

COG366 Project Task 4 - Literature Research

Our belief revision problem is task prioritization. There has been a few research done on this and each with their own prioritization method. One of the prioritization methods mentioned was dependent on the variable thresholds, and the values of the task (Parasuraman & Rovira, 2005). In a research done by Parasuraman and Rovira, they mention something called the improved performance research integration tool (IMPRINT), which was a network modeling tool that was designed to help evaluate actions of human users and system technologies. The point of that research was to improve IMPRINT and one of the improvements they suggested was task prioritization, so we could look at how they did that. They refer to task as higher priority tasks and lower priority tasks, which allows them to determine which task they will allocate their resources to before the others. In this study time deadline was also a part of the factors that was taken into account, which is something we are considering for our project.

Table 2. Task management activities (adapted from Funk 1991; as described in Funk et al., 1996, pp 308-309).

Activity Component	Description
Task Initiation	The initiation of tasks when appropriate conditions exist.
Task Monitoring	The assessment of task progress and status.
Task Prioritization	The assignment of priorities to tasks relative to their importance and urgency for the safe operation of the mission.
Resource Allocation	The assignment of human and machine resources to tasks so that they may be completed.
Task Interruption	The temporary suspension of lower priority tasks so that resources may be allocated to higher priority tasks.
Task Resumption	The resumption of interrupted tasks when priorities change or resources become available.
Task Termination	The termination of tasks that have been completed, that cannot be completed, or that are no longer relevant.

This is a table taken from that study and this may help us with our project. We can tweak the activity components a little. For example the task monitoring will only be limited to incomplete or complete and does not include half finished or such since we are going to only start a task that we can finish. Multitasking is too much work! Task prioritization will definitely be the most important component. We have to find a method that

we will and stick to to determine how we will prioritize our tasks. Since everyone has different priorities, it's best if we assume a priority that's consistent. Resource allocation in our project will be only the time we spend on each task since we are only modelling an individual person and their task. We will not include task interruption since we will not be dealing with partially finished tasks. Same for task resumption. Task termination will be useful to determine a task is completed and remove it from our list of tasks, or our knowledge base.

Another research that might be useful was a study done by Rhodes and others (2019), which focused on memory storage and prioritizing tasks. They mention something about competing for attention, and task prioritization in another word is basically just that. Depending on the values that we set as our priority, we will determine which task to give our attention and time to. In the study, the way they chose which task to prioritize was by manipulating the difficulty of each task. Difficulty will be used in our project as well. The study mentioned something interesting that we did not previously think about, prioritization cost and concurrent cost. Concurrent costs might not be included in our project since we will stick to only being able to process and do one task at a time. Prioritization cost might be important to our project but it probably will not be used and defined the same way it was in that study. We define prioritization in this project to be doing tasks in a certain order to ensure that we are doing the best and maximizing our time and product, given a limited amount of time and resources. So our prioritization cost can be time and the number of remaining tasks.

Currently the only given resource in our project is time. Time is what we will trade for completion of tasks. We might also want to consider having a certain amount of time per day since time per day is not infinite and one can only spend certain amount of time on some tasks. According to Google, college students should spend thirty hours studying a week. So we may use this as our limit per week. So maybe 4-6 hours per day seems fair. The difficult part of our project is determining the difficulties of each task and the deadline. We

might try to mimic the tasks we have in real life and also the time allocated by the professor for that certain task.

References

Parasuraman, R., & Rovira, E. (2005). Workload Modeling and Workload Management: Recent theoretical developments. <https://doi.org/10.21236/ada432181>

Rhodes, S., Jaroslawska, A. J., Doherty, J. M., Belletier, C., Naveh-Benjamin, M., Cowan, N., Camos, V., Barrouillet, P., & Logie, R. H. (2019). Storage and processing in working memory: Assessing dual-task performance and task prioritization across the adult lifespan. *Journal of Experimental Psychology: General*, 148(7), 1204–1227. <https://doi.org/10.1037/xge0000539>