

Planberry: Gamification for encouraging personal time management

CONTROL SYSTEMS AND INSTRUMENTATION ENGINEERING PROGRAM

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Abstract

Time is an important resource in everyone's life because it is a nonrenewable resource, therefore we need to consider about time management to be balanced and efficient. Although there is a "planner" that helps schedule your life which includes paper planner and planner application that allow users to schedule their activities and time. Even though planner applications let users see the overall result on how they spend their time in a day, but the features in the existing applications are not enough to motivate users who are just starting out because they do not have the discipline to do it regularly, which makes it seem like making a schedule is difficult. The team had an idea to develop an application for managing schedule and apply the principles of gamification, a principle which can encourage people to change certain behaviors by using game elements. We decided to use visual feedback, which is one of the game elements, to display the activities that users plan in the calendar in animation form in order to reflect users' own time usage and use it to improve how they spend time in the future according to their own desire. Moreover, this application can motivate users to schedule consistently. The result of application development, the functions in the application can operate as designed. Now users can schedule in calendar and view the daily feedback in numerical form. For the visual feedback, it is currently in development phase.

Introduction

Time is one of the important resources for everyone especially college students. Sometimes there are so many activities and work at hand. Some students can not manage time because of many reasons. one of them is a lack of discipline to keep consistent schedule planning. Even though there are time management application out there, but they still can not motivate users enough since most of them can only schedule but barely give feedback or reward. We came up with the idea to create time planning application using gamification principle to motivate users by giving visual feedback, encourage consistent schedule habit and improve time management skill

Methods

Gamification Loop

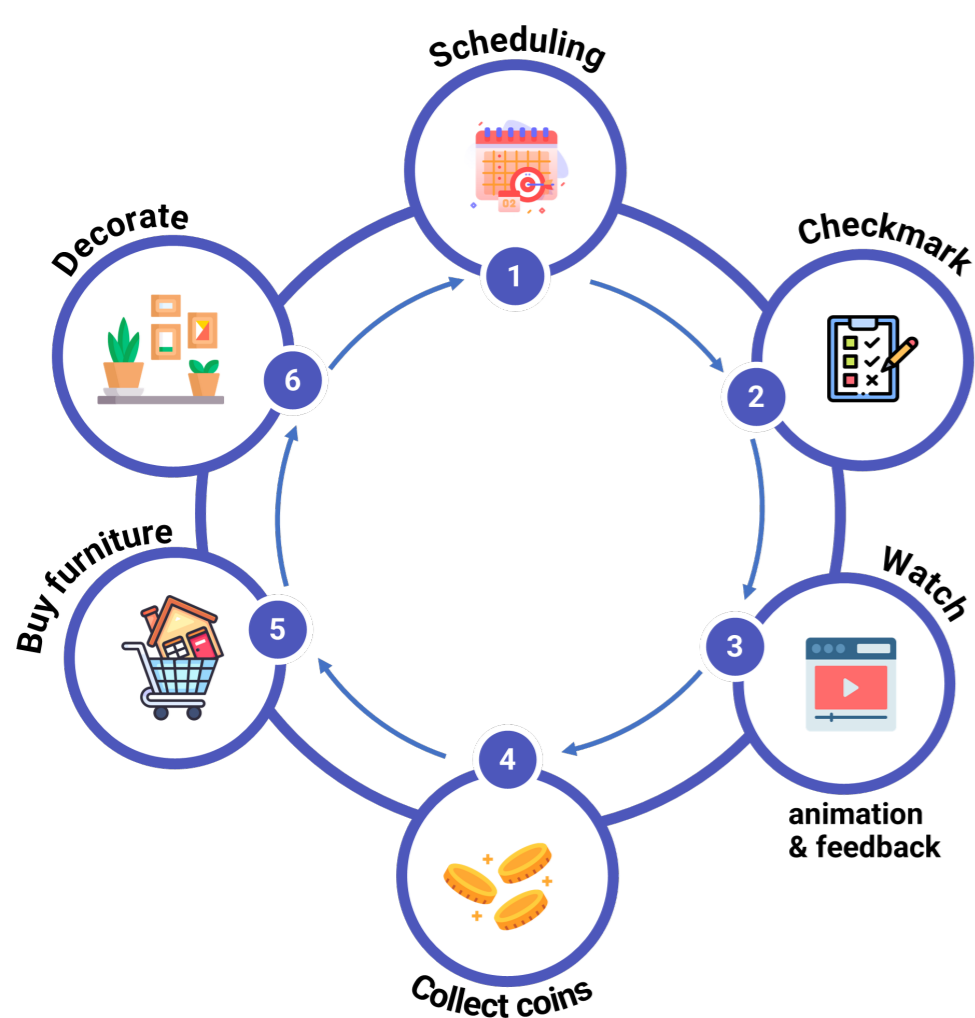


Fig 1 Gamification loop

The home page of the application is designed as a room. Initially, all of furniture is monotone. User can upgrade furniture to make it colorful by spend coins that receive from scheduling. The step of using application is starting from the application lets users set the priority of activity category. After they set the priority, user will schedule their activity then checkmark if the activity is done. At the end of users' day, they can watch animation summary video and see other feedback. Users then receive coins reward to buy furniture and decorate their room

System Overview

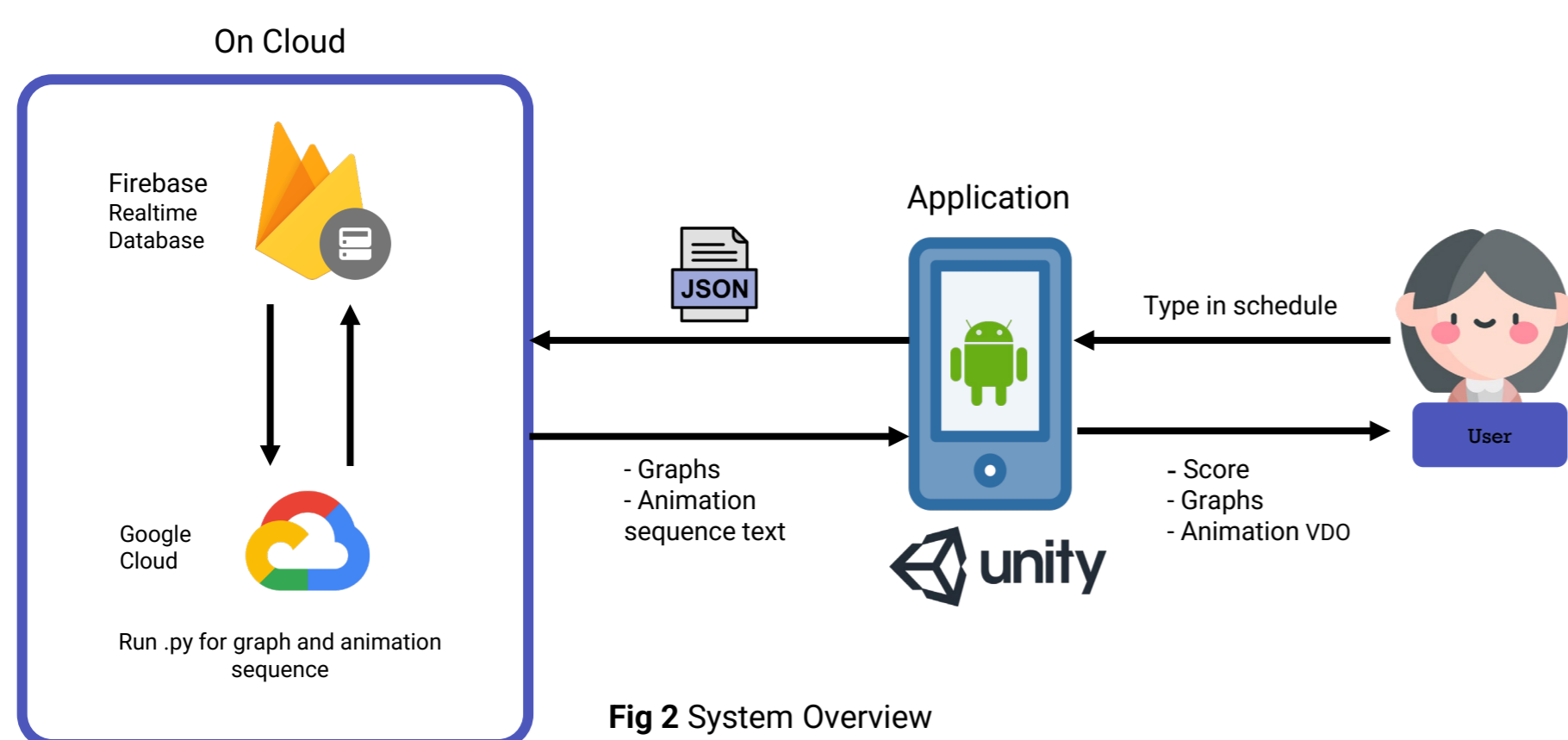


Fig 2 System Overview

A mobile scheduling application is created by Unity and is available for Android only. The structure of application use C# programming to make interfaces for interaction such as pressing button to continue or buying furniture and record the statistics of user such as event in calendar or time management score in json file format and keep them in the Firebase database. The data in database will be analyzed time management statistics of users each day and extract words of sentence based on event in calendar to generate the animation video through Python programming with NLP. The python programming will be run with Google cloud and send data back to the application to generate the animation video and it will be created and displayed in application by Unity when the user executes the command to view a daily feedback.

Time management calculation: A value that indicates whether you can follow the plan or not by the proportion between User time spent, a value that indicates when the activity can be completed, and Plan time, A value that indicates the activity you planned

$$\text{Time management score (T)} = \frac{\text{User time spent}}{\text{Plan time}} \times 100\%$$

User time spent and **Plan time** can be calculated from **Action time index** which is a weighted average of the priority of activity and the duration of activity.

$$\text{Action time Index} = \frac{\sum_{e \in E} [\text{priority}(e) \times \text{TotalTime}(e)]}{\sum_{e \in E} \text{priority}(e)}$$

Coin reward calculation: using **Time management score** and **Streak** that obtains from continuously schedule to calculate.

$$\text{Coin reward} = (T/10) + (1+ \text{streak}/10)$$

Results

Graph Feedback

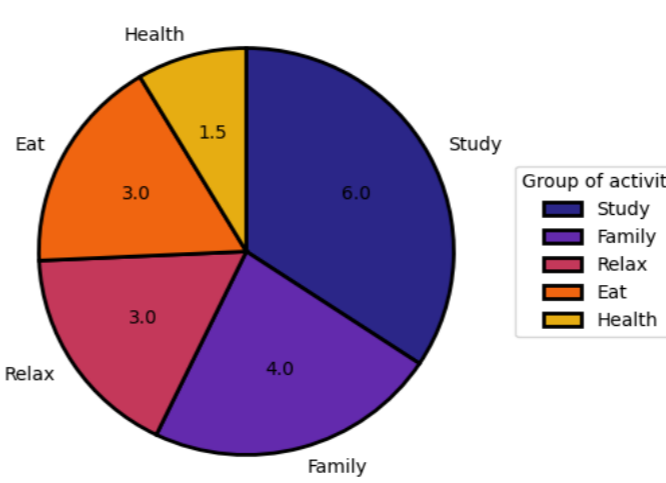


Fig 3 Daily Pie Chart

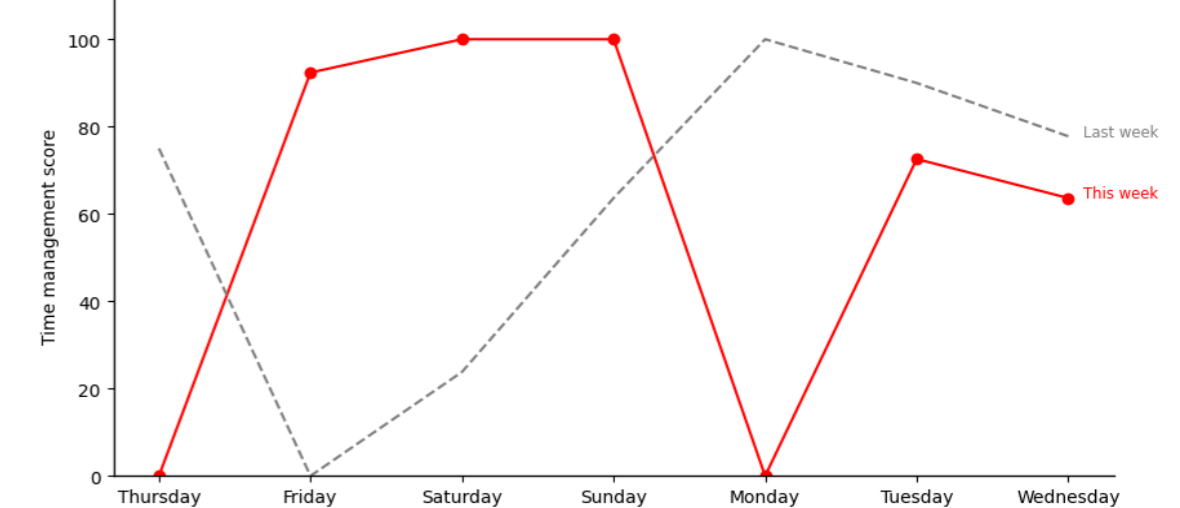


Fig 4 Time management score in a week

Fig 3 is daily pie chart used to visualize the proportion of completed activity group in a day

Fig 4 is line chart used to visualize the time management score in a week in order to the trend of score or to see the improvement over the week

Fig 5 is daily result used to show the detail of time spending each day, time management score, streak and coin received

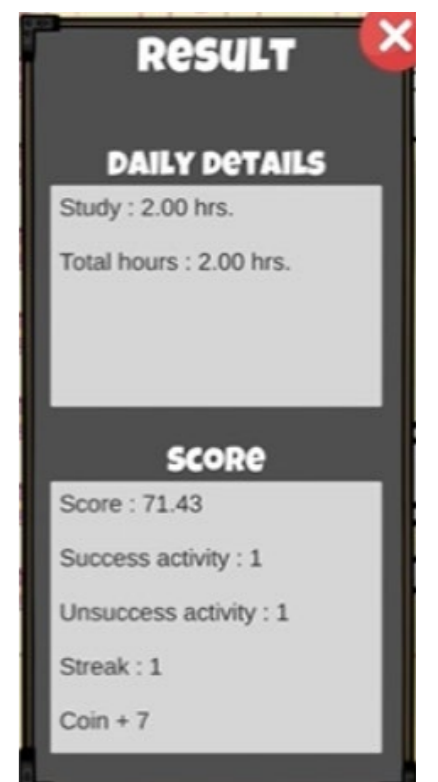


Fig 5 Daily result

Conclusion

Planberry is a time planning application which lets users schedule and manage their time. This application aims to motivate users to schedule consistently and ultimately lead to a change in users' time management behavior. One of Gamification or game elements that used in the project is feedback. The purpose of visual feedback – in animation form – is to reflect time usage of users in order to improve their performance in the future. The finished results of the current application development are as follow. The application has the flow according to gamification loop design. Users can add the activities in the calendar then checkmark the finished activities. Numerical feedback in daily statistics, reward calculation and furniture shop systems are also achieved. The part that is in development is visual feedback which will have the following steps:

1. Use machine learning to categorize the activities.
2. Connect machine learning to the application.
3. Generate animation video according to the calendar.

The visual feedback has partially developed. For the animation part, the character can change the action according to the fixed words. For graph visualization, the statistics data can be used to visualization as design and users' data are able to store on firebase for further analyzation.

References

1. Ayaan M. Kazerouni, Stephen H. Edwards, T. Simin Hall, and Clifford A. Shaffer, 2017, Quantifying Incremental Development Practices and Their Relationship to Procrastination.
2. André M, Gera N, Joran J, Merlijn S, Astrid S, Semiha D, Combining Web-Based Gamification and Physical Nudges With an App (MoveMore) to Promote Walking Breaks and Reduce Sedentary Behavior of Office Workers: Field Study.