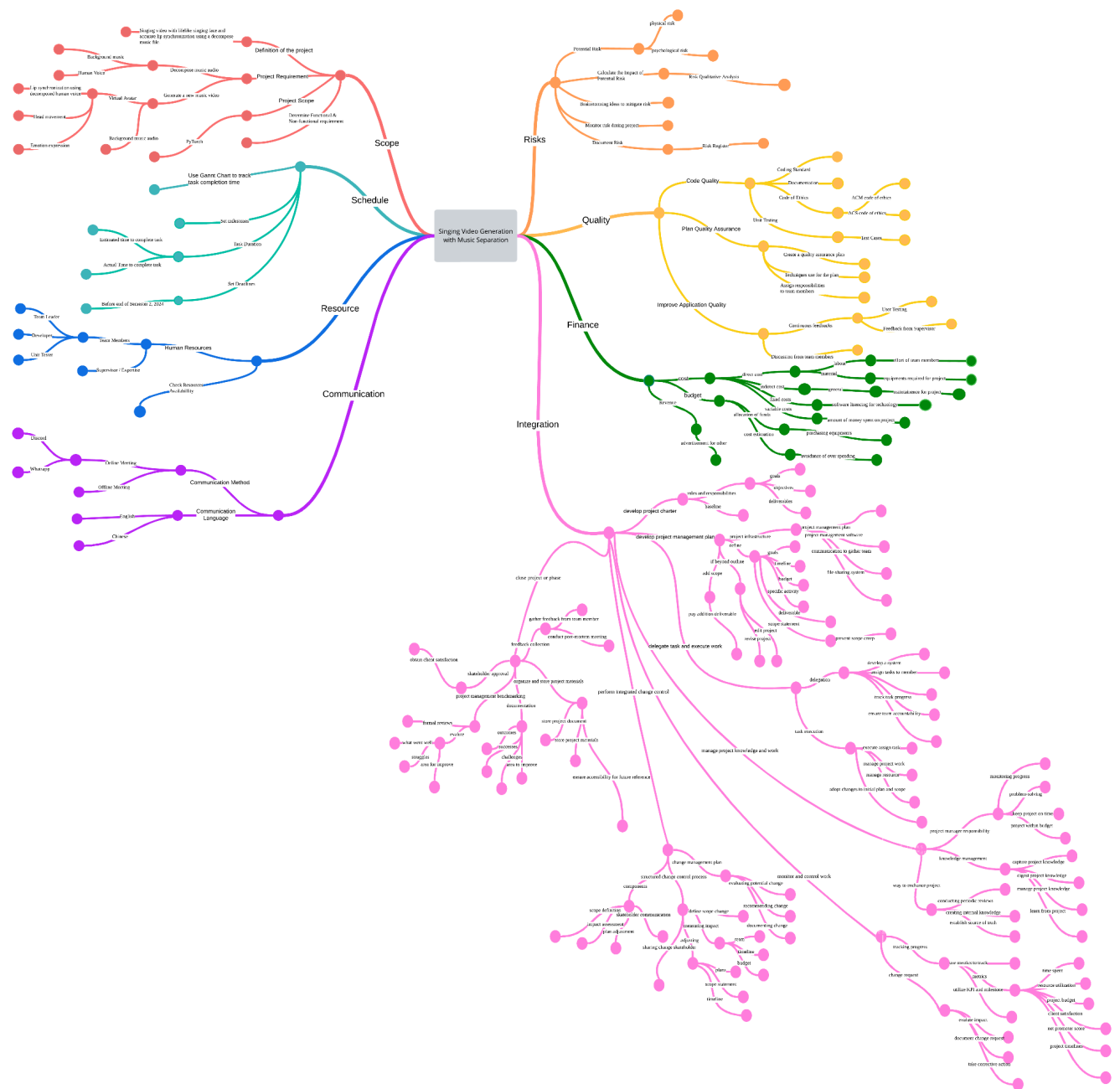


Figure 1: Mind Map for our current project

A link to the Mindmap:

https://lucid.app/lucidchart/bb176d93-0593-4a15-aeae-6804c9d9d2f8/edit?invitationId=inv_0cec5f53-be72-433e-bda5-1756f7109b72&page=0_0#

Explanation

Based on the mind map above, the central concept node will be our main project which is Singing Video Generation with Music Separation supervised by Dr. Arghya Pal. Various branches are expanded from the node that represents the main concept of the project, they are project scopes, schedule, resource, risk, communication, quality, financial and integration management. Without further ado, we will go through the first concept which is project scope.

In the mind map created, we have 4 branches in project scope. As of the first branch, we defined the project which is simply generating a singing video that contains lifelike singing face with accurate lip synchronisation using a decomposemusic file. The connections between it is based on what needs to be accomplished by our team and how we shall accomplish it. As of the second branch, we have the project requirements which gives us a brief idea on what we are supposed to expect and complete for this project. Based on our identification, we believe that we are required to decompose the music audio given by separating the background music and the human voice from the given music audio then generating a new music video by substituting the human with a virtual avatar with the same background music audio. The virtual avatar then lip syncs by using the decomposed human voice and is presented with some head movements and emotion expressions. As of the third branch, we were given our project scope as stated in the project to utilise PyTorch, a machine learning library used for applications such as computer vision and natural language processing, mainly used for applications using GPUs and CPUs. As of our last branch, we should determine the functional and nonfunctional requirements to enhance user experience and allow the system to work and perform perfectly.

Next main concept is the schedule of our project. A schedule is an important aspect as managing a time wisely would help us in completing the project within the date line. So, the current plan of tracking our time is to use a Gantt chart that enables us to track our completion time. Besides that, the Gantt chart allows us to use milestones so that we can determine the progress of our project to ensure it is within the deadline. Since our project is separate into different small tasks, we should also measure the task duration by estimating the time needed to complete the task and calculate the actual time as well. So, we can adjust the schedule accordingly based on the task duration. Our project has a fixed deadline which is the end of Semester 2, 2024 which means we need to complete our project before the deadline.

Besides, there are five branches in risk management. As of the first branch, We mention that the potential risk may be faced during the project. So, based on the situation above, we extend to our second branch that we should analyse to determine the severity of risks. After that, we should then do a brainstorming to think about ways to avoid, solve or transfer the risks. To make sure the risks can be solved as soon as possible, we need to monitor the risk that may occur at any time. This is what is mentioned in branch four. In branch five, it is telling us to document the risks so that we have ways to solve the problem when we face it based on the brainstorming before.

Next, another main concept for our project is the resources needed when planning. The main resources for the project are human resources which are the members in our team. It consists of a team leader, developer team and unit tester team. It is important to have a clear division of labour so that the work can be distributed nicely. Furthermore, our group will be able to get help from the supervisor to guide our project process which is considered a human resource as well. Besides that, we need to ensure the availability of the resources when planning our project so that our project can run smoothly. Otherwise, we need a mitigation plan if we lack resources.

The communication branch has extended into two branches which are communication method and language. We decided to use Chinese language as our communication but our main language is English as per project requirement. Besides that, we have different methods for us to communicate and discuss the project such as WhatsApp and Discord. It is better to have fixed communication software so that we can make sure we are able to contact each other. We also planned to meet together offline to have a better understanding during communication.

We have created three branches for the quality branch. Because we are going to do coding in this project, the quality of coding is one of the parts that should be emphasised. We show the work should be done during the coding and it is important for us to follow the rules of coding, ACM and ACS. Also, a nice test case will help to monitor the quality of code. To make a good quality project, we need to have a plan and that is why the second branch was created. The third branch is showing the way to improve the project. The best way to reflect the success of a good project is through feedback from end users. So, we should collect the feedback and do discussion and do further improvement to the project.

There are three branches in finance for project management. As of the first branch, we have different types of costs which are direct cost, indirect cost, fixed cost and variable cost. Direct costs involve any directly related expenses that are connected to a project's operations. Examples of direct costs would be labour and material, which in our case would be the effort of team members and the equipment required for our project. Indirect costs are costs that help the company perform activities that are not easily traced to the specific project such as general expenses. We believe that maintenance is a form of general expense of indirect cost, as maintenance could be fairly expensive and easily missed out. Fixed costs are costs that are stable throughout the project life cycle and would not change regardless of time and amount in any other time. In our case, a software licence is one of the costs our project would have as we might need some subscriptions while completing the project. Lastly, variable costs are costs that change with the amount of work involved with a project, which then branches to the amount of money spent on our project as we cannot determine the total money that would be spent on our project. As of the second branch, we have the budget which tells us the total amount of money we are able to spend for the project. We then have to allocate funds to purchase our required equipment that is within our budget. As of our last branch, we have revenue which tells us how much revenue we shall receive by advertising for others with our application.

Project integration management involves coordinating all aspects of a project to ensure seamless execution. There are 7 branches in integration for project management. For the first branch, we basically start off by writing a project charter, which gives the authority to initiate the project. It consists of the roles and responsibilities of the project, which then can be broken down further into more practical bits such as goals, objectives and deliverables. For the second branch, we advance by creating a project management plan. The Project Management Plan serves as the overarching framework for project execution. The scope statement ensures alignment with project goals and prevents scope creep. Overall, they provide the essential structure and guidance necessary for successful project completion. Next, we have extended two more branches for the third branch. They form the core processes of task management and execution, ensuring efficient project delivery while maintaining flexibility to address evolving project needs. In the fourth branch, the extended branches highlight the integral relationship between project management responsibilities, knowledge management, and effective strategies for project success. It shows the work that should be done by the project manager and shows capturing, managing, and leveraging project knowledge to improve future project outcomes. Besides, it also shows the strategies to enhance the project. The fifth branch is showing the way to keep tracking the project. It helps to insight into

areas for improvement, allocate resources effectively and provide informed decisions on the project. In the sixth branch, the allocated branches form a comprehensive framework for performing integrated change control, ensuring that changes are effectively managed and aligned with project objectives. It also minimises the disruption and improves stakeholder satisfaction. The last branch is called "close project or phase". It is important to have nice satisfaction from stakeholders and learn from the project experiences to improve the future project. Gathering the feedback form end users can improve clients relationship and make continuous improvement with utilising the resources efficiently.

Short essay

The development of a lifelike singing face driven by music signals remains a captivating and challenging task until this very day. In this project, we aim to perform thorough research and approaches along with an organised project schedule and schedule management process. Although our project schedule and schedule management process might change from time to time, an overview would be provided to allow insights into our project's organisation and execution.

Our project schedule consists of several phases. Before creating our project schedule, we had to start off by conducting planning and research where we identify our goals, deliverables and develop a timeline for our project. As of our current project schedule, it was created through references and discussions among the team members to decide on it. Besides that, we created a Work Breakout structure (WBS) that provides an overview of what we plan to do over the span of the project duration.

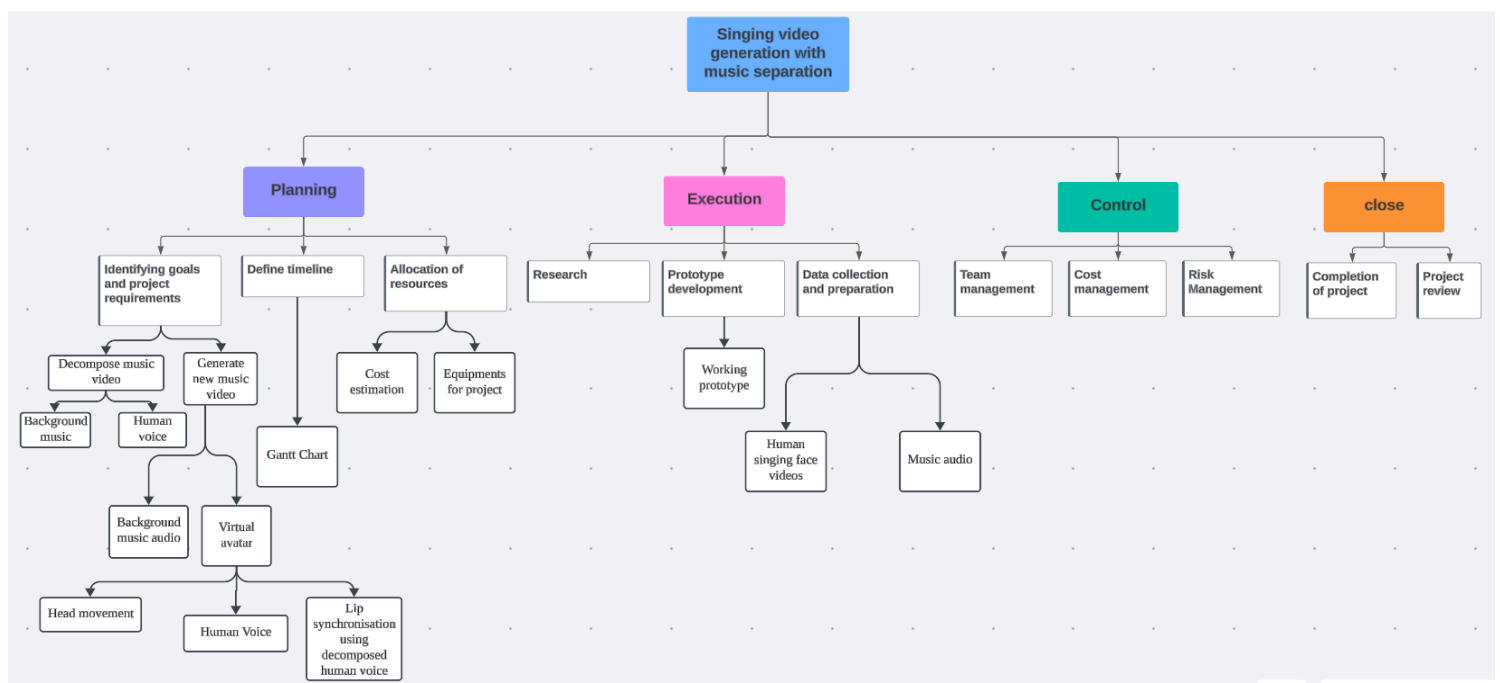


Figure 2: Work Breakdown Structure (WBS) for our current project

Link to Work Breakout Structure:

https://lucid.app/lucidspark/a7bdb885-913b-4aa8-b584-83b93d43796d/edit?viewport_loc=562%2C255%2C4608%2C2214%2C0_0&invitationId=inv_4db55cb1-7408-4e19-a68a-123906882117

From the WBS above, we broke down our project scope to visualise all tasks required to complete our project. As mentioned above, we identified the goals, timeline and allocation of resources during our planning phase, breaking down identified tasks to possible sub-tasks to ease completion of the project. During our execution phase, we will do research and attempts on creating a prototype by data collection and preparation such as music video and human singing face videos sample collection. As for the control phase, we have to tightly control our team, cost and risk management to minimise any possible issues that could affect our project. Lastly, closing of the project when our project is completed and performing a project review before handing it to our clients.

Then, we proceed on establishing the sequence of tasks where we complete our tasks in order such as planning to execution. These tasks depend on another such that execution cannot be done before research as we wouldn't have the knowledge to produce anything for our project. Following, we compile the tasks in order and divide it among the team. However, we do meetings on progress checkups to ensure that everyone is on track and understands the work that each of us did. Besides that, every team member participates in all the tasks to ensure a fair working environment for everyone. We continue by linking the task dependencies by mapping out in our schedule by using a gantt chart to prevent and avoid any bottlenecks possible.

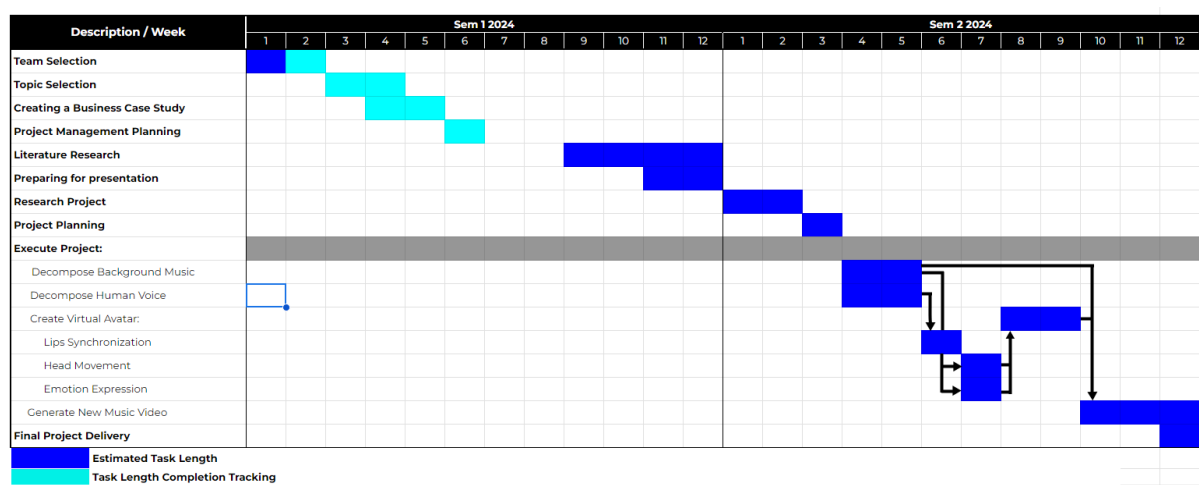


Figure 3: Gantt Chart For Our Group Schedule

Link to Gantt Chart:

https://docs.google.com/spreadsheets/d/1zx8UbR0mij9EKra4ugWL2y7QjezfQhWFH_0-g3J7NWs/edit?usp=sharing

From the Gantt chart above, we listed our tasks to present an overview of how our project is scheduled overtime. At our current state, we have completed our topic selection, business case study and project management planning. The remaining tasks are tasks that we estimate to complete in the near future. As off the arrows, they represent the dependencies on the tasks. For example, the decomposition of background music and decomposition of human voice cannot start without either one since we have to separate the background music and human voice in our project.

We then find a critical path to aid in making correct decisions on tasks that are not mandatory if time and cost become constrained. This is commonly used for scheduling risk analysis. There might be various factors that possibly affect our group schedule. The project may not be run smoothly throughout the whole process, it might change due to changes of requirements by the supervisor or additional requirements. Moreover, our group may have limited resources that might have delayed our schedule. Other than that, our group may encounter some issues during the process that may change our schedule as well. Although we have a planned project schedule beforehand, we cannot guarantee that the project schedule may differ due to unforeseen circumstances. So, we have some emergency plans that can help us to mitigate the issue and adjust our project schedule so that we have a lower risk of incomplete work.

Finally, we assign resources to every task on our schedule. By doing so, it can be completed by mapping the resource availability to prevent over budgeting. In addition, we can improve our plan accuracy on time and costs to keep our project running smoothly.