ACM PROJECTS REPORT

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INTRODUCTION

WHAT IS ACM PROJECTS?

ACM Projects is a semester guided project for those new to software development and wanting to get a better feel of software engineering principles. In ACM Projects, participants work in teams to build a large-scale project while being guided by mentors and industry professionals. There are 5 build nights in which all the teams and mentors meet at 1 place to work on their projects while explaining their projects to industry professionals. Then, there is a presentation night in which all the teams dress in business casual outfit and present their projects to 3 judges and all the other participants in ACM Projects. Once the presentations are finished, the judges will announce who the winner is.

OBJECTIVE

Create an augmented reality application using the Unity game engine.

SUMMARY

For ACM Projects, my 4 teammates and I made a single application composed of different augmented reality games that we created. Next, we presented our finished application to 3 judges and to the rest of the participants on presentation night. As a result, the 3 judges announced my team and I as winners of ACM Projects competition because of our project's originality and potential to be expanded for business purposes. Thanks to the teamwork and challenges, I am now adaptable and capable of working in a team to develop software using new technologies and Agile Scrum methodology.

PRINCIPLE AND TECHNOLOGIES USED

- **Software Engineering Principle:** Agile Scrum
- **Programming Language:** C#
- **Version-Control:** Git
- **Game Engine:** Unity
- **Software Development Kit:** Vuforia

EVENTS

BUILD NIGHT 1

When I met with my team, we introduced ourselves and started brainstorming ideas on how to create our augmented reality application. Eventually, we decided that each of us will create our own game in augmented reality so that we can merge them all into a single application. This is when I decided to make a model switcher game, where users can see the unique animations of 3-D models. Finally, we learned how to use Git for sharing our projects on GitHub.

BUILD NIGHT 2

We reported our progress and reviewed each other's game to fix any bugs and suggest improvements. After the review, we worked on improving our games based on feedbacks. In addition, we organized additional weekend meetings to set deadlines, communicate our progress, and improve our games further. Game improvements include changing the requirements, such as replacing, removing, and adding models and features. When improvements are made, we uploaded our games to GitHub using Git for the rest of us to see.

BUILD NIGHT 3

We did the same thing in Build Night 2; we told each other about what each of us did so far, provided comments, and improved our games based on those comments.

BUILD NIGHT 4

We did the usual but this time, we planned on how to make our presentation slides for presentation night.

BUILD NIGHT 5

For this last build night, 2 of my team members were making the presentation slides, the other 2 were finishing up their games, and I assisted in both.

PRESENTATION

Because of time constraints and the different Unity versions used, we cut 2 games from the presentation and merged the remaining games into a single application. As the last team to present, we finally presented our finished project to 3 judges, all the other mentors, and the rest of the teams in ACM Projects. During our presentation, we went over the slides, gave a short demonstration of our project, and answered questions. Click here to see our presentation slides.

RESULT

After the presentation, the judges announced my team and I as winners of ACM Projects because our project is original and has the potential to be expanded for business purposes. The judges also liked the direction we were going in with the project. As a reward, each of us received a Google Home Mini.

MODEL SWITCHER

BACKGROUND

As part of a collaborative project, I created the Model Switcher game that was originally intended to be merged with the others. However, this was cut from the presentation because presentation was starting soon, and one of my team members was using a different Unity version to merge the games.

MODELS

- **President**
  Users can use the joystick to move the President around.
- **Knight**
  Users can tap on the screen once the knight appears to see the knight slash his sword.
- **Slime and Dinosaur**
  Users can tap on the left buttons to play the unique animations.

FUNCTION

This application displays the unique animations of the President, slime, knight, and dinosaur on a $1 bill when the 3-D models are triggered to show up in augmented reality.

HOW TO RUN

See README.md in my GitHub repository.

NOTES

- Only a flat $1 bill can make the models appear. If the $1 bill is crumpled up, roll it in the opposite direction that the bill is crumpled towards to flatten it.
- If the $1 bill is flattened and the desired model is still not appearing on the bill, press the button of that model on the right to ensure that you are on the scene for displaying that desired model. If this still does not work, adjust the position and angle of your phone t o be close enough to the bill.

CONCLUSION

CHALLENGES

With no prior experience in augmented reality and C#, it was challenging for me to configure Unity for augmented reality, make models appear in augmented reality, and program their behaviors in C#. However, I overcame this by using online resources, such as YouTube videos, stackoverflow, and Unity forums. The internet helped me understand how to write C# scripts to make the 3-D models move the way I want them to, how to make these models appear in augmented reality with a triggering object, and how to use Unity for augmented reality.

WHAT I LEARNED

Thanks to collaboration, I am an adaptable person and a team player with a better feel for the Agile Scrum methodology. Because of extensive researching for making my model switcher game work, I also know how to setup Unity for developing augmented reality applications, how to write C# scripts to make models move in a certain way, and how to make the models appear in augmented reality with a triggering object.