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Application for Petty Cash Management

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ABSTRACT

Some people currently face into traps of dept and overspending without even realizing it. The feeling of never having enough cash or living paycheck to paycheck can lead serious final problems that can lead into financial difficulties over a lifetime. This study aims to determine how application can manage the financial problems. Specifically, it manages on how you spend your money and get the overview about it. In this application, it uses financial skills such as budgeting, saving and spending. It refers to the strategies technique to determine the use of an individual. To achieve a better understanding on the money management, a report is created to see the whole month transaction such as saving and spending. The report will show the total amount of money spent and where the money is going. You will understand your expenses with the report and create a budget for future expenses. By having good financial skills, you can have a strategy on how you want to manage your money. Creating and sticking to a budget might seem tough to achieve but it helps us to see full transparency our financial situation.

1. Introduction

Money is something our entire lives are encased in. We all know this yet many of us slip into traps of debt and overspending without even realizing it. The feeling of never having enough cash or living paycheck to paycheck can lead serious final problems that can lead into financial difficulties over a lifetime.

Life is a lot simpler when you have good financial skills. Your credit score and the amount of debt you end up carrying are influenced by how you spend the money. Despite making more than enough cash, you are dealing with money management problems. In order to overcome this, money management is important. Money management is the process of budgeting, saving or spending. It refers to the strategies and technique to determine the use of an individual or company. If you are to be successful in living within your means, you must have a plan for spending. People who do not plan often end up with trouble with overspending.

Cloud Petty Cash Management Application is an application that designed for getting an overview on how you spend your money. This platform is chosen as it ensures the target users can access the application at any time. The application can detect on how and where the money is spent. This application can avoid waste and money loss. It can provide an accurate expense reports and this also

can save our time to establish an accurate one. With an accurate report, we can create a budget and start saving for future expenses. You will understand your expenses and your income better. Many people do not know the total amount of expenses they generate on any given month.

The problem that are quite plenty of people who spend their money without having an awareness on how important managing their money. Many applications nowadays only use a manual input into the application. Other than that, people do not realize how much spending that have been made because of not seeing the total amount in receipt and some people is rather lazy to keep the receipt. Many people do not know the total amount of expenses they generate on any given month. We need to track of all our expenses. The idea to have all the expenses counted is for get a total amount. This will allow you to see the whole picture on how your expenses going.

The aim of this project is to develop an application to be employed by the person who have a problem on managing their expenses.

1. To design an optical character recognition for detect the total amount in receipts.
2. To develop an interactive application for user.
3. To perform a beta testing for the developed Cloud Application for Petty Cash Management.

Managing our own money is very important skills to survive. It is important for us to start practicing save and manage our expenses instead doing nothing about it. Petty Cash Management Application target age group ranging from 16 years old and above. People in this age group are already responsible to save their own money for their own purpose of buying.

2. Related Work

2.1 Optical Character Recognition (OCR)

Nowadays, more innovative approaches have been employed by teachers to meet the needs of language learners to be more communicative, and be able to construct their knowledge. There has been a shift in learning from teacher-centered to student-centered, where the learners are expected to be competent. It is by developing their learning and relating it to their prior knowledge while at the same time increasing their ability to be aware of their learning; purpose, method, observation, and evaluation of their learning [27], [28], and to discuss, engage, and interact with others [26], [29], [30].

Optical Character Recognition is the use technology to defines typed or handwritten text characters from digital representations of actual records such as scanned paper document. OCR can recognize all kinds of different characters. This feature makes it easy to instantly identify through an optical process character. In the case of a person, our eyes, our beings are an optical mechanism. The picture seen by the eyes is input for brain [1]. OCR is a technology that acts as a reading skill for humans. While OCR cannot compete with human reading ability.

The most critical problem in OCR is the transformation of non-ideal analogue images into ideal binary images. The original documents sometimes be dirty, multi colored and produce by variety of pens, markers, pencil or printer mechanisms [2]. OCR systems are made up of combination of hardware and software that are used to convert physical documents into readable text for computer. Hardware is used to copy or read text such as an optical scanner while the software usually performs advanced computing.

The first step of OCR is using a scanner to process the physical form of a document. Once the pages are scanned, OCR software converts the document into two colors which is black and white. The scanned image is analyzed for light and dark areas, where dark areas are identified as characters that need to be recognize and light areas are identified as the background. The dark areas are then processed into further to find characters such as alphabetic letters or numbers.

Characters that are identified then converted into an ASCII code that can be used by the machines or computer for further manipulations [3]. The advantages of using OCR are it can save our time and minimized work for people. It also capable to highlighting keywords and manipulate the physical text into data.

2.2 Optical Character Recognition (OCR) Methods

There are three basic steps of an Optical Character Recognition processes, which are image pre-processing, character recognition and the post-processing of the output. OCR system comprehend image is multidimensional array. 2D array if the image is grayscale and 3D array if the image is in colour version. Each cell in the matrix called a pixel and can store 8-bit integer which the pixel range is 0 to 255.

For the first step which is pre-processing. To improve the chances of successful recognition, OCR software often pre-processes images. Improving the real image data is the purpose of image pre-processing. Unwanted defects are suppressed in this way and basic image features are improved. The main objective of this pre-processing step is to make the OCR system easy to defines a character or word from the image. There are important techniques in this step which are:

1. Binarization
2. Skew Correction
3. Noise Removal
4. Thinning and Skeletonization

Binarization means that a colored image is transformed into an image consisting of black and white pixels. For the value of pixel, 0 is consider as black and the value of 255 is considered as white. In binarization, determining the threshold also crucial. If the pixel value is greater than the threshold, the pixel is considered as white, else it is considered as black. Determining threshold important because some results is not successful if the lighting conditions are not uniform in the image. Skew Correction is crucial because while scanning a document, the document may slightly skewed or the image aligned at a certain angle. When extracting the information from the image, detect and correcting the skew is important.

Other than that, noise removal is used to smoothen the image by removing small dots or patches which will distract the image processing. Noise removal can be performed for both colored and grayscale image. Lastly, thinning and skeletonization is an optional technique which depend on the context of OCR system used.

The second step is Character Recognition. For the character recognition, feature extraction is very important to understand. There are various types of classifications of feature extraction like statistical feature base methods, structural feature base methods and global transformation techniques [4]. If the input data is larger to be processed, only a reduced set of features is selected. This feature is focus on the important ones while the suspected to be redundant are ignored. This step defines each character by presence or absence of key features.

Lastly, post-processing in OCR. Post-processing is error correction technique to ensure the higher of accuracy of the OCR. The accuracy can be improved if the output is restricted by lexicon. Algorithm can fall back to a list of words that are allowed to occur in the scanned document.

3. Methodology/Framework

Selecting appropriate development approaches can be easy if we know the system shortcomings. In this case, iterative development is chosen as model to develop this application. It breaks the overall project into a series of version that are developed sequentially. Iterative model focuses on an initial, simplified implementation which progressively become complex and more feature set until the final version is complete. It gets preliminary version of system to upgrade the application time to time.

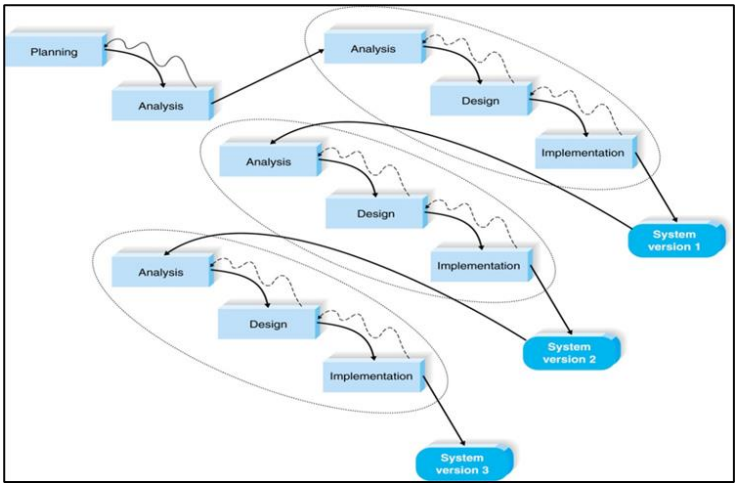

Figure 1. Prototype Model

There are several advantages in iterative model. First it can work with moving targets. The design can be modified with each iteration which that it evolves as new functional capabilities are developed. Other than that, potential defects are spotted and dealt with early. It is very useful to deal the defect early so that the problem is not drag until the end of process. Next, the testing is facilitated by the modules being relatively small. Most risk can be identified during iteration and higher risk can be dealt as an early priority.

3.1 Version 1

In phase 1, we go through an initial planning stage to map out specification documents, establish software or hardware requirements and generally prepare for the upcoming stages of the cycle. Project goals are to determine and high levels plan project established. First step is to develop an objective to determine what we want to accomplish. Our objectives are to help people who are having trouble with money management. From the objectives, I need to understand how projects initiated and analyze what are the benefits. Next step is managing the project by preparing a work structure, scheduling activities and costs. From this, Gantt charts is created to schedule the works need to be done and selecting an appropriate methodology to perform the project.

Once planning stage is complete, an analysis is performed to nail down the appropriate business logic, database models and what are the requirements for the project. In this stage requirements gathering is perform to transform the system request into more detailed and precise list of what the system must do to provide the needed value to the business. In this requirement, it will describe what the business needs, what the users need to do, what the application should do, characteristics of the application should have and how the system should be built. Next, the final deliverables of the

analysis phase is the system proposal. The system proposal is presented to explain the system in moderate detail to get an approval. After getting the approval, an analysis is performed again to improve what are the system lacking and focus on what users needed. In this analysis, the system is undergo an improvement more to achieving what are user want. Other than that, the analysis is also adding other features that might help the application to run smoothly.

Next, the designing the application is done based on the requirements and the detailed analysis of the system must be designed. Input, output database and code schemes are drawn in detail. In this phase, the language and the hardware and software is specified to run the application. Data structure, control process, equipment source, limitation of the system, interface, procedures of using system are determined at this stage. There are also several tools and techniques on how to describe the system design. These tools are flowchart and data flow diagram (DFD).

Lastly, the implementation phase is including on coding, testing and installation. Implementation ensure the system is operational and can be used. It also ensured that the system is meets quality standard. The system is being tested and tester will pin down suggestion that might help to improve or fix the bug in the application. After that, the system will undergo another phase which is the system version 2 which will contribute more functionality.

3.2 System Design Flowchart

This section will discuss about the system design and will be illustrated in a flowchart. In this flowchart will show a visual representation of the sequence of steps and decisions needed to perform the process by the system. Each step in the sequence is determine within a diagram shape.

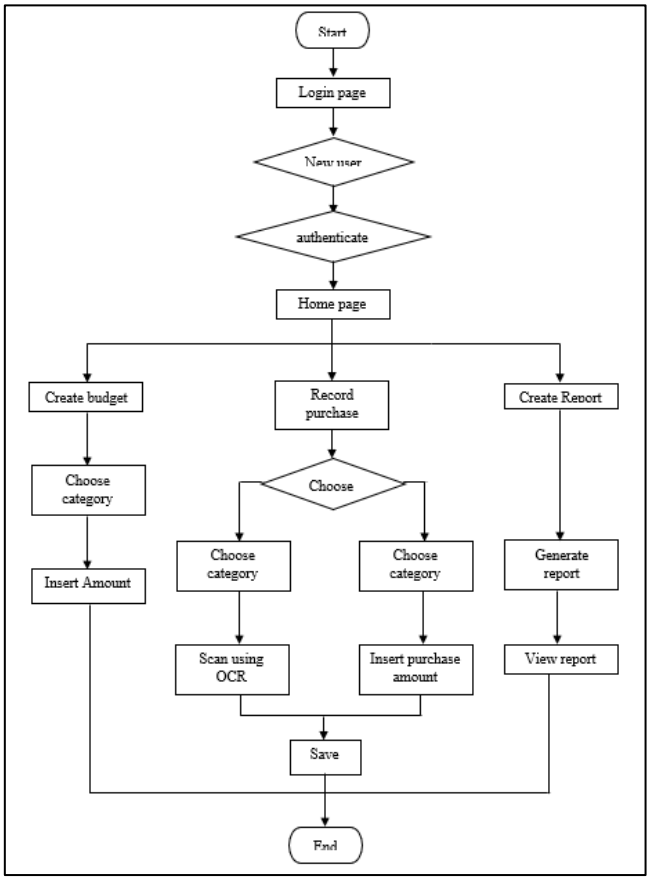

Figure 2. System design flowchart

In Figure 2 will show the system design flowchart and decisions needed to perform the process by the system. Each step in the sequence is determine within a diagram shape.

3.3 System Analysis and Design

- Requirement Analysis

Requirement analysis is process in defining the user needs for a new development. It consists of those task that go in determining the requirements needed or conditions to meet for project, analysing, documenting and manage system requirements.

- Functional Requirement Analysis

A functional requirement defines a system or its components. It describes on how the functionalities in the system is perform. It consist input, behavior and outputs. In Table 1 will show the functionalities requirement for the system:

Table 1. Functionalities requirement for the system

Module	Functionalities
Log in	- User inputs valid ID and Password - Systems alert for any invalid input
Menu	- Show user the graphic user interface for the application. - Show the current total amount of budget. - Provide button for user click to go other features
Create budget	- User input the amount budget for certain category
Create report	- System generates the report for the current month expenses
Record purchase	- User input any purchase that have been made - User can input the purchase via scanning using the Optical Character Recognition (OCR) system

- Non-Functional Requirement Analysis

Non-functional requirement defines the quality attribute of the system. It represents a standard used for a specific operation in system. In table 2 will show the Non-functionalities requirement analysis:

Table 2. Non-functionalities requirement for the system

Requirement	Description
Performance of the user interface and system flow	- System should be located to the correct session depend on the user authorize.
Operational	- The system available either with internet connection or without internet connection
Usability	- The system appearance for the user interface is simple and easy to use
Reliability	- Users record all the transaction in order to achieve better understanding with their expenses

4. Results and Discussions

The results and discussion section presents data and analysis of the study. This section can be organized based on the stated objectives and different experimental configurations that have been made. The OCR will detect on the total amount in the receipt from the picture have been taken. The test categorized into 2 types:

- Different types of receipt

- Different type of font

4.1 Testing on different types of receipt

The testing is being done by running the program by many types of receipts from many shops such as Tesco, 7-Eleven, Restaurant and many more. In table 3 will show the results taken by doing testing on different types of receipts:

Table 3. Results of different types of receipt

Item	Shop	Picture	Results
1	Tesco		"accepted total 6.00 rm"
2	7-Eleven		"total amount paid: 20.00"
3	Restaurant		"item total excl... rm 9.70"

Item	Shop	Picture	Results
4	Tesco		"total 40.85"

4.2 Different types of font

In this test, the font will be tested either in capital letter or small letter. Each of the font in receipt will not be the same. The shop may use all the word in capital letter or mixed. In table 4 will result testing on different types of fonts in receipt:

Table 4: Results on different types of font

Font	Picture	Results
Using all capital letter		"total 40.85"

Font	Picture	Results
Mixed capital letter and small letter		"item total excl... rm 9.70"

4.3 User Interface

In this section, it shows the proposed system interface from the user side of perspectives. There are several features available for the user that is ready to use.

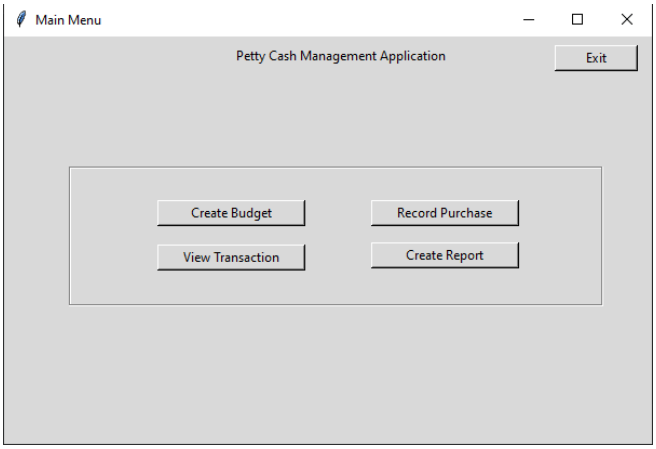

Figure 3. Main Menu of the application

Figure 3 shows the main menu for all the functionalities provided.

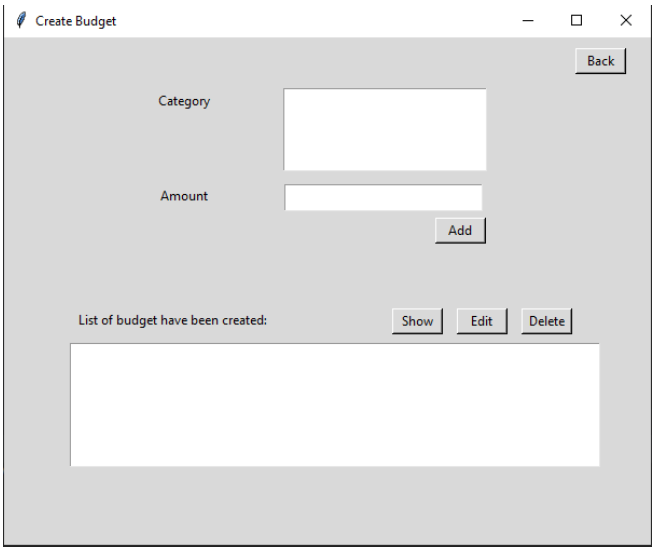

Figure 4. Create Budget

Figure 4 shows the create budget window where user can create budget category and set the amount for the budget. User also can see the list of budgets that have been created and user can edit or delete it.

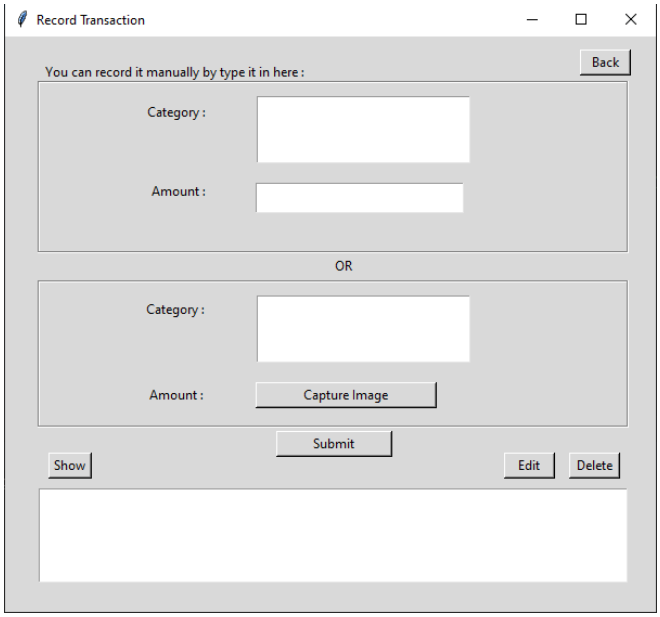

Figure 5. Record Transaction

Figure 5 shows the record transaction window where user can record the transaction by category and insert the amount for the transaction been made. User also can see the list of transaction that have been created and user can edit or delete it.

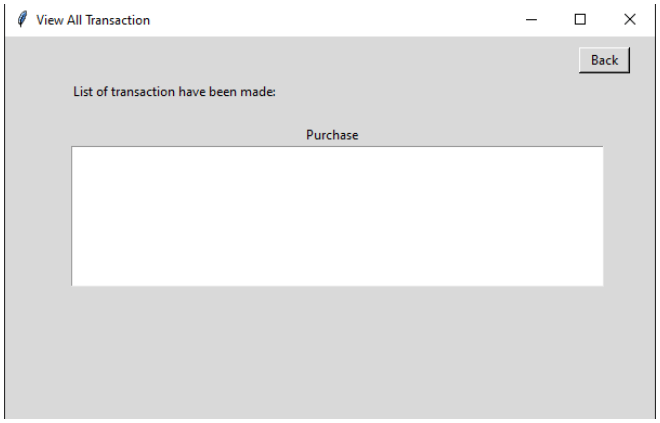

Figure 6: View All Transaction

Figure 6 shows all the transaction that have been made.

5. Conclusions

The application developed to use by people that involved with money management and do not have any plan on how to overcome the problem. This application will reduce the financial problems such as creating budget and get overview on how the money spent. The budget can be created to produce awareness on how much money needed and divided into many categories. The report is created to produce an effectiveness money overview for the user understand their income and expenses. It will make user to be prepared for the future month.

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