

PERSONAL FINANCIAL MANAGEMENT USING CHATBOT (CASE STUDY ON UNIKOM STUDENTS)

Venny Siti Febriyanny¹, Tati Harihayati²

^{1,2}Teknik Informatika – Universitas Komputer Indonesia

Jl. Dipatiukur 112-114 Bandung

Email: vennysitif@gmail.com¹, tatiharihayati@email.unikom.ac.id.com²

ABSTRACT

Financial management is all activities related to the acquisition, funding, and management of assets with several overall objectives. Financial problems that faced by UNIKOM students are difficulties in preparing budgets and obtaining financial information, difficulties in recording and managing their personal finances. Chatbot is a computer software program designed to simulate intellectual conversation with one or more. Based on those cases, the author decided to use chatbot as a tool to manage finances in order to keep pace with current technological developments. The purpose of this study is to provide financial information, as well as facilitate UNIKOM students in recording and managing finances. The method used for the Natural Language Processing approach is the Text Mining method. Text Mining is used to get keywords. Testing of the system that was built using black box testing and beta testing gets results where this chatbot can provide financial information, as well as facilitate the recording and management of the personal finances of UNIKOM students.

Keywords: Chatbot, text mining, financial management, LINE.

1. INTRODUCTION

Financial management are all activities related to the acquisition, financing and asset management with some of the overarching goal [1]. Students who have little knowledge of finance will make a wrong decision in their financial [2]. This suggests that knowledge in the field of personal finance will affect the students in making good financial decisions. University Computer Indonesia (UNIKOM) currently has 6 Faculty of Faculty of Engineering and Computer Science has 11 Studies Program, Faculty of Economics and Business has 4 Studies, Faculty of Social and Political Sciences has 3 Studies Program, Faculty of Law has 1 Studies, Faculty design features 2 Program of Studies, and the Faculty of Letters has 2 Program.

Financial problems ranked number one by Bruce Hokin is "Spending without knowing your limits", or spend money without knowing the limits themselves, followed by a second rank "Spending Without Setting Savings Targets", or spend money without setting a target savings [20], here proved that the difficulty of managing money is not an issue that is small or simple. The results of a questionnaire distributed to 142 students / student at the University Computer Indonesia in April 2019 using Google Forms listed in Appendix C, contained 67.6% of respondents who had difficulty in financial records, and 78% of respondents who had difficulty in managing finances.

Some of the factors that cause the respondent difficulties in managing the finances of them do not know how to prepare a budget (50.5%), do not know the benefits of financial planning (46.8%), and difficulty in debts (55.1%), this resulted in financial becomes unstable and unfocused, and potentially on extravagance. The financial plan in order to set overall and managed there are things that should be remembered, according to Dwi P Herlina "By writing the budget in personal finance book, create a financial plan, prioritize debt payments and receivables before spending the money," [4]. Here it can be seen that by arranging the appropriate budgets will have a positive impact on the finances.

"Since Steve Jobs unveiled the apps marketplace beginning of the 2000s, the era of the website has been changed to the era of mobile applications. Now, it's time the world will be changed again, from mobile applications is becoming activity-based conversations and chatbot "[18] of the statement can be seen that the technology is growing, the authors decided to use the chatbot as a tool to manage finances in order to balance the current technological developments. The results of the questionnaire addressed that 60.6% of the students / student UNIKOM use chat applications LINE, and 39.4% use chat application WhatsApp. Questionnaire results showed that the majority of student / student UNIKOM use chat applications LINE.

Based on the existing problems the author see the technology can take a role in the problem. Thus

the authors decided to build a personal financial regulator chatbot using LINE as a platform for communication. With the chatbot is expected to be the solution of the existing problems.

2. CONTENTS OF RESEARCH

2.1 Research Methods

This research use methods that already exist. The method is performed including data collection methods and methods of software development.

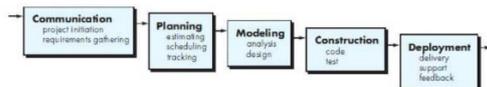
2.1.1 Data Collection Methods

Data collection methods used in this study are:

- a. questionnaires
- b. Study of literature

2.1.2 Software Development Methods

In this research, software development method used is the waterfall method.



Picture 1 Waterfall model [6]

Here is an explanation at every stage:

- a). Communication is the stage for an analysis of the requirements needed for this research, so that the author can understand and achieve the goals to be achieved.
- b). Planning is the stage of system design does that explain the necessary resources to make the system.
- c). modeling is doing the design and modeling phase of system architecture that focuses on the design of data structures, software architecture, interface views, and program algorithms.
- d). construction is an application design process which is implemented in the form of a code or language that could be read by the machine, and then a test of the system.
- e). At this stage of the implementation of applications to the user, application maintenance on a regular basis, improvements and applications, evaluation of applications, and application development based on feedback provided by users.

2.2 Review of Literature

2.2.1 Financial

Financial management is all the activities related to finance and asset management with some overall financial objectives [8].

Budget is a very important thing in personal financial planning, because the budget is a plan to detect how much monthly income and expenditure, as well as calculating the difference between the

two. Here are the steps that must be done in preparing the budget [4].

2.2.2 Personal Finance Management

"Management of personal finance is the art and science of managing resources (money) from the individual unit / household" [13]. In the management process, there are several steps that must be followed systematically.

Interest determine net cash flow is that no deficit spending [16]. This shows the importance of having knowledge of financial management.

2.2.3 chatbot

Chatbot is a computer program that conduct conversations using auditory or textual methods. Chatbot can interpret and respond to a wide variety of human input [22]. If the user can not know the bots as a computer program, the chatbot is categorized as artificial intelligence or artificial intelligence.

2.2.4 Natural Language Processing (NLP)

"Natural Language Processing (NLP) or Natural Language Processing (PBA) is a science of artificial intelligence (Artificial Intelligence) who studied the communication between humans and computers" [12]. Classic tracking and techniques penyocokan pattern (pattern matching) is used together with a knowledge base so that the computer can understand what the user entered in natural language.

2.2.5 text Mining

text mining is mengesktrak petterns and knowladge process that is interesting and nontrivial (importance) of a document or text. At its core Text mining work process similar to the process of data mining work, only the data in a text mining databases [11]. Stages in text mining is the parsing / tokenizing, stopwords removal / filtering, stemming and analyzing.

2.2.6 LINE

LINE software is a free instant messenger that can be used on various platforms such as smartphones. LINE enabled by using the Internet network so that users can perform activities such LINE send text messages, send pictures, videos, voice messages, etc.

2.2.7 Messaging API

API (Application Programming Interface) is a collection of functions that are used by programmers to build an application. In this chatbot line, fire is used, namely messaging on the fire line that serves to transmit data between applications each line with the system used by the server line [10].

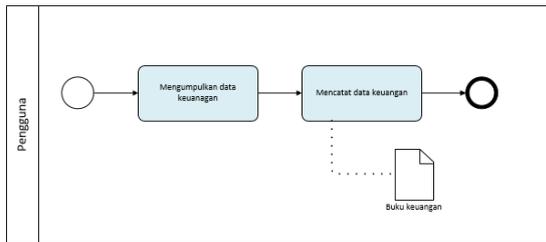


Picture 2 Messaging System Architecture API [10]

2.3 Analysis Procedure That Runs

Analysis of current procedures in this research that the financial management procedures. Basically, data about financial management information created manually using a personal notebook, the depiction of current procedures can be seen in Figure 3.4, the following current procedures:

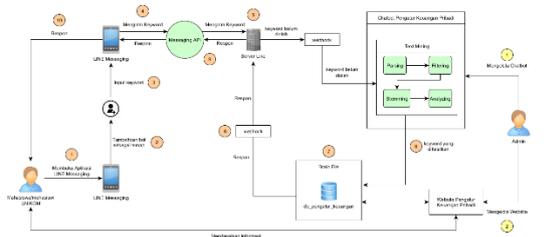
1. Users collect financial data hers.
2. Users record financial data on their personal financial records book



Picture 3 Procedure That Runs

2.4 Application Architecture Analysis

Application is constructed chatbot, where users can search through the menu information in a manner that has been provided and by typing a message in the form of questions or requests.



Picture 4 System Architecture

The application consists of two main parts namely Server Bot and Third Party Applications (Line Messaging API)



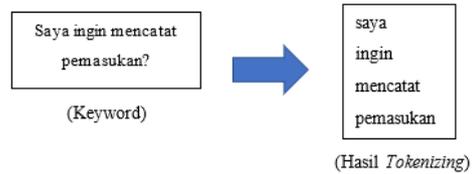
Picture 5 Part Needed

2.5 Analysis of Text Mining

I want to record revenue

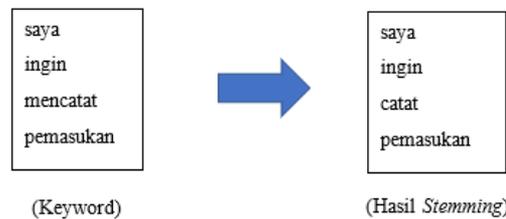
Here are the steps in the example sentence text mining of description that contains the words "I want to record revenue"

1. Parsing / tokenizing, this process is the process of checking of the first character to the last character, such as punctuation or spaces.



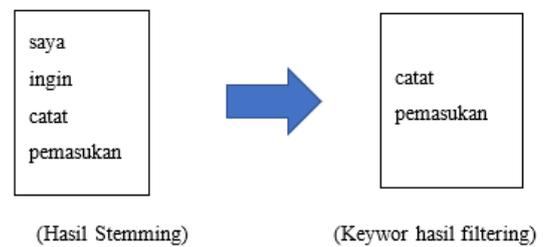
Picture 6 Parsing stage

2. Stemming a token into the keyword management process is intact, namely by removing the suffix as including "the", "at", "to", "me", "clicking", "right".



Picture 7 phase Stemming

3. filtering a process that is taking important words from the token.



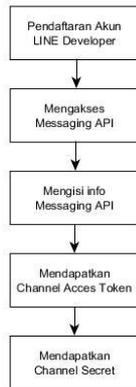
Picture 8 stage Filtering

Of the removal process is not important word list above, then left the word "record revenue" which is regarded as the important words or keywords. Keywords that have obtained brainfile matched with that of the database.

2.6 Analysis Messaging API

API (Application Programming Interface) is a collection of functions that are used by programmers to build an application. In this chatbot line, fire is used, namely messaging on the fire line that serves to transmit data between applications each line with

the system used is WebHook through server line. To link between the boots and the necessary server code "Channel access token" and "Channel secret".



Picture 9 Flow Messaging API

2.7 Analysis Keyword Search

This section will be explained (the whole stage text mining techniques are used) how the chatbot can be produced in response to questions put by the user input "I want to record revenue" responses : "Now enter the name of inclusion "

Before the filter:

1. "I want to record revenue"
2. Array ([0] => I [1] => want [2] => notes [3] => income)
3. Array ([0] => I [1] => want [2] => note [3] => income)

After filtered:

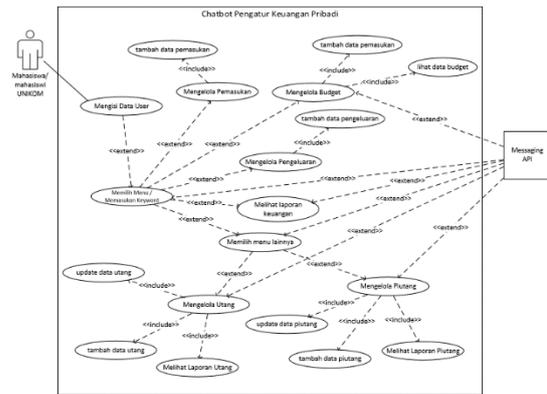
4. Array ([0] => log [1] => income)
5. record revenues

From the above filtering process, didapatkanlah a keyword that is "record revenues", the results of these keywords will be sought answers from the data that resides in the database. input "I want to record revenue" responses "Now enter the name of inclusion" input : "Pocket money" responses : "How many?" input : "500000" responses "Good, revenues already accounted for ya"

2.8 Functional Needs Analysis

2.8.1 Use Case Diagram

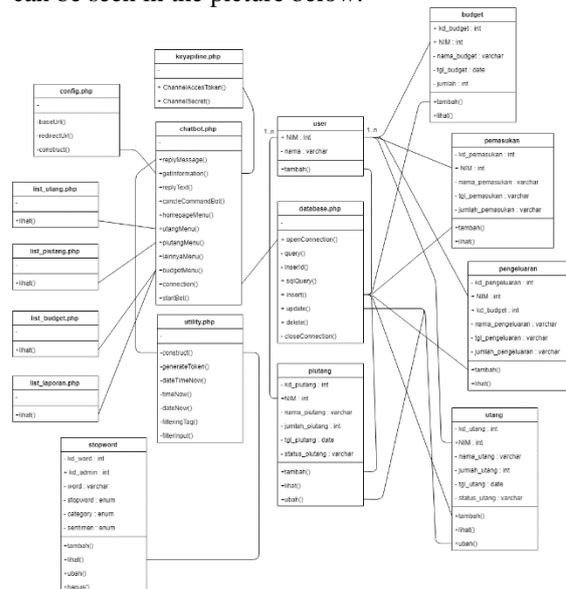
Use Case diagram illustrates a user with system connectivity.



Picture 10 Use Case Diagram chatbot Financial Controller

2.8.2 Class Diagram

Class Diagram on financial regulatory chatbot can be seen in the picture below.



Picture 11 Class Diagram chatbot Financial Controller

2.9 Interface Design

The design interface is the look is still shaped design program or mockups that will be implemented into a program or application.



Picture 12 Interface Design

2.10 Implementation Interface

Table 1 Implementation chatbot Financial Controller Interface

Menu	Description	File name
Other menu	File program to display a menu of other receivables	chatbot.php
Financial statements	Used to look at the financial statement data	list_keuangan.php
Debt reports	Used to see the debt data	list_utang.php
Accounts report	Used to view data receivable	list_piutang.php
Budget	Used to add the budget and look at the data budget	chatbot.php
Spending	Used to increase spending data	chatbot.php
inclusion	Used to add data entry	chatbot.php
debt	Used to add and change DTA debt	chatbot.php
credit	Used to add and change the data receivable	chatbot.php

2.11 Testing System

2.11.1 Blackbox Testing

At this stage of blackbox testing, design a personal financial controller by using the chatbot tested in the functional suitability

Table 2 Blackbox Testing Scenarios

Components tested	scenario testing	types of Tests
User Data Collection	Add your user data	Black Box
Other menu	Displaying other menu	Black Box
Budget	Displays menu budget	Black Box
Record the Budget	Add data budget	Black Box
See Budget	See data budget	Black Box
inclusion	Add data entry	Black Box
Spending	Add expenditure data	Black Box
debt	Displays menu debt	Black Box
Make a note of Debt	Add a debt data	Black Box
Pay debts	Change the debt data	Black Box
Debt reports	See debt data	Black Box
credit	Displays menu receivable	Black Box
Make a note receivable	Add Data receivables	Black Box
pay Accounts	Change Data receivables	Black Box
Accounts report	See data receivable	Black Box
Financial statements	Check the overall financial data	Black Box

Based on test results by testing the Blackbox is done, the conclusion that the application built already meet functional requirements.

2.11.2 Beta Testing

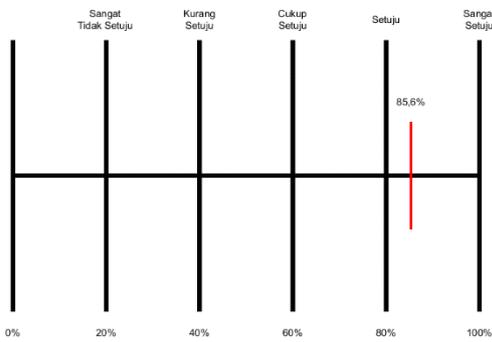
Beta testing with a questionnaire conducted by questionnaire to 103 students / student UNIKOM has used this personal financial regulatory chatbot for 14 days.

Table 3 Beta Testing Scenarios

No.	pertanyaan
1	After using this chatbot, apakah can help provide financial information?
2	After using this chatbot, whether this chatbot easier to manage your finances?
3	Information / answers given in accordance with the chatbot already asked?
4	Doing the accounts by the chatbot more interesting than the usual application
5	Is it necessary updates to improve the system?

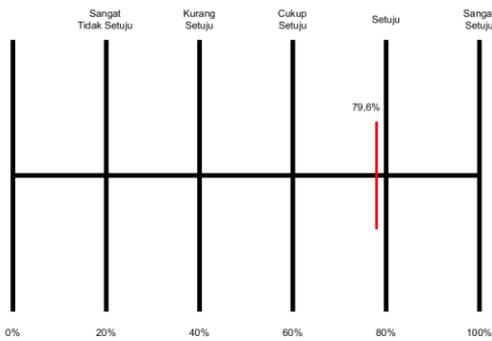
Here are the results of the questionnaire answers that have already been counted. The questionnaire was tested on 103 people.

Based on the results of the first question of the 103 respondents can be seen below:



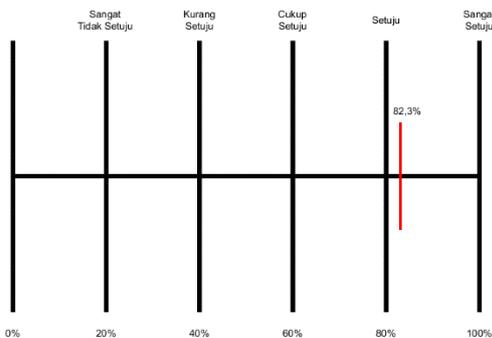
Picture 13 Percentage results of the first question

Based on the results of the second question of the 103 respondents can be seen below:



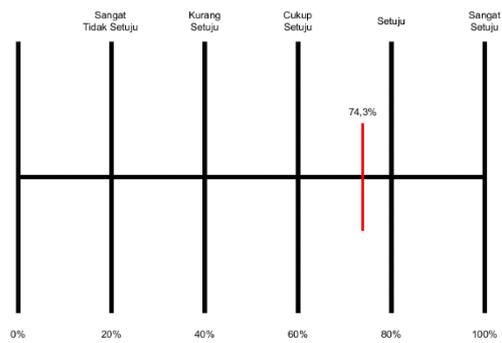
Picture 14 Percentage results of the second question

Based on the results of the third question of the 103 respondents can be seen below:



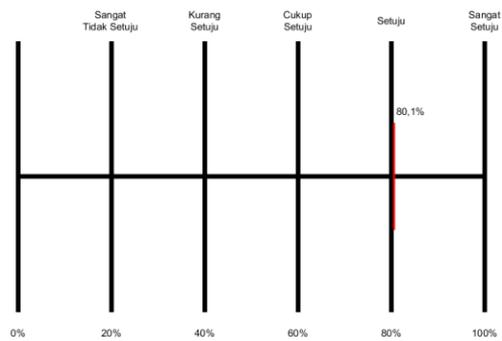
Picture 15 Percentage results of the third question

Based on the results of the fourth question of the 103 respondents can be seen below:



Picture 16 Percentage results of the fourth question

Based on the results of the 103 respondents fifth question can be seen below:



Picture 17 Percentage results of the fifth question

Based on the results of the calculation of percentages for beta testing of the student / student UNIKOM as users chatbot personal financial regulator, is hereby concluded that the design of personal financial regulators use the chatbot is in conformity with the expected goals.

3. CLOSING

Based on the results of the implementation and testing of the application chatbot this personal financial regulator, it can be concluded as follows:

1. This personal finance regulator chatbot can provide financial information, and how to prepare budgets on student / student UNIKOM.
2. Chatbot this personal financial regulator ease student / student UNIKOM in recording and managing finances,

Here are some suggestions for further development, as follows:

1. Development on text mining method is more refined, so that the user is currently interacting and bot, the bot will give a more precise answer.
2. NIM validation in the early development when adding chatbot conversation, so that only

- mahasiswa / student UNIKOM to use the chatbot.
3. Development of interface design could be improved again, to make it look more attractive.
 4. Development of features for managing finances, could be further enhanced as provide input or financial advice when finances deficit.

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