

Personal Recommender for Gold Investment Portfolios

Nor Iadah Yusop*, Eng Qian Yi

School of Computing (SOC), Universiti Utara Malaysia, 06010 UUM Sintok, Kedah, MALAYSIA

*Corresponding Author Designation

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Abstract: Customers frequently buy digital gold from companies that offer higher profits. In line with this, a company by the name of ABC offers units of gold-based Gold Enhancement (GE) for a fixed unit price in US dollars. With GEs, the consumer can benefit at a rate that is five or ten times greater than the spread between the purchase and sell prices, respectively. It is interesting to note that the customer can sell if the desired level of net profit is achieved. However, the existing ABC system does not offer such data. In order to determine the ideal time to release a particular unit, the user must manually compute to see if the target percentage of profit is met. As a result, the consumer may miss the ideal opportunity to sell his unit and, more crucially, he may do so at a loss. Thus, automating the computation is essential for the user to obtain prompt advice for selling a unit in his portfolio. This is what the developed application, Personal Recommender for Gold Investment Portfolio (PRGI), aims to do. The Agile Method, a software development methodology, was used to develop PRGI. Android Studio serves as the main integrated development environment (IDE) tool, and it was created using Visual Studio Code and the Cpanel database. PRGI has successfully been developed to satisfy the needs of the user. For a more satisfying experience, the application can be further enhanced by incorporating an automated approach for less data entry work. Additionally, delivering the notification as a pop-up notification or something similar can be more effective than sending it by email.

Keywords: Personal Recommender Application, Gold Investment Application, Digital Gold.

1. Introduction

Gold plays the role of a global currency and is sometimes seen as a commodity and sometimes as a financial asset [1]. In the process of rapid development of global financial market in 1980s and 1990s, gold became a progressively appealing investment. Some investors purchase gold in an effort to benefit from rising gold prices, albeit the limited supply of gold may have an impact on this strategy. In recent years, many people have gotten involved in gold investment as a means to enhance their

*Corresponding author: noriadah@uum.edu.my

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wealth. Even though gold price fluctuates over time, in general, its value appreciates and that makes gold a good investment instrument. The gold that was acquired is only to be used as an investment tool that can be converted into cash should the needs arise. To ease its conversion to cash, digital gold has become one of the popular options. Other gold investors consider it a long-term investment because of the special nature of this financial asset. Investors often focus on the profit gained from their investments. They surely would not want to miss the opportunity to gain the profit when the targeted gold price is hit. In line with this, a personal recommender application is proposed to facilitate the investors in managing their gold investment portfolio. The recommender provides a personalized service by reducing information overload by retrieving only the most relevant information and services from large amounts of data.

A recommender system can be defined as a program that tries to recommend the most suitable item to a specific user by predicting the user's interest in the item based on the relevant information of the item, the user, and the interaction between the item and the user [2]. In the past few years, several survey papers on recommender systems have been published. However, these papers either focus on recommender techniques and methods, or on a specific area of recommender system development. None of these survey papers focus on a comprehensive analysis of recommender system applications. Recommender systems help and enhance this natural social process. In an ordinary recommender system, individuals provide recommendations as input, and the system aggregates and directs these recommendations to the appropriate recipients [3]. The recommender system is also an alternative method which helps to notify users by sending a notification, text message, email and so on [4]. In contrast to the traditional recommender systems, financial products often require significant long-term financial commitments because their utility is not immediately accomplished, depending on several external factors such as market returns, government normalization, and currency. Users often protect their personal data, and this is especially true for financial services, which raises privacy risk concerns in recommender systems and requires more sophisticated alternative personalization methods. Since privacy concerns are important in financial services, personal metadata and personal transaction data are often lost, which leads to user cold-start problems for recommender systems [5].

Foreseeing the importance of a recommender system in one's life, an application called the Personal Recommender for Gold Investment Portfolio (PRGI) is developed. PRGI is meant to be used independently by the client to personally manage his gold portfolio which was bought from a company referred to as ABC¹. PRGI aims to support ABC's clients to manage their portfolios containing gold-based products, namely Gold Enhancement² (GE). GEs are sold in units at a fixed price in US Dollars. There are two types of GEs, GE5 and GE10. GEs allow the consumer to gain profits that are greater than just the difference between the buy and sell prices, but five or ten times the difference respectively. The calculations for both types of GE differ in that each uses a different formula.

The current ABC system does not provide information on the net profit that the client, as the system's user, will gain at any particular time. The profit has to be manually calculated and checked if the target is hit or otherwise. In either case, the client makes the decision whether to sell or hold the GE unit. To add to the complexity, a client may hold multiple units, and of different types, GE5 and GE10. Each type has its own formulae for calculating the profit. Furthermore, the gold price changes almost every second, and so do ABC's selling and buying prices. This will make the calculation made a second or a minute earlier no longer valid. This could result in the untimely selling off of units that could potentially with a loss.

PRGI application helps to automate those calculations to allow the respective client to receive a timely recommendation for letting off a unit in his portfolio. In addition, PRGI allows the user to

¹ ABC is used to replace the actual company name to protect its right.

² Gold Enhancement (GE) is one of the products offered by ABC.

manage his GE units and set a target percentage of net profit for each unit. It will calculate the gross profit and the net profit for both types of GE products. When the target percentage of net profit is hit, the application will send a notification to the user. Throughout the development of PRGI, several deliverables have been produced. However, most importantly, PRGI could facilitate ABC's clients by providing a timely recommendation for letting off the specific GE units. The benefit to the clients is huge as it will potentially bring great monetary losses if the timely opportunity for selling off the unit is missed.

2. Methods

To develop PRGI, Agile Method is applied. Agile method is a software development process method that employs an iterative approach, open collaboration, and process adaptation throughout the life cycle of the project. This iterative agile approach is more adaptable, with short time span iterations as the project seeks improvements in small releases, with minimal planning instead of detailed planning. This helps minimize overall risk and empowers projects to adapt to changes more rapidly [6]. This method consists of six main phases which include requirements collection, analysis, designing, coding, testing, and maintenance. The agile method allows better control of the development activities, can improve the project predictability, and reduce the risks. Most importantly, through frequent interactions with clients, more feedback on the application was gathered, and this helps in fulfilling the client's requirements.

In the first phase, which is requirements collection, the information related to the problem and solution will be collected through the websites that are related to the current system. Also, the requirement from the client will be collected via online meetings. In the second phase, after all the information and requirements are collected, the information and requirements are analyzed. The aim of this phase is to define the appropriateness of the information and requirement to this system while the requirement that is not appropriate will be removed. In this phase, the analysis focused on the objective, problem, alternative solution that is going to be used, requirement from the client, method, and the implementation that is going to be applied in developing this system. In the third phase, which is designing, the project developer prepared a design document for the application. The structure and layout of this application were designed. From the third phase, the register and login page, the homepage of the system, the Manage units page, the Manage report page, the navigation bar, and so on were produced. In addition, the application logo, background color, and text field for users to key in their information were also embedded. In the fourth phase – writing codes - the developer will start writing the code for the application and convert the design into the actual application by using Visual Studio Code after the design was completed. This phase has been the longest part of the whole process. In the fifth phase, which is testing, the application is tested to make sure compatibility and not have any bugs according to the code writing before. In this case, Quality Assurance plays the role of beta testing, application testing, and end-user testing. An error or bug may occur such as the data could not store in the database, the button not functioning, the interface may be blank, and so on. In the last phase, which is maintenance, the developer will always collect the requirement from the client's feedback to fix up the bugs or upgrade the version of the application by adding some features. Finally, Android Studio is used as the primary integrated development environment (IDE) tool. The Cpanel development platform is used to facilitate key features such as user verification and the database for data storage. In addition, the developer will also conduct maintenance services when there is any problem or bug exists. For example, when there is any problem that occurs, the users may contact the admin to give their feedback so that appropriate actions can be taken.

3. Results and Discussion

In this Section, the examples of interfaces of the PRGI are presented as proof that the application has successfully met the client’s requirements and has been successfully developed. **Figure 1** and **Figure 2** show the interfaces of PRGI. Kindly note that, the term “GAE” used in the Figures refers to GE.

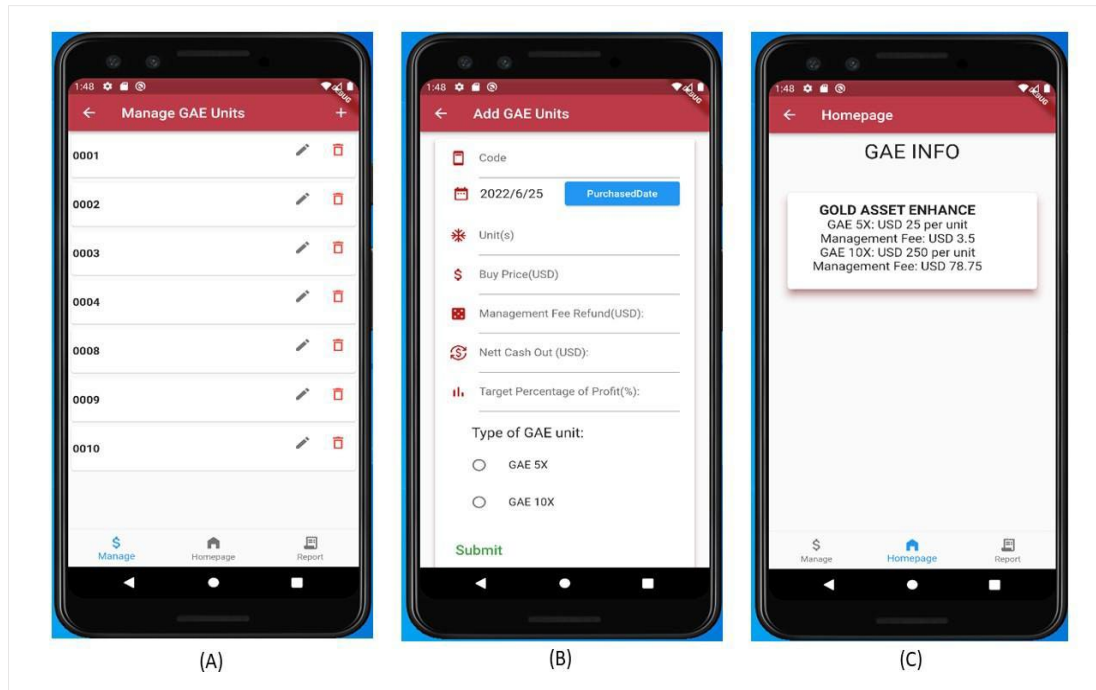


Figure 1: Main interfaces of PRGI on Manage GE Units

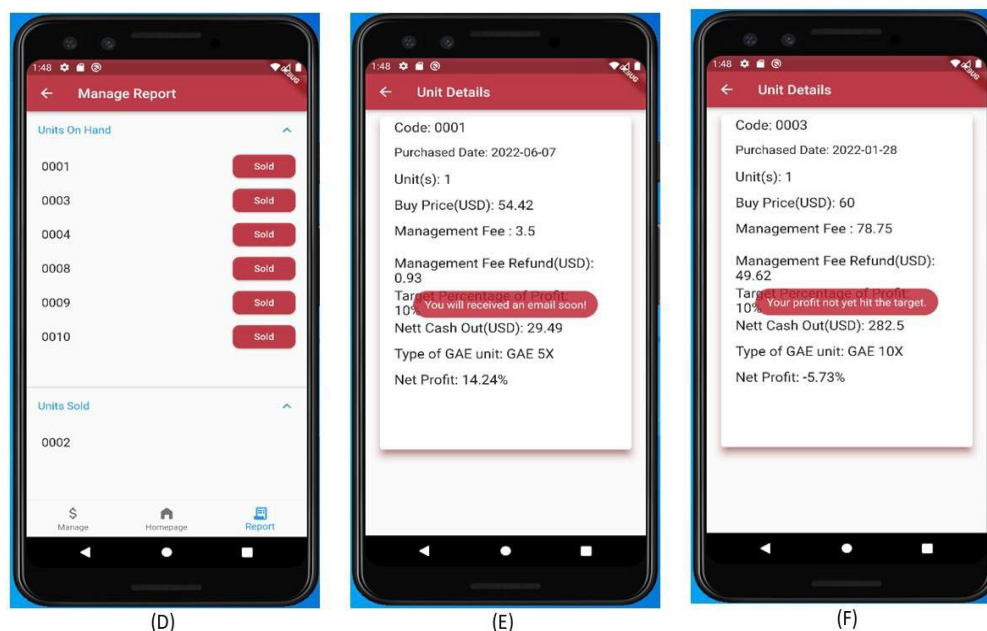


Figure 2: Main interfaces of PRGI for Unit Details

3.1 Usability evaluation

The usability evaluation of the PRGI application was done by 30 respondents, and the questionnaire consisting of 21 items pertaining to system usability is used as the data collection

instrument. There are two sections in the questionnaire. Section A asked about the demographic of respondents, and Section B asked about the usability of PRGI. The respondents performed the following step-by-step procedure for the evaluation: (1) install the APK file attached to test the application, (2) interact with the application, (3) evaluate the usability of the application and answer the questionnaire.

3.2 Demographic of respondents

Analysis of the demographic of respondents revealed that 30% of them were aged between 30 and 39, 23.3% of them aged between 21 and 29, 20% of them aged between 40 and 49, 16.7% of them were aged 50 and above, while 10% of them aged below 20. For gender, 53.3% of them were male while 46.7% of them were female. About the races, 43.3% of them were Chinese, 36.7% of them were Malay, and 20% of them were Indian. Besides, there are 63.3% of them have experience in using any application that is similar to PRGI while 36.7% of them were not.

3.3 Usability of PRGI

This section presents the analysis of the respondents' perception and evaluation of the usability of PRGI was conducted. The table below reported the frequency and percentage of respondents in every usability evaluation items. Most of the respondents had rated four and five while none of the respondents rated one and two. This provides an indication that in general, the PRGI's usability is high.

4. Conclusion

A recommender system is an information service system that connects users and items. The PRGI, as an example of a recommender system, could be a capable system that can add value to a company. Also, it opens up new opportunities to retrieve personalized information and enables users to access the products or services on the system. Through this paper, a lot of limitations of PRGI mobile application could be reviewed and the possible improvements were also discussed to provide a better facility. This paper describes the development of mobile applications which could manage GE units and notify users. There are some aspects that could be researched for future improvements. These include expanding the PRGI mobile application to include more functionalities and improving its' design layout for a more fulfilling experience. It is suggested that the application could embed more automated mechanisms for less data entry effort. In addition, instead of sending the notification via email, it could be more efficient if it is sent as a pop-up notification or the like.

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