

Virtual Project Management Web App

Prototype Project Report

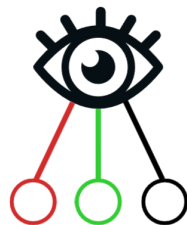
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I. Introduction

This document provides details regarding the Virtual Project Management Web Application developed by The Visualizers. It provides an overview of the project, including features and goals. It also describes the rationale behind Visual Project Management. The document also provides an overview of the requirements and use cases for the web application.

I.1. Project Introduction

The Visualizers have been asked to create a project management application for our client, Dr. Holt. This application can be used as a tool by companies, managers, and individuals for tracking their progress on a particular project. The tool will help solve the problem of inefficiency in project management. The creation of such an application requires the implementation of a web application with a front-end web interface and a database in the backend which will be used to determine the progress of the user in the project. The core of the project is the re-creation of the graphical interface which provides a visual representation of the task and project status. The end goal of this project is to provide a new product with improvements to the current solution.

I.2. Background and Related Work

Virtual Project Management is an application that Dr. Holt currently owns [2]. The application serves the purpose of facilitating efficient time management during a project. It has three main features which aid it in fulfilling its purpose. It displays the status of a task based on the input by the user, tells which tasks need to be prioritized based on their life cycle, and aids in determining the right hierarchy of time allocation to follow based on the status of the task. The essence of this application is the graphical user interface which is the visual representation of the project life cycle.

Previously, Dr. Holt built a basic version of the application on a spreadsheet program for demonstrating his idea and once had a mobile application. Over the years, the software transitioned into a web application. The current version of the application is built using obsolete technology, and key security changes are being implemented under the supervision of Scott Mattes, an associate of Dr. Holt. The changes include transitioning from HTTP to the more secure HTTPS, improvements and changes to the graphical interface, and bug fixes. The client suggests that the team create the product in a way that it can be further used for the creation of a mobile application.

Throughout the project, the team is expected to acquire new skill sets such as gaining an understanding of a query language for the management of databases, learning tools similar to GraphJs for developing a graphical user interface, and improving knowledge of UX for a better user interface and user experience.

I.3. Project Overview

Much of the work that people do today is centered around projects [1]. Companies hire project managers to plan and manage projects, and they hire workers to carry out the actual project work. However, sometimes predictions for project timelines are incorrect, resulting in late projects or projects completed too early [1]. According to Dr. Holt, management may have difficulty determining when to start new projects and when to wait for current projects to progress further [1]. The purpose of VPM is to make the process of planning and tracking the

progress of projects easier. One aim of VPM is to provide project managers with a visual representation of whether a project is on track, falling behind, or whether it can be paused to allow other projects to get back on track. VPM strives to help organizations, or anyone who works on projects, become more efficient.

In VPM, projects are represented as a plot on a graph, with the x-axis as the percentage of the project that is completed and the y-axis as the percentage of the buffer consumed. This is known as the Fever Chart. Each project is allocated a 50% buffer to account for errors in the predicted time for the project. A diagonal line is drawn from the lower left corner to the upper right corner; the space below this line is colored green while the space above this line is colored red. Projects in the green zone are on track. Projects in the red zone have used up too much of their buffer for the amount of the project that is completed, and they may need some help in getting back on track. Projects “in the black,” or plotted directly above the red zone on the graph, are projects that will be late.

When the project is in the green zone, the project is on track. If it lands on the diagonal line, it is progressing as expected. Depending on where the project falls in the green zone, resources for the green project may be spared to help projects in the red zone get back on track. When a project is in the red zone, it has consumed too much of its buffer too soon and it is at risk of being late. Depending on where the project falls in the red zone, experts or resources from other projects may be called in to help the project get back on track. Projects in the black zone are projects that will be late. They have used all of their allocated buffers too soon in the project timeline. For these projects, the customer may need to be notified of the problem or the project may need to be canceled.

The desired outcome of the project is a functioning web application that serves as a tool for managing projects according to VPM guidelines. The web app will allow users to create projects and specify the duration, tasks, and other information associated with the project. Projects in the planning stage can be duplicated and edited. When a user starts a project, they will be able to check off tasks that they complete and see a visualization of the project's progress on a colored graph.

Some of the other features of this web application include a graph known as the Multi-Project Fever Chart that shows a plot of all projects currently in progress. The app will feature a prioritized list of the tasks that are not yet completed from all projects. These tasks will be prioritized based on which zone their project is currently in. For example, tasks from a project in the black zone will be prioritized over those from a project in the red zone. Projects can exist in the “In Planning” state, the “In Progress” state, or the “Archive” state.

While these are the most important features to implement in this web application, there are many other features to mention. The web app will need to support the creation of user accounts protected by passwords as well as the ability for a user to become part of an organization. Users should be warned when different projects enter, for example, the red zone, and require attention. While this describes the basic functionality of the app, many other features will be described in detail later on. A web application created under these guidelines and with these features should help make project management easier and more efficient for its users.

I.4. Client and Stakeholder Identification and Preferences

Our client is Washington State University's Engineering and Technology Management (ETM) program, and Dr. James Holt is our primary contact for the project. Scott Mattes is also involved in the project and is a programmer brought in by Dr. Holt to help with the development of the

current version of the VPM website. Our instructor, Ananth Jillepalli, will be our mentor throughout this project. The VPM website is open and free for anyone to use.

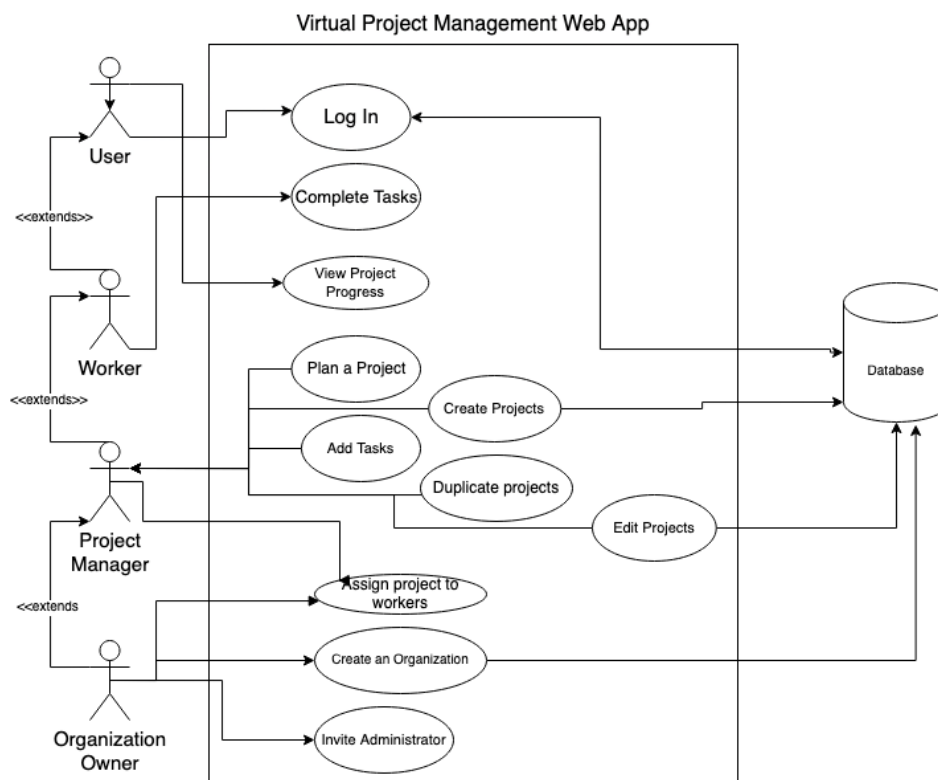
For this project, Dr. Holt requests the development of a web application for VPM. This web app will help users visualize whether a project is on track to finish on time before the due date. As described above, we will be implementing the main features of VPM, including the presentation of a project in progress through a graph showing the Project Percent Complete versus Percent Project Buffer Consumed. This graph will be displayed with information on whether a project is on time (green) or behind the initially assigned due date (red). Furthermore, there is a Multi-Project Fever Chart to keep track of many projects' timelines in one graph.

Another important use of VPM is to prioritize the list of uncompleted tasks. This ensures the uncompleted tasks in the black zone (where the buffer consumed 100%) will always appear above tasks in the red and green zones. For the programming language, the client does not have a preference and requests that the most suitable tools be used for the project. The client also suggests the use of tools that make for an easier transition to a possible mobile app version in the future.

VPM aims to aid people in visualizing project progress and ensure that they are on track to finish them on time. The current product is not ready to be fully used on the web or mobile devices as there are bugs and some features are yet to be implemented. As a result, the product will need to be fixed and packed with more features to give users a complete and satisfying experience.

II. System Requirements Specification

II.1. Use Cases



Story: As a project manager, I want to manage project(s) so that I can keep track of the progress and supervise the workers.

Criteria:

- Users should be able to create and login into their accounts.
- Able to create project(s).
- Can duplicate project(s) once a project is created.
- Assign to workers in projects.
- Keep track of the progress of the tasks created and assigned to workers.
- Able to access all features of workers.
- Can extend or shorten the due date of the project.

Story: As a worker, I want to see my tasks that are assigned to me so that I can have an understanding of my part in project(s).

Criteria:

- Users should be able to create and login into their accounts.
- Should be able to see tasks they are assigned to in project(s).
- They can mark their tasks completed or not completed.
- Can access multiple projects if they are under various projects.

Story: As the owner of the organization, I would like to see the overall situation on all projects and the information about them so that I can know what are the progresses in the company.

Criteria:

- Users should be able to create and login into their accounts.
- They can see all of the progress of the subprojects for the overall project.
- Able to access all of the information on a project.
- They can cancel or delay the subprojects of a project.
- They can assign project managers to subprojects.
- They can access all the features of both project managers and workers.
- They should be able to invite administrators with privileges as the owner.

II.2. Functional Requirements

II.2.1. Project Tracking

Fever Chart: The system needs to plot the Percent Complete versus the Percent Buffer Consumed on a line graph for a project that is in progress. The system also plots the “last known task completion” for each current project on a Multi-Project Fever Chart with labels.

Source: Dr. Holt originated this requirement and the requirement is necessary for users to view the progress of their projects.

Priority: Priority Level 0: Essential and required functionality

Prioritization of Tasks: The system must prioritize the list of tasks associated with each project. The tasks are prioritized first by the project status (black, red, or green), then by the expected task start date. Projects in the black zone should be prioritized over projects in the red and green zones.

Source: Dr. Holt originated this requirement and the requirement is necessary for users to view which tasks are currently most important in each of their projects.

Priority: Priority Level 0: Essential and required functionality

View Project Status: An authorized user must be able to view new projects (“in planning” stage), started projects (“in progress” stage), and archived projects (“archived” stage). The user must be also able to access projects in each stage and move projects between these stages.

Source: Dr. Holt originated this requirement and the requirement is necessary for users to view the status of their projects.

Priority: Priority Level 0: Essential and required functionality

II.2.2. Project Planning

Creating and Editing Projects: The system needs to allow Project Managers (or authorized users) to create, edit, and duplicate projects. A unique identifier must be created for each project. Projects should be created with at least one task.

Source: Dr. Holt originated this requirement and the requirement is necessary for the app to function and for the user to track their projects.

Priority: Priority Level 0: Essential and required functionality

Adding Tasks: The system needs to allow an authorized user to add tasks to a project. A unique identifier must be created for each task, and an estimated, aggressive time for completion should be assigned to the task. Tasks should also have a name and a description. Tasks may be assigned to specific workers.

Source: Dr. Holt originated this requirement and the requirement is necessary for calculating the progress of the project and plotting it on the Fever Chart.

Priority: Priority Level 0: Essential and required functionality

II.2.3. Authentication

User Accounts: The system must allow users to create an account with a login email and a password. The user will have the option to create and be the owner of an organization.

Source: Dr. Holt originated this requirement and the requirement is necessary for a user to view projects in their organization or projects that they own.

Priority: Priority Level 0: Essential and required functionality

Organizations: The system must be able to keep track of organizations created by users. An organization will own projects and share projects to members of the organization. Organizations will also have data items associated with it, including a name, address, phone number, etc.

Source: Dr. Holt originated this requirement and the requirement is necessary for projects to be shared across multiple users’ accounts.

Priority: Priority Level 1: Desirable functionality

User Roles: The system must allow users to have different roles in an organization. Every user in an organization is a Worker. The Owner is the user that created the organization. Owners can assign Administrators, Project Managers, Resource Managers, or other Workers, all with varying levels of access to all the features of the app.

Source: Dr. Holt originated this requirement and the requirement is necessary for controlling user access to certain features and resources.

Priority: Priority Level 1: Desirable functionality

II.2.4. Project Data Storage

Current Projects: The system must be able to show the user the projects that are currently in planning or in progress and their related tasks. This data must be stored persistently.

Source: Dr. Holt originated this requirement and the requirement is necessary for project data to be saved and accessed across different user accounts or sessions.

Priority: Priority Level 0: Essential and required functionality

Archived Projects: The user must be able to archive projects and view projects that they have archived. These projects must be stored persistently and retain all necessary information concerning the project, including the tasks within the project, the time it took for the project tasks to be completed, and the overall Fever Chart for the individual project.

Source: Dr. Holt originated this requirement and the requirement is necessary for users to retain and view their past project data across different sessions.

Priority: Priority Level 1: Desirable functionality

II.2.5. Project Optimization

Predecessor Tasks: Allow tasks within a project to be completed in any order. Allow some tasks to be specified as a “Firm Predecessor” to other tasks.

Source: Dr. Holt originated this requirement and the requirement is necessary for tasks to be completed in the correct order or prioritized correctly.

Priority: Priority Level 2: Extra Features or Stretch Goals

Sub-Projects: Allow a more complicated project to have sub-projects that show parallel paths of tasks that can be done at the same time as the project.

Source: Dr. Holt originated this requirement and the requirement is necessary for tasks to be prioritized correctly.

Priority: Priority Level 2: Extra Features or Stretch Goals

Warnings: The system will alert a user when a project is entering the black or red zones.

Source: Dr. Holt originated this requirement and the requirement is necessary for teams to track their progress and ensure they are managing their time well.

Priority: Priority Level 2: Extra Features or Stretch Goals

II.3. Non-Functional Requirements

Performance and scalability:

The software should be able to function properly even in the case of a large input and multiple sub-tasks.

Reusability:

It needs to be designed in such a way so that in the future it can be used to create a mobile application and be able to keep up with advancements in technology.

Security:

The security of the servers needs to be increased which will be performed by upgrading the existing module from HTTP to more secure HTTPS.

Portability:

The software needs to be designed in such a way that it is able to work across various operating systems in the future.

Maintainability and Manageability:

The software needs to be designed using object-oriented principles and using appropriate naming conventions such that engineers can understand it and it is easy to maintain the software in the future.

Easy to use:

The software needs to be designed in a way that it can be used by anyone who does not have a specialization in the field.

Reliability:

The software needs to be highly reliable as the nature of its function can be very sensitive to organizations and users for appropriate planning and managing deadlines.

II.4. System Evolution

Critical chain project management is the core on which our software is based. The first task our team is focused on is the development of the VPM graph which gives a visual representation of the project status. The graph needs to be developed in a way that multiple tasks and higher workloads are computed with adequate speed, performance, and scalability. The current VPM application is based on HTTP protocol and requires a transition to more secure HTTPS, but in future even more secure protocols might be available and the project will therefore be created in a way that most of the components of the code are reusable. In addition the product needs to be created in a way that it can have utility ranging from a web-app to a multiple OS application. Furthermore, with advancements in technology and methods the VPM model we are creating might need future updates, therefore it needs to be created with the flexibility of adding new attributes so that it is prone to future updates.

III. Glossary

VPM: Visual Project Management

ETM: Engineering and Technology Management

UX: User Experience

UI: User Interface

HTTP: Hypertext Transfer Protocol

HTTPS: Hypertext Transfer Protocol Secure

IV. References

[1] Holt, Dr. James, WSU Academic Outreach and Innovation - AOI. Visual Project Management by Dr. James Holt. (Apr. 13, 2012). Accessed: Sep. 20, 2022. [Online Video]. Available: <https://youtu.be/DPFTJayYrnk>.

[2] J. Holt. "In Progress." Visual Project Management. <https://www.visualprojmngmt.com> (accessed Sep. 20, 2022).