PROJECT MANAGEMENT ASSIGNMENT – PART 2

Topic: DroneAI: Humans interacting with Drones

Course Code: FIT3161

Team: MCS14

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Introduction

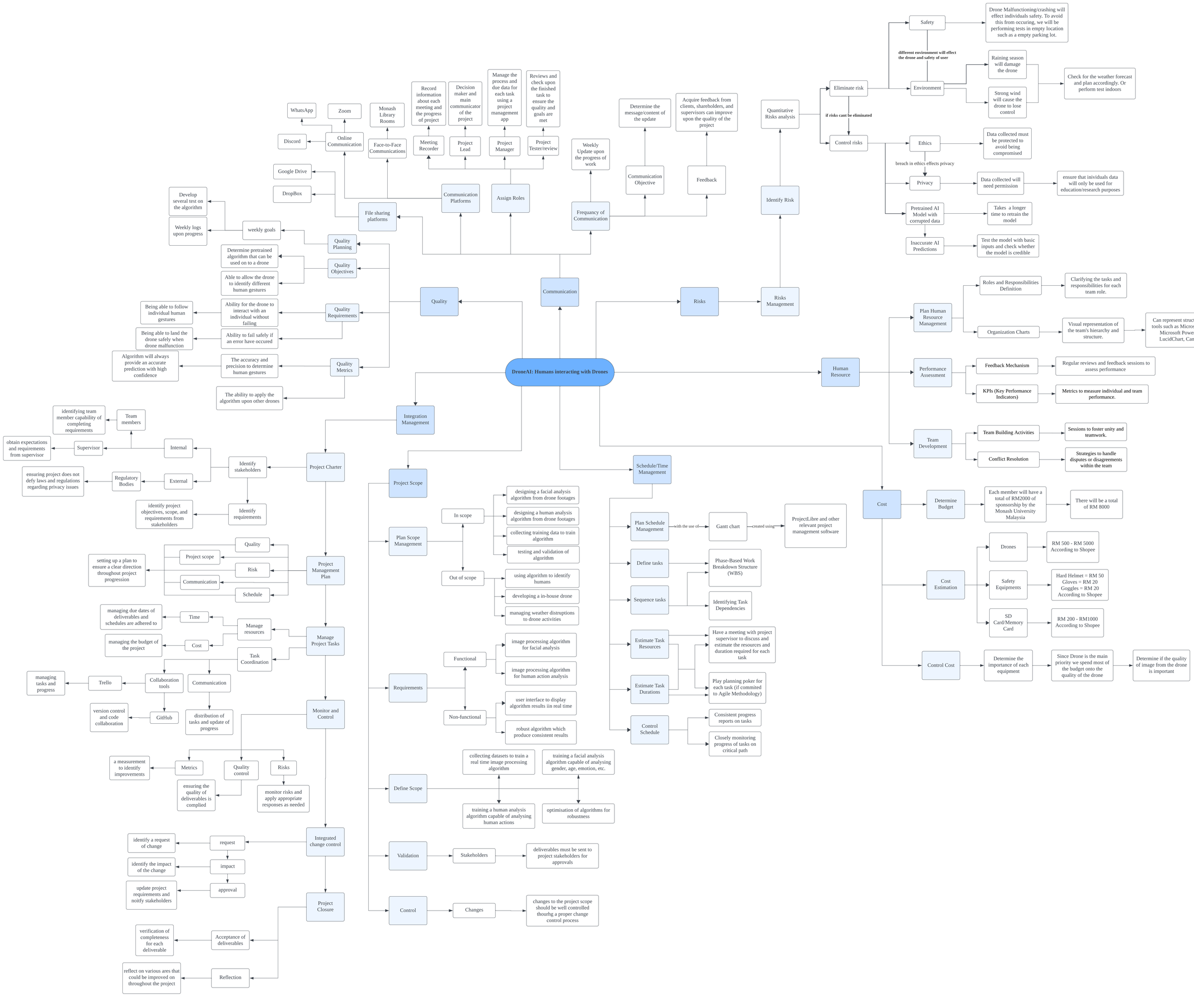
In the ever-evolving landscape of technology, the convergence of artificial intelligence (AI) and drone technology is igniting innovations across various sectors. Drones, or unmanned aerial vehicles (UAVs), fortified with AI algorithms, hold the promise of revolutionising numerous fields through enhanced efficiency and safety. Outfitted with modern sensors, cameras, and microphones, these drones are adept at capturing extensive data, enabling AI to glean deeper insights into human movements, emotions, and behaviours.

This report introduces our team's venture, DroneAI, aimed at refining video analysis techniques tailored for drone-captured visuals. Our objective is to accentuate the understanding of human features and behaviours from a drone's aerial vantage point. By doing so, drones will have the capability to interact with humans more meaningfully, mirroring the symbiotic relationship we share with entities like dragonflies.

The significance of project management cannot be overstated, especially in a venture as intricate as DroneAI. Effective project management is the cornerstone that ensures the alignment of resources, timelines, and objectives, leading to the successful realisation of our vision. To provide a structured overview of our approach, this report utilises a mindmap—a visual representation encapsulating the main concepts and inter-relationships pertinent to the project.

In the ensuing sections, you will discover the critical aspects of our project, the intertwining project management concepts, and an in-depth discussion on project scheduling. We invite you to embark on this journey with us, gaining insights into the potential of DroneAI and the pivotal role of project management in bringing it to fruition.

Section 1.1: Mind Map Diagram



Section 1.2: Explanation of Mind Map Diagram

Communication

Communication management is responsible for planning, executing and monitoring in the process of communication in the project. The management ensures that the information is transferred in a clear, accurate and efficient manner. In the mind map there are 4 different branches of responsibility for communication management. Firstly, a communication platform within the project group must be established as it is the primary location where information is exchanged. There are 2 different modes of communication which are face to face and online communication platforms. Online platforms such as zoom, discord, whatsapp, gmail and facebook/meta messenger will be used. On the other hand, face to face communication are physical destinations such as monash library meeting rooms or lecture halls to be used for discussions. File sharing platforms are also a crucial tool to transfer private files between group members. File sharing platforms such as google drive and dropbox are excellent tools as they provide security features and productivity softwares. The frequency of communication should be established for the project to provide an update about the progress of the project. The objective of the communication must be decided for each update and it must be delivered in a professional manner. Feedback must be received from each individual to improve the quality and requirements of the project.

Risks

Risks are negative events and situations that can occur anytime during the project. These quantitative risk assessments should be performed before the project to prepare for unforeseen events. The first step of all quantitative risk assessments is to identify all the potential risks that might occur during the project. Risk such as environmental effects, low finance, ethical constraints, software/hardware malfunction and many more. These risks should be defined into two separate groups, risk that can be prevented and risk that can be mitigated. All these risks should have different plans of action to follow, to minimise the impact upon the project.

Quality

Quality management is a procedure that ensures that the overall quality and expectation of the product are met. The definition of quality for the project will constantly improve throughout the project to ensure the product is constantly improving. Quality objectives must be instantiated before the project to set a minimal requirement for the final product. If the minimal requirement was achieved before the set date, then the objective can be updated to a better requirement. The quality requirement needs to be decided by the project manager, as they communicate with the stakeholders/supervisors about their expectations and quality of the final product. If the goal is unrealistic, the project manager will lower the standard that is possible within the time frame. Quality metrics should be provided to the project manager, to demonstrate the current quality and progress of the project.

Cost

Cost management is essential for every project as it is the main process that is keeping the project alive. Cost management allocates appropriate financial resources towards different parts of the project. It determines all equipment and resources that are needed and ranks them based on their importance in the project. After that, the price of each equipment with different specifications will be listed out. Using the list, the equipment will be chosen based on the project requirement. For example, the quality of the drone camera should be high when dealing with facial expression. On the other hand, the quality of the drone camera can be lower when dealing with human gestures.

Integration Management

Integration management is the strategic coordination of various different components in a project to ensure a smooth and seamless execution of the project. The various components include creating the project charter at the start of the project where we have to identify the stakeholders and requirements of the project. Integrating the planning phase of the project involves designing a blueprint of tasks, resources and timelines. It is crucial for good communication and coordination within the team to execute the tasks. Hence, collaboration tools such as Git and project management softwares will be very useful to us. Monitoring and controlling the direction of the team as well as the progress will allow us to manage our risks and quality better by using different metrics to measure the progress of the team. When integrating various areas of the project, it is essential for us to be prepared for changes. Having a proper protocol of requesting a change, identifying the impact of it and deciding to proceed with the change will allow us to be well prepared for any changes. Lastly, integration of the closure of the project is necessary to ensure the deliverables are complete to the requirements and to reflect upon the different hiccups throughout the project where it could have been improved upon.

Project Scope

Project scope defines the objectives of a project. It is important to outline the tasks which should and should not be accomplished which are the “in scope” and “out of scope” tasks. For our project, the in-scope tasks are to create a facial and human analysis algorithm through a drone live video feed. On the other hand, an example of an out of scope task would be to develop a drone and instead we should focus on existing commercial drones. In the project scope, we identify requirements of our project, both functional and non-functional requirements. This scope should be validated by our stakeholders to ensure that everyone is well aligned in the project objectives. Changes to a project scope might be inevitable and a proper scope change process should be adhered to where all stakeholders and documentations are updated.

Project Schedule

Project schedule management is pivotal in ensuring that a project is completed on time and the first thing to establish is the method in which we manage our schedule. Our team has chosen to use a Gantt chart, created using softwares such as ProjectLibre, to handle the project schedule. To produce a Gantt chart, we first need to identify and sequence project

tasks with reference to a comprehensive work breakdown structure (WBS) and pin down each task's dependencies. We can then proceed to estimate each task's resources and durations by researching papers and meeting with the project supervisor. As a result, we now have a logical sequence of tasks to be completed, visualised by a Gantt chart which should be controlled with the help of progress reports on tasks and paying close attention to the progress of tasks in the critical path of the Gantt chart.

Human Resource

Human Resource ensures everyone knows their role and works well together.Within the Plan Human Resource Management branch, delineating Roles and Responsibilities provides clarity to team members about their duties, streamlining tasks and fostering accountability. Organization Charts, crafted using tools like Microsoft Excel or LucidChart, lay out the team's hierarchy, ensuring a clear line of communication and responsibility. Performance Assessment is about checking how the team is doing. Feedback Mechanisms are put in place to have a regular check on performance. These mechanisms aren’t just top-down; they encourage feedback from all levels, ensuring a holistic view of performance and areas of improvement. But a project isn't just about tasks and outcomes; it's about people. The Team Development branch emphasises the human aspect. Through Team Building Activities, members get to understand, trust, and rely on each other better. These activities aren't just fun; they are designed to build a cohesive unit that can communicate effectively and work synergistically. But, like any human endeavour, conflicts can arise. The Conflict Resolution strategy is not about avoiding conflicts but addressing them in a manner that they lead to growth, understanding, and better collaboration. It promotes a culture where disagreements are seen as opportunities for dialogue and improvement rather than impediments. In essence, the Human Resource branch doesn't just view team members as resources but as vital assets, ensuring that they are well-equipped, well-understood, and well-integrated into the project's journey from inception to completion.

Section 2: Short Essay on Project Scheduling

A project schedule can be defined as a timeline that highlights the sequence of tasks or activities that need to be addressed in order to complete a project. As a result, project schedules play a pivotal role in project management and scheduling issues are one of, if not the main reason why projects derail from their original vision as time lost from these conflicts cannot be recovered. Thus, we are only able to adjust the other two constraints of project management which are by reducing the project scope and/or increasing cost to ensure the project is completed within the specified timeframe.

We can start creating a project schedule by first eliciting the project requirements by communicating with stakeholders and in the case of DroneAI, our project topic, this would be our project supervisor, Professor Raphaël Phan. With a clear understanding of our project requirements, we are able to define our project scope which would serve the basis of our Phase-Based Work Breakdown Structure (WBS), where the scope of the project is broken down into smaller, manageable tasks and activities that covers all of the work required to ensure the completion of the project.

Each task that has been identified is then sequenced by first identifying the task dependency relations of each task. There are 4 types of relations which are finish to start (FS), start to start (SS), finish to finish (FF) and start to finish (SF). For example, when given two tasks, Task A and B, an FS relation is specified when Task B can only start when Task A has completed. If Task B can only start when Task A has started, this is describing an SS relation whereas if Task B can only finish when Task A has finished, this is an FF relation. Lastly, an SF relationship is present when Task B can finish only when Task A has started. Based on Table 1, tasks such as researching papers on various techniques of human/facial analysis of drone camera images/videos has to be finished first before starting the task of preparing a literature review for the project proposal which describes the FS relationship between those two specified tasks. On the other hand, we can start the task of developing an advanced technique based on industry standard computer vision algorithms only after we have started on familiarising ourselves with those algorithms beforehand leading to a SS relationship between the two tasks.

Hence, with the order and task dependencies identified, we only need to estimate the duration of each task to create a logical sequence of tasks to be completed. This sequence can then be represented as a timeline in the form of a gantt chart to visually represent the project schedule that shows tasks, durations and dependencies as well as defining the critical path which helps us determine the shortest time the project can be completed by.

There are many other key factors that can affect the scheduling in a project that involves the use of drones. One of the main factors being the resources required to complete a specified task which affects when a task can be executed. For instance, the testing phase of our drone project on human/facial analysis can only be conducted when we have access to drones and the majority of the team present on site. On the other hand, unexpected risks have the potential to disrupt the project schedule and should have contingency plans in place to

address these issues. For example, the availability and maintenance of drones can drastically affect scheduling as it is pivotal in the testing phase of our DroneAI project.

The management of the project schedule is just as important as the creation of it. We plan to continuously track the advancement of tasks in comparison to the project schedule. We are able to do this by using frequent progress reports on tasks and revising the gantt chart to include any alterations that need to be made based on those reports.