

GWAP Final Report

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1 Introduction

Nowadays there has been a growing concern on whether some translation tools e.g. Google Translation can yield the most appropriate answer that we actually want. Since the computer cannot think like humans, in most of the cases, we are given the wrong translation. Here we aim to address this issue in a more effective way with the help of a human – players of the game. In this project, a Game with a Purpose (GWAP) is developed, the purpose of which is to boost the translation accuracy to localize different applications interfaces with the help of human interaction as mentioned above. Particularly, this game is designed for people who use a mobile phone, the user interface of the game is designed in a way that takes the element of localization problem we are trying to address and embedded it in a game. The game itself is simple and easy to follow yet provides us with a powerful data as an outcome.

The main goal of this GWAP game is to help other developer's to translate their applications into other languages with a minimal effort and help from others who speak it. Since the icons/symbols are considered to be an international language, we believe this project will help in generating a huge dataset to make that possible yet not or a minimal cost will be required.

The remainder of this report is organized as follows: in section 2, the motivations and target problem is illustrated in detail, in section 3, literature review and references to related work in the area of GWAPs is shown, in section 4, the game specification and game mechanism is introduced, with screenshots demonstrating how the game would be played, in section 5, the quality and efficiency of the project are evaluated, and finally, section 6, the concludes and future work.

2 Motivations & Target Problem

The following example will draw the picture of the idea behind our project. Take this example. A Japanese developer created an amazing iOS app that has hundreds of downloads in the Japanese App Store. The developer noticed that many people from Middle-East regions are also downloading the app from the geolocation tool Apple provide for developers. He decided to localize his mobile applications into Arabic. The first intuition that he might do is to use a translation tool such as Google Translate or other tools available on the internet. However, there are a lot of issues with those tools. The translation is not always accurate and this might lead to mistakes. For example, the *trash icon* might have many possible labels to be used as a non-speaker of that language how are you supposed to pick the right matching word. From a programmer point of view, Google would normally link their API to a database to find the examples learned from thousands of previous documents and patterns, after which it populates a list of possible translation results for the searched word. This is known as Machine Translation (MT), a sub-field of computational linguistics which aims to translate words, phrases or sentences from one language to another. To date, enormous progress has been made in bettering the performance of language translation with the help of corpus statistics and neural technologies. However the bottleneck is still there, as translation demands a deep understanding of both grammar and culture, computers in many occasions may fail to specify the rules of a language as well as the habits of the language users. Besides, due to the computer's lack of recognition, some idioms, multi-meanings or compound words always find it difficult to be translated in a good manner, plenty of evidences have shown that even for the most experienced professionals, confusion and frustration are still familiar feelings. Despite the fact that few machine learning algorithms could be implemented to cope with the issues, it would involve high costs and inevitably add more complexities to the translation system, thus this is considered to be too narrow of an approach, and would not give us the desired outcomes.

It can be seen from the evidences stated above, it is still a challenging work/task for a computer to do the language translation in the way we want it to be. But is there any solution to enhance the translation accuracy? the answer in theory is yes. In the last decade or so the collective intelligence/AI has emerged, which aims to generate a shared or group intelligence from the collaboration and competition of many individuals. The idea of collective intelligence sheds the light on cutting-edge technologies and encourages new solutions to problems that has been considered hard and challenging work for computers to do. This idea is suitable in delivering the solution to combat the language translation issues. People who have a good command of different languages would translate the words or phrases based on their own knowledge, their unique life experiences and the culture diversity which always play an important role in the whole translation process and deeper understanding of that language. In such cases, the decision making is objective and balanced, thus would tend to give more reliable and more accurate results. Based on the considerations described above, we believe that the translation problems can be effectively addressed by introducing the idea of human interaction. In this report, we propose and deliver a new idea of GWAP (Game with a Purpose) which might help solve the translation problem in a more interactive fashion.

When put into practice, this game will provide us with a whole database that can be used by developers to localize their application with a very accurate matching labels. The data collected in this game is produced by each individual game player, during which process the useful data is fed into the database to boost the overall translation confidence and the translation accuracy.

3 Related Work

People who want to have a good grasp of new languages, may be expected to see a language-learning tool that is convenient, easy, and quick to use. The person may be expected to use a language learning application that is free, and more importantly, not boring at all. Then Duolingo (Duolingo.com, 2018) could be their best choice. Duolingo is one of the most popular and well-known online game for learning languages. In this game, the player is told to complete different modules by translating, tagging or picking the correct words. After each module, players will get a progress report showing how well their work is and what achievement they have done so far.

Though functioning as a personal language tutor, Duolingo has its own collective purpose, which is to help translate text on a web. In Duolingo, the players do not even know they are actually helping solve a real world problem, so what it achieves is to help people learn different languages and at the same time, implicitly solve the translation problem. Besides Duolingo harvests the designing ideas of some good and successful existing games, and it uses different methods to motivate players and keep them hooked, e.g. it uses goal setting tools to remind the players everyday whether or not they are on the track to reach their goals. This might work well for those learners who are motivated by the idea of making a ‘formal arrangement’ with the app, but it may fail to attract and keep the players who only want to play the game for fun. Also there is no scoring system in Duolingo, which could be an important game mechanism to promote more engagement.

Based on these considerations, we propose a new GWAP game, the aim of which is to solve a similar problem, but in a more motivating way. In our game, we score the players by how much they contribute to the game, and reward them with nice trophies. The players are encouraged to compete with each other and share their best score on Facebook, Instagram or any other social media platform. The idea is that players would feel like they are actually playing a game rather than being forced to complete daily tasks. Also, players can see others’ trophies and best scores of their friends are more likely to claim one for themselves. By doing this, we are making the game more fun/interesting and the translation problem would be solved efficiently with more and more players willing to contribute to the game.

4 Game Design & Mechanics

Architecture

The architecture of the game is shown in *Figure 1* below, with each parts being clearly illustrated.

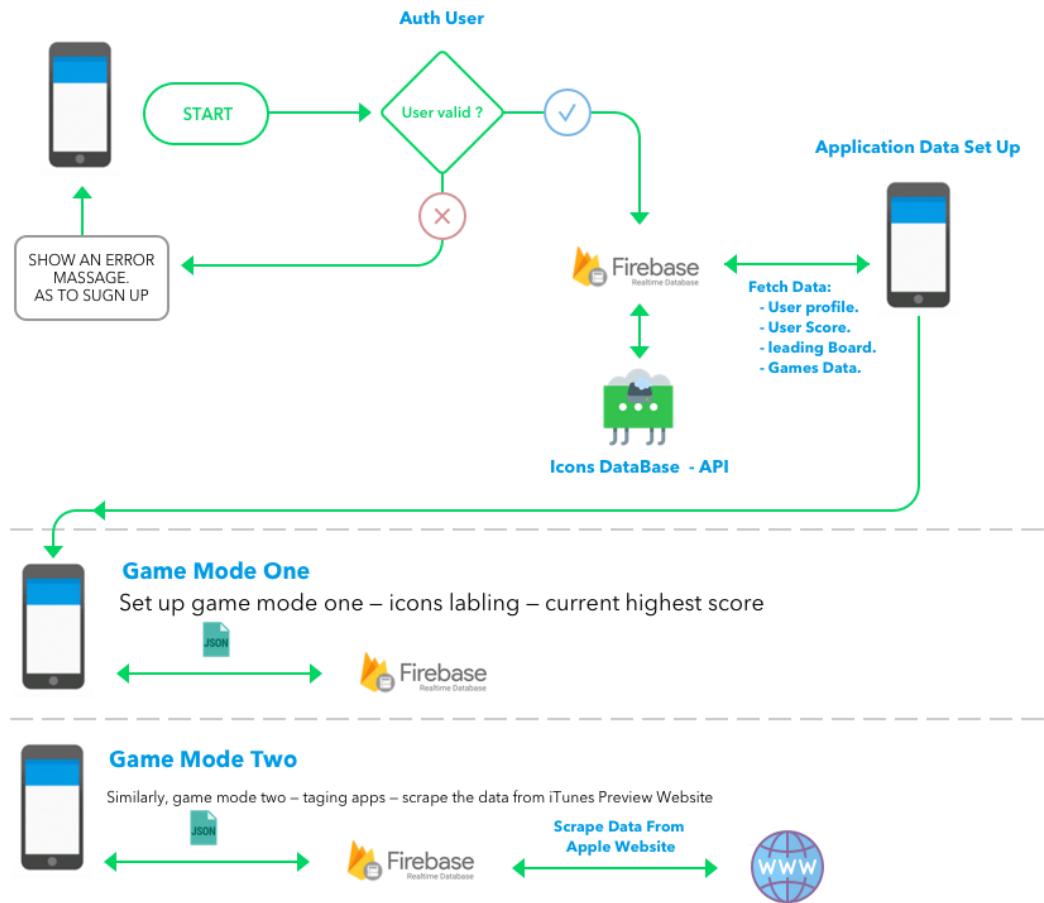


Figure 1

Architecture Description:

1. The user must have an account to play the game. The current authentication method is a simple email & password authentication.
2. Firebase Real-time Database is the backend used to store all the user's data such as profile image, score, labels, tags etc.

The player can choose which game mode they want to play. Along with the language that mode will be played in.

For mode one:

The assets will be taken from the (Icons8.com, 2018) API to populate that mode.

For mode two:

The assets will be taken from the Apple website under – App Store – (Apple, 2018) to populate that mode as well.

Prototyping

In-vision tool (invisionapp, 2018), is a professional prototyping tool that simplifies every aspect of the workflow and calibration between design and development, leaving us with more time to focus on making a better GWAP game. More information about in-vision app could be found in.

How the Game would be played?

Before the game starts, the player have to have an account to log in. Just like any other games, we associate players with their email address, so that he/she would be notified if there is a game update or can be able to reset their password if forgotten. The Sign Up and Sign In User Interface is shown in *Figure 2 and 3* below:

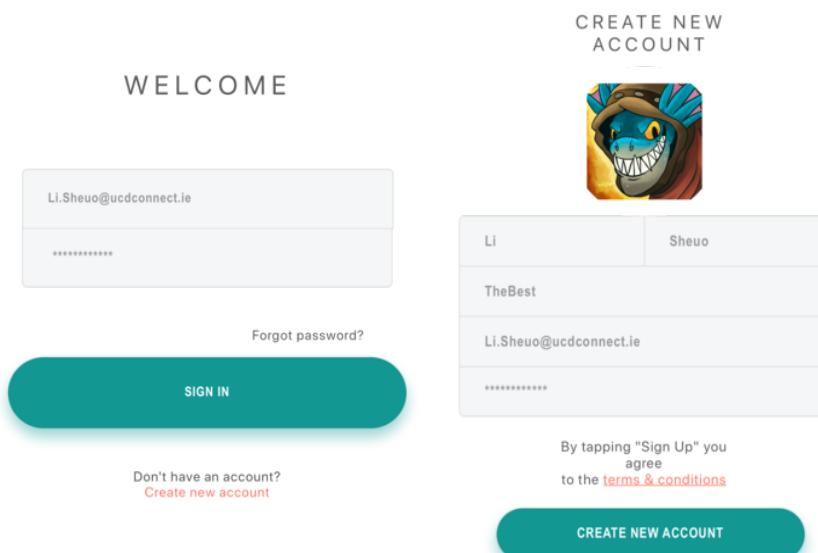


Figure 3 -Figure 4

After analyzing many excellent games, we agreed that a good game must, in a many cases , have an appealing UI to attract the players at the very start. Note that an attractive and nice-looking GUI is vital component for a successful game, Some features like music have been added and animation to the whole UI. The aim of which, is to hide the original purpose of the game, thus players would focus more on the game itself without noticing that they are actually help to solve a real world problem. Players can see their profile, achievements, and change the settings of the game if they want. More importantly, the rules of the game is clearly illustrated in the Instruction and the help icon throughout the app, which makes it easy to follow.

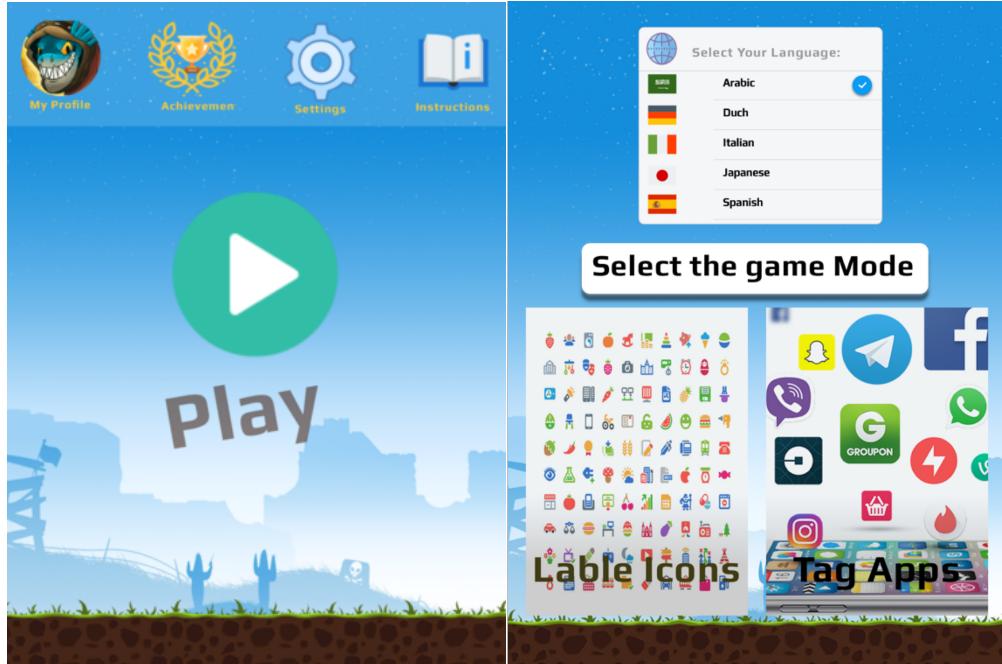


Figure 5 Main Screen of the Game - Figure 6 Language and Mode Selection

The next step of the game is shown in the above *Figure 5 Main Screen of the Game - Figure 6 Language and Mode Selection*, when the game starts, the players will be able to select the language they want since many languages are supported. Note that the aim of the game is to better the translation accuracy and help localize different apps to different languages, this is of vital importance in solving the problem that the game is intended to do. To make it more fun, the game has two modes and will let the player decide which mode they are interested in. Players are encouraged to play both modes as more useful data will be collected as they engage with it. Here we incorporate some special game mechanism to incentivize the player, e.g. extra bonus scores are given to the player who play both modes, and the players who contribute more will be given a trophy and added to the leading board for everyone to see their highest achieved score which is then updated to the player's profile.

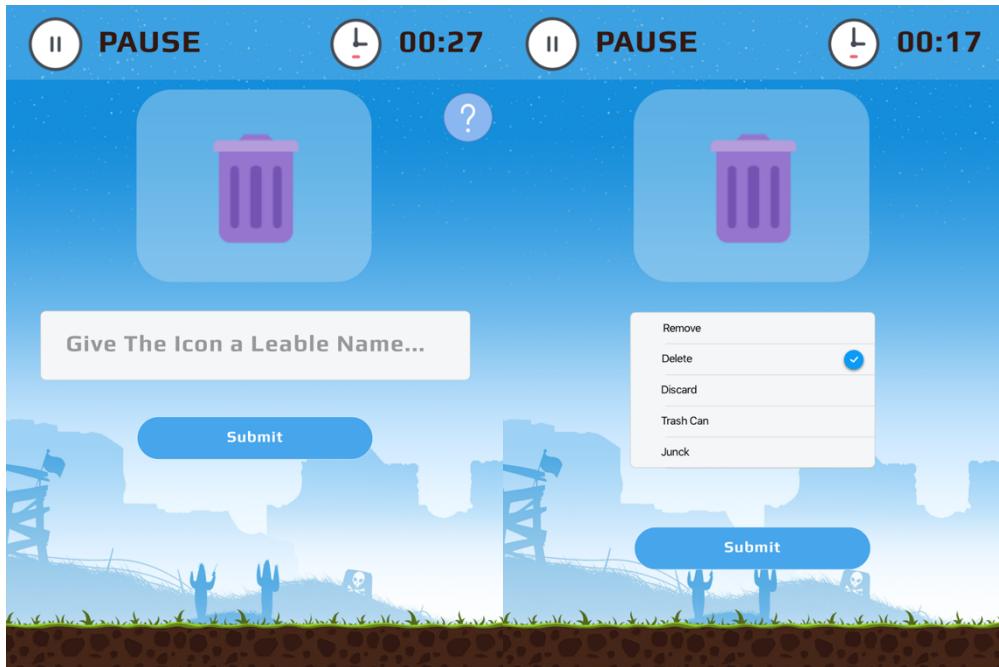


Figure 7 Game Mode One Round One – Figure 8 Round Two

Game Mode One: Icon Labeling Game, round one is where the player is given an icon and asked to provide a label best matching to it. Round two to choose the most appropriate label from the given list that they think matches the icon the best. Here the list is populated with labels from other players. We score the players based on how many words they typed in or they matched in a fixed time, we then take the words and try to see if other players did choose them as well. If so, we could be more confident to say that they are possible matches. We will rank all possible words to that icons based on how many time they have been chosen by all players, the game produce a ranking list that can help boost the translation accuracy.

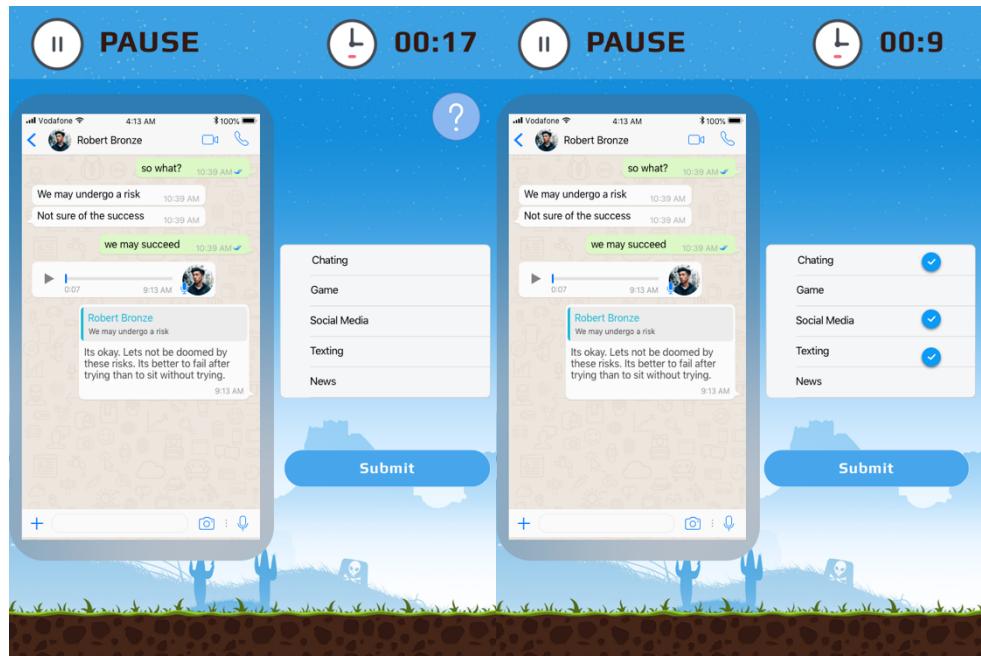
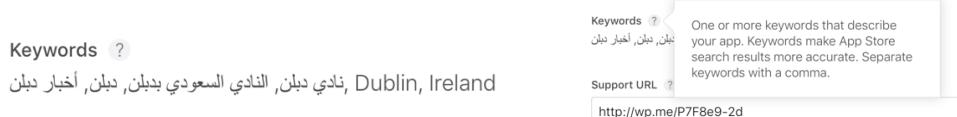


Figure 9 Game Mode Two

Game Mode 2 : Apps tagging Game, where the players are told to choose the most appropriate words from the given lists that they think matches the given applications. The data collected can be used for two things: One, to help organized the App Store apps categories with more specifics sub-categories. Second, is to use these keywords to help improve the App Store accuracy of the search engine. See an example below from an app I released on the App Store.



Similarly the player will be scored based on how many words they matched correctly with existing words in the database in a fixed time.

The following code shows how the terms are saved along with their overall scores in a JSON format.

```
{
  "WhatsApp": {
    "imageURL": "www.image.com",
    "keywords": [
      {
        "label": "Delete",
        "Score": 375
      },
      {
        "label": "Remove",
        "Score": 250
      }
    ]
  }
}
```

Scoring System:

In game mode one and game mode two, the scoring function is introduced to motivate and engage game players, as are shown below:

Scoring function:

$$\text{Total Score} = T * [P * 2 + (N - P) * 1]$$

where:

T: is the time. (time is random)

P: matched Icons in the database.

N: total number of icons played with.

The basic idea is that the more icons player matched/defined will increase their chances in getting higher scores, Especially, when the words matches an existing one in the database which result in a double score.

After each modes, the total score is shown to the game player as follow:

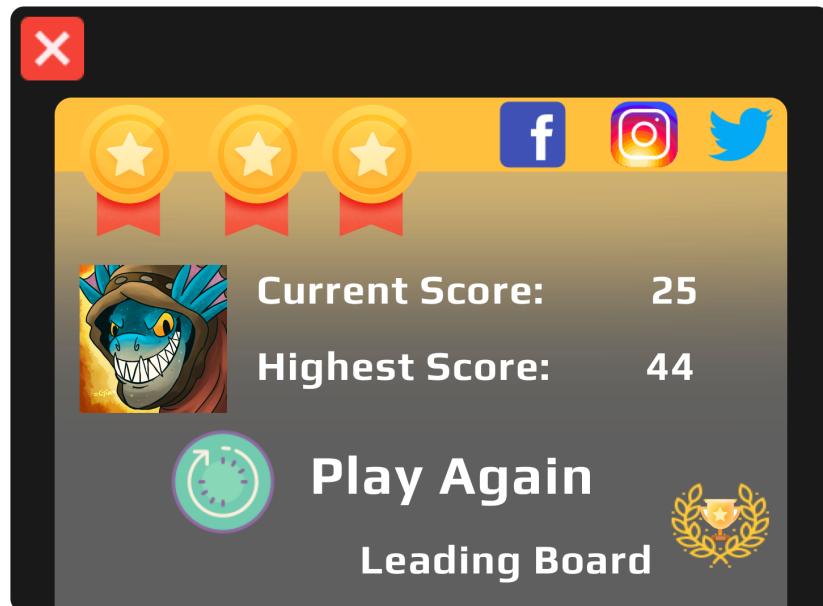


Figure 10

Here we provide a Play Again button to those who are not satisfied with their score and want claim for a higher score. To make the game more fun, we encourage players to share their scores on stoical media (Facebook, Instagram, or Twitter).

The player could also challenge their friends, More specifically, each player can:

1. Share their score with other players in the app.
2. Ask others to beat their score.
3. Whoever has the highest points is determined to be the king of the day, and will win a trophy.

Envy is an emotion which occurs when a person lacks another's superior quality, achievement, or possession and either desires it or wishes that the other lacked it". In our GWAP game, we use this technique to drive competitions between players. After each round, the leading board is shown to the player, the aim is to motivate the players to get higher score. Also, the players is allowed to see others profile which includes their best time, best scores, and their trophies. By doing this, we can drive and stimulate them to claim those goods themselves.

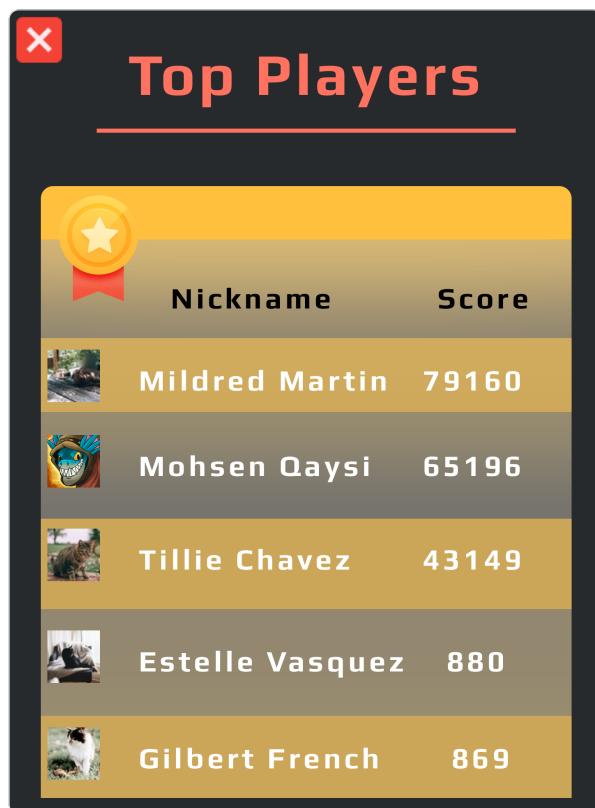


Figure 10 Leading Board

5 Evaluation

Efficacy & Quality

A good GWAP should be always designed in a long-term consideration. Here we propose some evaluation standards to help regulate and optimize our game. The idea is that the player who feel happy about this game would more likely to give us some feedbacks. The efficacy is thus evaluated by the feedback collected from the game players. Practically we would ask the player some questions e.g.: Is the complexity OK? are you satisfied with your trophy? or do you expect more of this interesting game...etc., we believe that the game quality would benefit from these exposures. Besides, we will evaluate the quality of the words that we collected from the game, to see if it do suggest appropriate translations. The player's feedback also indicate that whether the scoring system is actually helpful to promote more engagement. If it shows no sign of improvement, we will try to improve the interaction to make it more attractive.

Prevent from Cheating

To deal with the case the players might cheat the system itself, Our game guarantee that the same icons would not appear again to the same player, with the combination of randomization algorithm and tagging Boolean value.

```
def icon_seen_before(icon):
    if icon in lablebed_DB:
        return True
    else:
        return False
```

6 Conclusions and Bibliography (1 Page)

Our GWAP game make it possible to solve the translation and localization problems in a good manner, and it is when compared to others, more interesting and more effective than the normal solutions. In this project, we designed the game rules and strived to make it fun by introducing plenty of game features that had been found helpful in existing games. We did the prototyping which is simple and prove our concept, and managed to show each step needed to play the game. Yet there are still some goals that we failed to achieve. For example, more features could be added to the game to make it more competitive, similarly the game could be designed to allow multi-players rather than single player mode.

This project promotes our creativity in problem solving. We believe that our future career would benefit from this early exposure, bearing in mind the basic concepts of collective intelligence, we are capable of solving some difficult and complex real world problems that computers may fail to solve. In this project, we also learned how to design a interesting game, how to implement the game mechanism to attract the players, and how scoring system works in incentivizing players and keep them hooked.

In the near future, the game is expected to be optimized and updated more often, and the scoring system is taken as the first priority to be worked with. Besides, the players are expected to get better trophies and souvenirs to show off. We would take more time doing the research on the field of GWA (www.sketchappsources.com, 2018)P to see how their game mechanism works and the way they motivates players. In the future release, players of the game are welcomed to give us feedback regarding to any of the issues in the game. we would try to increase the game difficulties and add different game modes based on the feedback collected.

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