

Engineering Design - GNG 1103 [C]

Project Deliverable E
VR/AR for Recycling

Professor M. Majeed

Section C03 – Group 11

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Abstract

This deliverable will distribute the tasks that are required to be completed among the team members. The tasks are also differentiated and grouped into categories from mandatory tasks to optional bonus tasks that will improve the overall app. The estimated time required for each task to be completed is also determined and listed. A risk management analysis is performed and the risk type, probability of occurring, level of impact and the appropriate contingency plan is established. Finally, a cost analysis on the list of required items is also performed.

Introduction

The project team has been researching and developing an app design to increase household recycling and correct general recycling habits and assumptions for the client, Mitch Bouchard. The team has completed a debriefing with the client and gained the client's approval for the proposed design. He liked many of the proposed ideas and was very eager for the prototyping to begin. However, before commencing any prototyping, a cost and a time analysis must be performed to ensure that the design will meet the budget and deadline.

The proposed design was very ambitious since it incorporated almost every idea that the group thought up. The multitude of features allows for the design to meet all of the clients needs: user friendly, accessible, accurate, and functional, along with other less important desires like education. However, the project is expected to be completed by early April. With only a little over a month to complete the design, the tasks must be assigned efficiently and to those with the most expertise. Similarly, since time and coding ability are large restraints, a risk assessment must also be considered and ways to manage these constraints must also be considered, along with contingency plans if these liabilities occur.

This deliverable will explore the logistics of the proposed design. It will first assign tasks to members of the group and create an estimated timeline. The deliverable will then analyze the different risks that the team may encounter when creating the prototypes and final product, and then provide ways to minimize and deal with these risks. Finally, a cost analysis will be performed where it will list the costs associated with the design and compare it with the budget for the project.

Task Assignment

Table 1: User Interface Tasks

Task	Assigned Member	Estimated time	Dependent
Creating Screen Layout (User Interface)	Adam	2 Days	None
Developing finger Swipe Page Change (User Interface)	Adam	2 Days	Creating Screen Layout
Implementing Finger Swipe Page Change (User Interface)	Adam	1 Day	Developing Finger Swipe Page Change

Table 2: AR Sorting Tasks

Task	Assigned Member	Expected Duration	Dependency
Implement Bar Code Scanner Asset	Sam	1 Day	None
Create or Acquire Bar Code Database	Sam	5 Days	None

Set Up Vuforia or Other Unity AR Plugin	Sam	2 Days	None
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Table 3: Manual Sorting Tasks

Task	Assigned Member	Expected Duration	Dependency
Design Flow Diagram	Laura	2 Days	None
Create Recycling Database	Sam	2 Days	Bar Code Database Creation
Database Information Retrieval	Laura	2 Days	Creation of Databases
Develop Search Bar	Laura	2 Days	Creation of Recycling Database
Designing Manuel Sorting Page Layout	Adam	2 Days	None
Creating Manuel Sorting Page	Laura	2 Days	Manuel Sorting Page Layout and Completion of User Interface Tasks

Table 4: Social Tasks

Task	Assigned Member	Expected Duration	Dependency
Create User Database	Hongdi	2 Day	None
Create Unique Accounts	Hongdi	1 Day	User Database
Differentiate Between Users	Hongdi	2 Days	None
Implement QR Code Generator to Add Friends	Sam	3 Days	User Database
Create Recycling Points System	Hongdi	1 Days	Recycling Database
Create Leaderboard	Hongdi	3 Days	User Database

Table 5: Website Tasks

Task	Assigned Member	Expected Duration	Dependency
Website Layout	Seonaid	2 Days	None
Website Accessing Mobile Databases	Seonaid	3 Days	Completion of Databases Used in the App
Website-App Cross-Compatibility	Laura	3 Days	Completion of the App

Table 6: Other Tasks

Task	Assigned Member	Expected Duration	Dependency
Education Page Layout (Education)	Adam	1 Day	User Interface
Find Articles and News Related to Recycling (Education)	Seonaid	1 Day	None
Error Checking	Everyone	5 Days	Completion of App
Game Development (Games)	Everyone	3 Weeks/Game	Optional Upon Completion of Other Tasks

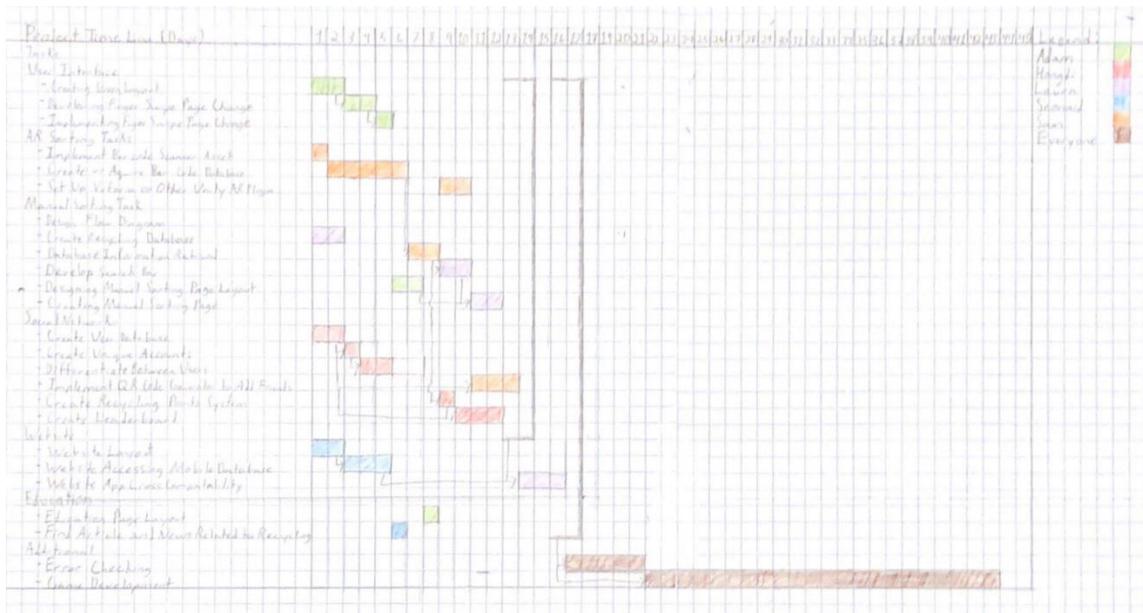


Figure 1: Gantt Chart

Risk Management

When developing a project, it is always important to consider the risks involved to determine how the team should manage each task. Depending on how a risk is handled, it can either prove to be easily managed, or it can completely derail the entire project. To avoid the latter, risks should be assessed early in the development process and should be paired with contingency plans. The best risks to take, if any should be taken at all, are those with a low probability of failure with a large payout when successful. Additionally, risks with a high chance of failure and few benefits should be avoided completely. The following table evaluates certain risks involved in the project, compares its probability of occurrence to its impact on the project, and provides a course of action in the case that the issue occurs.

Table 7: Risk Evaluation and Contingency Planning

Risks	Probability	Impact	Contingency Plan
Inexperience in Coding	High	High	Focus on a single sorting method, ensure the app has some form of working code to meet the functional criteria. Also, make sure that all code is formatted with comments and clearly defined variables so others can follow along and provide help.
Team Conflict	Very Low	High	Host a meeting, explore each side of the argument, come to a compromise, and develop an agreeable plan for the team to follow. If a compromise is unable to occur, majority vote will be used.
A planned feature will not be completed	Moderate	Moderate	Organize features in order of importance. If time remains, work on less significant features to boost the app's functionality.
Loss of data and work	Low	Very High	Save data to multiple/external sources frequently. The less data lost over a smaller time period, the better.
Loss of available work time	High	High	Set aside several hours every week dedicated to working on the app.

- Inexperience in Coding:
 - Each member is unfamiliar with coding as all members are in the Chemical Engineering program. Those with some to little experience in coding will work together to code in unity. Other members unfamiliar or uncomfortable with coding will work on the app design and interface.

- Team Conflict:
 - Through previous group deliverables and the team dynamics report, the team discovered that they work well together and most, if not all conflicts, are resolved quickly and seamlessly. The team has discussed that should more conflicts arise, egos should be set aside, and compromises should be the goal of conflict management.

- Uncompleted feature:
 - The team has already evaluated the most important aspects of the app that need to be done. The work process will involve completing the features that meet the functional criteria first, then working on features that are not as essential to the app, such as education and games. All focus will be put on the functional criteria first and foremost. These include the user interface and sorting mechanics, with significance on social features.

- Loss of data and work:
 - Though unlikely, problems may still arise where many lines of code or interface designs were not saved properly or were accidentally deleted. Frequent saves to external sources (i.e. USB, Hard Drive, GitHub) should mitigate these issues.
- Loss of available work time:
 - Each member has multiple other classes to attend and study for, limiting the time for project work as the semester continues. Several hours during the week should be set aside to ensure that the project advances. Team members should not compromise their duties to other classes but should also not abandon their teammates and responsibilities to this group.

Cost Assessment

Table 8: Cost Assessment

Item Name	Purpose	Price
Friendly & Clean UI	Make user interface look clean and friendly	\$9
Complete Account with Database	Assist in coding in Unity	\$17.49
AR Throwing: Augmented Reality — AR Throw Ball, AR Throw Weapon — AR Toss	Make AR recycling game that involves throwing recyclables in the recycle bins	\$20.02
QR/Code Reader and Generator--Cross Platform	Read QR codes for AR scanner	\$15
Versatile Game Sound Effects	Sound effects for recycling games	Free
Free Sound Effects Pack	General sound effects for the app	Free
Lean GUI	Make user interface look clean and friendly	Free
GitHub for Unity	Assist in coding in Unity	Free
	Total Price:	\$61.51

Conclusion

In this deliverable, the future of the project is planned out and assessed to ensure the completion and preparation for Design Day. The project was separated into smaller tasks to show a clearer picture of the project and they were then allocated to various members of the team to distribute the work evenly. A risk assessment was also performed, and contingency plans were put in place for each risk to ensure that the project could stay on schedule. Lastly, a cost analysis was performed with a bill of materials, which shows the total cost of the project being \$61.51 of the budget of \$100 for the project. With these plans and assessments, the application and website will be complete on time for the final presentation.