Serious gaming

Final Report

This document is the final report on the image recognition through gamification project

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Introduction

The following document is to provide the results of the serious gaming project developed as part of the Honours Bachelor of Science degree in Software Development developed between October 2016 and March 2016.

The project was for the development of a new piece of software using the two concepts of serious gaming and gamification. This project was a time consuming tasks that presented many difficult challenges to overcome.

The game will be use to register car licence plate that computer cannot register by standard software which creates a time consuming process to check, the aim of this project was to create a application to do this in an easy way by turning the process of determining the images into a simple and fun game by using gamification.

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Project Description

Serious gaming / Gamification

There are two main concepts that that the project was revolved around for the creation of the car registration game, these concepts are "Serious gaming" and "Gamification", these new concepts are need to create an entertaining application and used in the creation of the new software the project

What is Serious Game?

"Serious gaming describes a technology that can educate and train while entertaining users" [1]. Serious Gaming is the combination of an enjoyable game that also can teach valuable lessons such as new languages, skills or allow for the progress of work in an enjoyable way this is why they are considered learning games.

A serious game is a term that can be applied initiative that has at its core an additional agenda these agendas can include training and development of topics. Serious gaming are able to helps highly motivate and develop employee's skills this is can be necessary as these maybe the skill that can make the difference between a company that succeeds and one that fails. [2]

A serious game helps to teach or reinforce a skill through a game and story, one example of serious gaming is maths blaster this is an educational game used to teach and reinforce the knowledge learned during a maths class by children in primary education by creating a fun way for them to keep learning and improve upon their skills.

What is Gamification?

Gamification is the use of game elements, design and techniques in non-game contexts to encourage participation and engagement but also to motivate and excite people, but note that it is not a learning game or a simulation.

Gamification is about taking the effect of an existing core experience and making it better by applying the game mechanics and techniques, these are what make so many games engaging and fun to play. [3]

An example of gamification can be seen through websites such as "Chore Wars" were children create Dungeons and Dragons (D&D) based characters where they are given tasks (chores) to complete receiving EXP upon completing the tasks (household chores),, this makes tasks children would not normally do but with added rewards are egger to do their chores. [4]

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Application Description

As described earlier the project was for the development of a new piece of software based on the concept of serious gaming and gamification. The application is a native Android application that communicates with a PHP backend and mySQL database.

The application was build to take time consuming tasks based on filling out simple details and turn it into an application using gamification which would allow users of the system to do the following things.

- Register/ login with the system
- Play a game
  - Enter the details of a of an undefined image
  - Receive points for entering in a value for a given image
- View player details
- Edit player details
- View and purchase rewards from a given list

The application works by asking the user to enter in information once all fields have been enter the user would click a submit button which would sent the entered information off to the backend, this is where the PHP code would process the data given to it into usable information which would then be used to communicate with database, the mySQL database is the queried for certain data and send

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Application Overview

This section of the project will show of each section of the application and explain a little bit of how it works each screen will be accompanied by an image.

Main screen

The main screen is where users begin the application, the user is asked to register with the system or login. The user has only two options click the first login button to log in with the system or click the second button to register with the system.
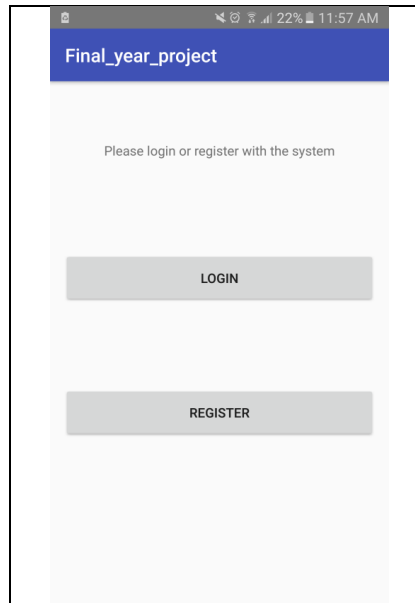

Figure 1

Register

The registration form is used to add a person to the system so that they be able to login and play the game, the user must enter their name, e-mail address, password and confirmation password.
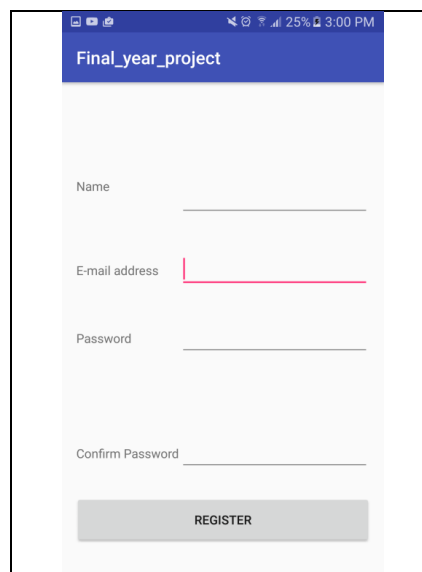

Figure 2

Login

To login with the system the user must enter their e-mail address and password associated with the system.
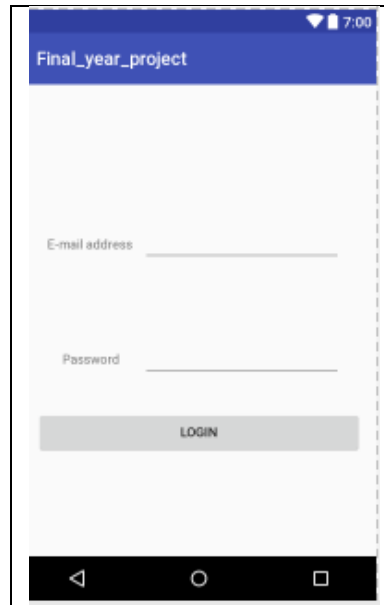

Figure 3

Lobby

If the user has successfully logged in with the system they are brought to the lobby screen where the user is given 4 options

1. Play game – Play the licence registration game
2. Rewards   – View and purchase rewards
3. Profile   – View and edit profile details
4. Logout   – Log user out from the system

Figure 4

Play game

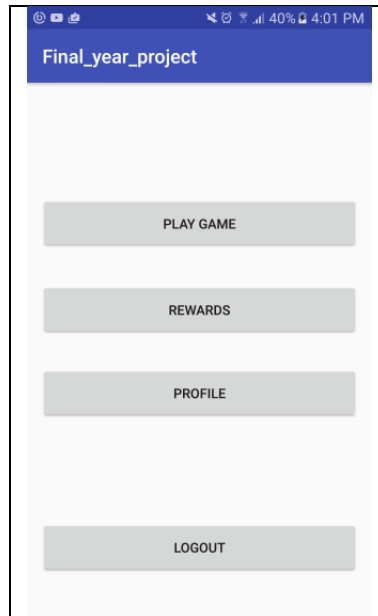When the user chooses to play the game they are given a random image the user must determine what the image is based on the values of the modified number pickers.
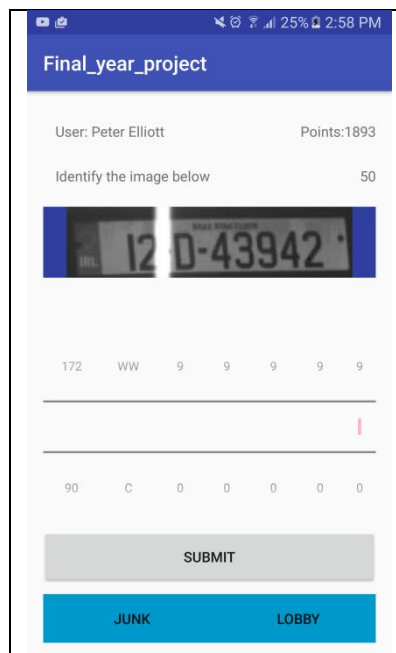

Figure 5

The user slides the number pickers up and down until they feel that they have gotten the the correct value or the best one that matches, once the user thinks this they click the submit button and a new image is loaded.
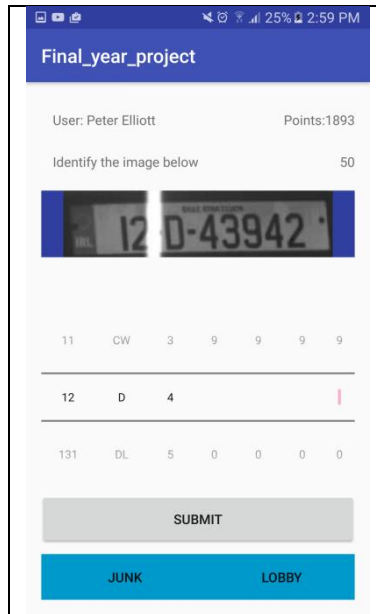
Figure 6

If the user is unable to determine the image they can click junk to state if the image is to bad to read, the point value for the image is then increased.

Rewards

The user can select a number of rewards from the system, the players can purchase based on the points they have gotten from playing the game, a player select a reward and then clicks the "Select rewards" button which then cause the value of the reward to be subtracted from the players score.
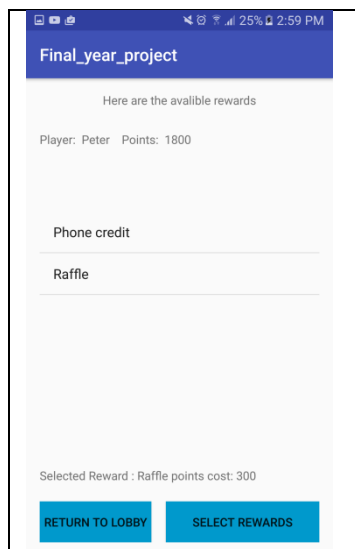
Figure 7

If the user's points are too low when they are proceeding to purchase the selected reward, they will receive a message stating so and no points will be reduced from the user's score.

Profile

The user can select a number of rewards from the system, the players can purchase based on the points they have gotten from playing the game

Figure 8

Edit profile

The edit profile screen is similar to the register screen but were the fields in the register activity cannot be left black the ones in the edit profile activity can be only the fields filled in will update.
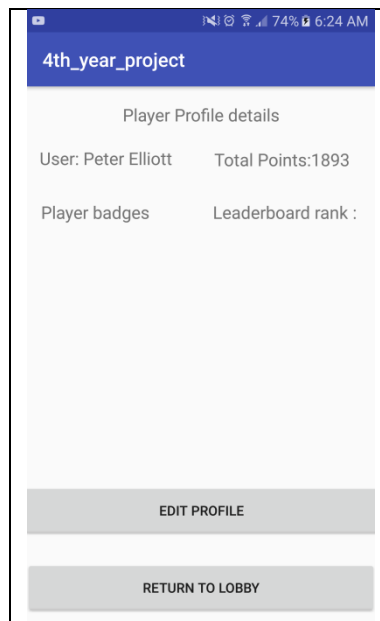
Figure 9

Logout

In the lobby users can choose to logout from the application this will them from the system updating the database as it does so
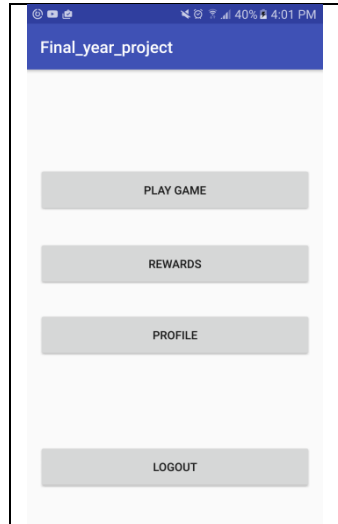
Iterations

The project was broken down into three different integrations each will a key factor to carry out and building upon the last.
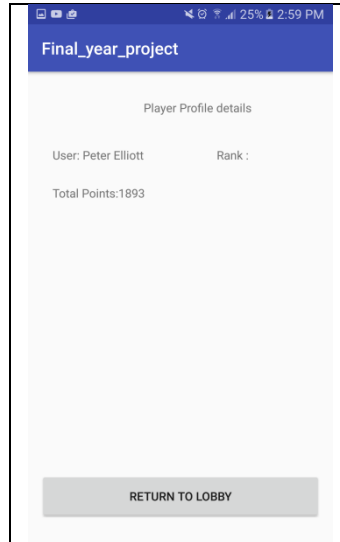
- First iteration will be building the basic functionality of the game
- Second iteration consist of add the functionality to the application in an offline mode
- Third iteration focuses on connecting the system together.

First Iteration

Scheduled Work

- **Project research**
  Research into the project topic of serious game as well research into gamification was carried out as the two are closely linked, other the project topic the different technologies such as platform, languages storage, hosting where all looked into.

- **Design of Application**
  The design of the application was carried out from the look and feel of how the application would work to structure of the systems communication.

- **System Structure**
  The structure for the system was decided for the communication of the system
    - Application – A native Android app
    - Backend   – Pyhon for communication between the database and application
    - Database   – MmySQL as it works well with PHP
    - Hosting   – The application will be locally hosted using a WAMP server

- **Database design**
  The layout and structure of the database was determined the names of the tables with in the database were decided, the data types of each field would be determined (i.e. Field: Name Type: varchar) as well as primary keys and how different tables would link together if it was need.

- **Local host**
  Research into different local hosing software was done to determine the best one to use for hosting the proposed system.

Changes to iteration
During the course of the first iteration there were no changes that could be made to the project.

Second Iteration

Scheduled Work
- **Project documents**
  All project documents were reviewed and updated. New documents were also started if there was enough information to being even if it was just noted down links or small detail on the project.

- **Development of the app began**
  The application was given basic functionality, but not connected to the backend or database. The application was also designed with the layout defined earlier

- **Setup of local host**
  Local hosting software was downloaded and installed the server selected was WAMP as the device it was going to run on was a laptop running windows 10.

- **Creation of Database**
  Once the server had been correctly installed and turned on it the database was then created on the server, to access the database while the server was running phpmyAdmin was being used for the database. PhpmyAdim is a free tool written in PHP for mySQL management.

Changes to iteration

- **Backend**

  The backend was changed from python to PHP as it was supported by the hosting software, while it was unknown if python would be supported by it in addition the developers skills with PHP are stronger then python as the developer has had more time and experience working with PHP then python.

- **Documents changed**

  All project documents that noted python as the backend of the project were updated to reflect the changes made to the project using PHP as its backend now.

Third Iteration

Scheduled Work

- **Update of project documents**

  New documents such as the final report were started while all other documents were updated.

- **Linking up the components of the system**

  This section was to focus on connecting the application to the database using the PHP the backend to manage the data being transferred between the two components.

Changes to iteration

- **Feature removed**

  Due the unforeseen errors with the system there were certain feature of the application system that were not able be fully realised and then added to the system because of this some these feature were scrapped from the system, these features were
    - A script for adding images to the database
    - Another script for collecting processing users submitted answers on images
    - Designing a nice GUI using bootstrap

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Learning Outcomes

Personal Achievements

Project as a whole

The project provided many opportunities for personal learning and growth for me as a developer able to put the knowledge and skills gained over the last 4 years during the course of my studies.

The project gave me the chance to create a new piece of software that seemed har and was challenging enough from the start became somewhat easier as time processed and a little clearer as the document helped outline what needed to be done.

By getting help the more challenging parts of the project became easier to look at for a solution and to change focus when no solution was clear at the time.

Unforeseen Errors and Challenges

There were many errors that could be seen for this project due to limitation of skills and knowledge in the development of mobile applications such as an error in loading data, but there was the one error that was unforeseen and that was the denial of access to the local hosting server as seen below.

Local server denial of access
[authz_core:error] [pid 8888:tid 1120] [client 10.40.3.63:53625] AH01630: client denied by server configuration: C:/wamp64/www/favicon.ico, referer: http://10.40.9.149/phpmyadmin/

Due to the setting in apache on the device hosting the system no access from the application was granted whenever the application tried to communicate with the backend files the error that occurred was "AH01630" solutions to the errors where found online. [5] [6]

To help figure out the exact error the coded was looked up by using another device web browser but only the word "Forbidden" which belonged to error code 404 stating that the file was not found (or the file path to the file is incorrect) [7]

The solutions to the error "AH01630" were applied, but the files were still unable to be accessed due to the client being denied, the next error "authz_core:error" was looked up but the same solution were recommended.

These errors created the biggest challenge of the project as they were unfixable and no solution or work around could be created to get the server to accept the requests from the application.

Learning opportunities

During the course of the project there where many opportunities to learn such as increasing my understanding of mobile applications in addition with the different errors that arose it gave me quite a few learning experiences for improving my skills for troubleshooting problems and error checking.

There are many thinks that will be taken away from this project that will help me with the creation and development of future project I was provided an excellent learning experience and was able to pick up more skills with the errors I encountered.

The learning outcomes of this project were

- Better error checking and troubleshooting
- A improved understanding of the mobile applications and their structure

Additional features

There are many feature that were not possible to work into this project, but there are feature that would be perfect for a game like this would work with this type of application

- Timer

- Additional games - Animal detection for unknown images other than licence plates
- Leader board
- Player images

Advice

If the project was to be restarted again or give if another developer advice who was going to attempt the same project, I would recommend the following advice

- **Platform**
  Change the platform from a native android application to a web application to help avoid the server error that was encountered, if possible maybe a hybrid app give some offline functionality.

- **Management of screens**
  Spend equal amounts of time to each part of the projects system on

- **Help**
  Do not be afraid to ask for help with the project another set of eyes will be able to pick out the mistake or come up with another solution that may work.

- **Check configurations**
  Check the configurations of each component to ensure that each part works as expected before work become too demanding.

Project Review

In review of the project, I can clearly say that the project became more difficult than it was expected to be as many unknown errors kept occurring, but this provided an excellent learning experience for me.

Thing that went right
- Basic functionality of the application
- The code the backend is working correctly
- Being provided the opportunity for personal learning and growth and putting my skills to the creation of new software.

Thing that went wrong
- Denial of access to the local hosting server.

Missing components

- A script for adding images to the database
- Another script for collecting processing users submitted answers on images
- Designing a nice GUI using bootstrap

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