DWIT COLLEGE

DEERWALK INSTITUTE OF TECHNOLOGY

EXPENSE TRACKER APPLICATION USING FLASK

A MICRO PROJECT REPORT

Submitted to

Department of Computer Science

DWIT College

Submitted by

Aarjan Pokharel

13th Jan, 2022

DWIT College

DEERWALK INSTITUTE OF TECHNOLOGY

SUPERVISOR' RECOMMENDATION

I hereby recommend that this project prepared under my supervision by AARJAN POKHAREL entitled "**EXPENSE TRACKER APPLICATION USING FLASK**" in partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Information Technology be processed for the evaluation.

……

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STUDENT'S DECLARATION

I hereby declare that I am the only author of this work and that no sources other than that listed here have been used in this work.

……

Aarjan Pokharel

13th January, 2022

DWIT College

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LETTER OF APPROVAL

This is to certify that this project prepared by AARJAN POKHAREL entitled "**EXPENSE TRACKER APPLICATION USING FLASK**" in partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Information Technology has been well studied. In our opinion it is satisfactory in the scope and quality as a project for the required degree.

……	……
Mr. Bijay Babu Regmi	Mr. Hitesh Karki
Lecturer	Campus Chief
DWIT College	DWIT College

ACKNOWLEDGEMENT

First and foremost, I would like to express my special gratitude to Mr. Bijay Babu Regmi for helping me to put all my ideas well above the level of simplicity and into something concrete. I got to learn more about deep learning and machine learning through his motivation. His vision was aspired as well as inspiring, and a corner stone for the completion of this project.

I offer my sincere appreciation for the learning opportunities provided by the Deerwalk Institute of Technology, as well as by micro project supervisor committee: Mr. Hitesh Karki, Principle; Mr. Bijay Babu Regmi, Professor and HoD; Mr. Niresh Dhakal, Professor and HoD; Mr. Ritu Raj Lamsal, Professor and HoD.

Aarjan Pokharel
802
13th January 2022

ABSTRACT

In today's world, almost everything has been digitized. We are dependent on computers to perform record keeping and calculations tasks instead of traditional record keeping systems. Similarly, our day to day life is being expensive day by day as we spend on sectors of food, clothing, shelter, entertainment and many more. Most of the people cannot track their expense and income due to which they may face money crisis, so in this case Expense tracker application can help the people to tracking income-expense day to day and making life tension free.

This project is a Flask application based on expense and income tracking system. This project aims to create an easy, faster and smooth tracking system between the expense and the income. This project also offers some opportunities that will help the user to sustain all financial activities like digital automated diary. The users can define their own categories for expense type such as food, rent, miscellaneous where they have to enter the money that has been spent and add some description to specify that expense. The user can view and analyze their expenses via the use of diagrams: pie-chart and bar-diagram.

Keywords: *Flask; Bootstrap; Web; transactions; budget; pie-chart; line-graph*

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LIST OF ABBREVATIONS

CSS	Cascading Style Sheet
ER	Entity Relationship
HTML	Hyper Text Markup Language
PIP	Preferred Installer Program
UI	User Interface
VS Code	Visual Studio Code
WSGI	Web Server Gateway Interface
YNAB	You Need a Budget

CHAPTER 1: INTRODUCTION

1.1. OVERVIEW

This project focuses on reducing the unnecessary expenses of an individual by keeping track of their daily expenses. The goal is to make an application that allows user to set a budget and enter their expenses and incomes and analyze them with the statistical diagrams.

1.2. BACKGROUND AND MOTIVATION

The idea for this project came about with the goal to help people who are unaware where they are spending their money on. Humans desire various needs such as foods, clothes, shelter, entertainment and many more. In today's busy and expensive life, we tend to spend excessively on less important things and are left with inadequate money to fulfill our more important needs in the future. As an adult, keeping track of your expense is a must as being independent, you need to consider various sectors of expenditures and maintain balance between them. Tracking expenses can really help to save a lot of money.

The idea for this project was born observing the situation to help people minimize spending excessively on unimportant things and not going overboard with regard to a set budget. Once you start tracking your expenses each day, you will get a better idea regarding where you are spending your money so that you stay in control of your expenditure and achieve your goal of saving money. This will help you to save money for more important future investments.

1.3. PROBLEM STATEMENT

About 65% of the people cannot fully figure out how much money they spend every day and later may have to sustain with inadequate money for their more important needs [1]. There is no complete solution present easily or should we say free of cost which enables a person to keep track of their expenses easily and notify them if they are going overboard than the certain budget. This project aims to build a web app that allows users to enter their expenses based on categories and represent them diagrammatically.

1.4. OBJECTIVE

The objectives of this project are as follows:

- To keep track of daily expenses and budgeting.
- To save money for pre-defined expenses which will help to plan future investments.
- To help users to understand what they spend the most money on so that they can devise ways to control their expenditure.

1.5. SCOPE

Although this app is mainly focused for interns, teenagers and new job holders who have just started earning money, anyone who is willing to manage their expenses and who aims to save money for important future investments can use it.

1.6. LIMITATION

Some of the limitations imposed by the system that may occur while using it are as follows:

- Users have to enter each record manually.
- The system does not provide notification if the user has exceeded the budget.
- Pie-chart and Daily Expenditure Graph of only the current month can be viewed by the user.

1.7. OUTLINE

This outline following by the report contains six different main sections which approximately describes the project to the report viewer. This report includes diagrams to properly depict the structure of the system. The outline of the document is shown below:

Preliminary Section: This section is the first section of the report and this section consists of the title page, abstract, table of contents, list of figures and list of tables.

Introduction Section: This section is the second of the report and this section consists of the discussion about the overview of the project, the background and motivation of the project, problem statement, its objectives and scope.

Requirement and Feasibility Analysis Section: This section talks about the research done for this project along with the functional and non-functional requirements for this project.

System Design Section: This section consists of diagrams which help to visually describe the design of the system.

Implementation and Evaluation Section: This section explains about how the system was created and the evaluation results of the system.

Conclusion: This section concludes the paper.

CHAPTER 2: BACKGROUND AND RESEARCH

2.1. LITERATURE REVIEW

Tracking daily expenses is not so innovative [2]. Many traditional and technological approach is found to keep track of expenses and budget with their own functionality. For a long time and even today, many people have been writing their expenditures in a register to calculate their profit and savings. Similarly many desktop and mobile applications has been developed for this purpose.

2.2. CURRENT SYSTEM

Currently, there are various applications providing the facility to keep track of expenses such as YNAB, Mint, and many more. YNAB is an expense tracker that gives automatic tracking of your expense through your bank account or credit cards. The expenses that may take place in the future can be pre-defined so that you do not go out of bound [3].

Similarly, Mint is one of the best-known personal finance tools around. It is free, supports a wide range of banks and lenders, and comes from one of the largest and most trusted names in financial software, Intuit. With this app, users are provided help with budgeting, expense tracking, credit monitoring, and bills [4].

2.3. THE PROBLEM WITH CURRENT SYSTEM

The major problem with YNAB is that, it is mainly focused on tracking business expenses rather than personal expenses. Hence, this application is quite expensive considering you are an intern or a new job holder. Similarly, this application does not provide detailed expense information.

The major problem with Mint is that, although being free and suitable for personal expense tracking, it is currently available only for USA and Canada and hence cannot be used in Nepal. Also, Mint does not provide you the functionality to set a budget and pre-defined expenses.

CHAPTER 3: SPECIFICATION AND DESIGN

3.1. REQUIREMENT ELICITATION AND ANALYSIS

The requirement analysis is broken down into two parts, namely functional requirements and non-functional requirements. Both of these are discussed below.

3.1.1. Functional Requirement

- The system shall allow the user to register and login.
- The system shall allow the users to add categories to their expenses and income.
- The system shall allow users to add date to their expenses and incomes.
- The system shall provide updated log of the expenses and incomes.
- The system shall display the data in pie-chart and bar-diagram

3.2.2. Non-Functional Requirement

- The system must be available all the time with no time constraints.
- The data records must be stored in an efficient database to avoid data loss.
- The system must be well built to be supported in any machine.
- There must be consistency in all the modules and pages.
- The system must be easy to use.

3.3. SYSTEM DESIGN

The system architecture is elaborated using UML and other diagrams listed in the table below:

3.3.1. Use Case Diagram

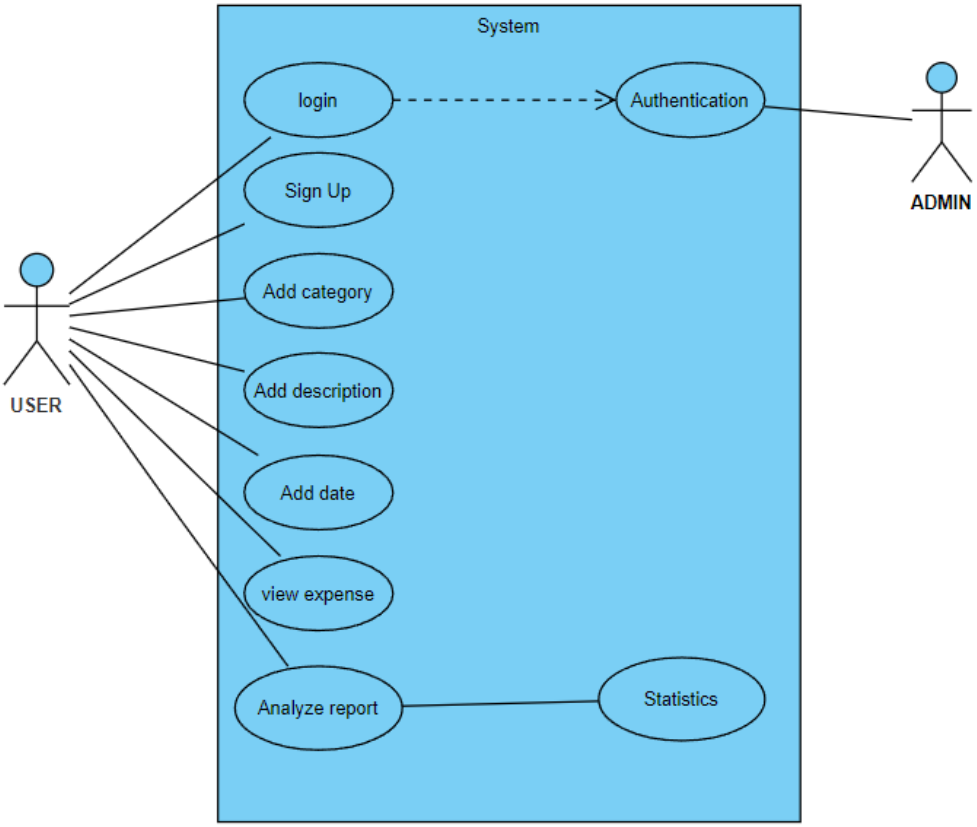

Figure 1: Use Case Diagram

3.3.2. ER Diagram

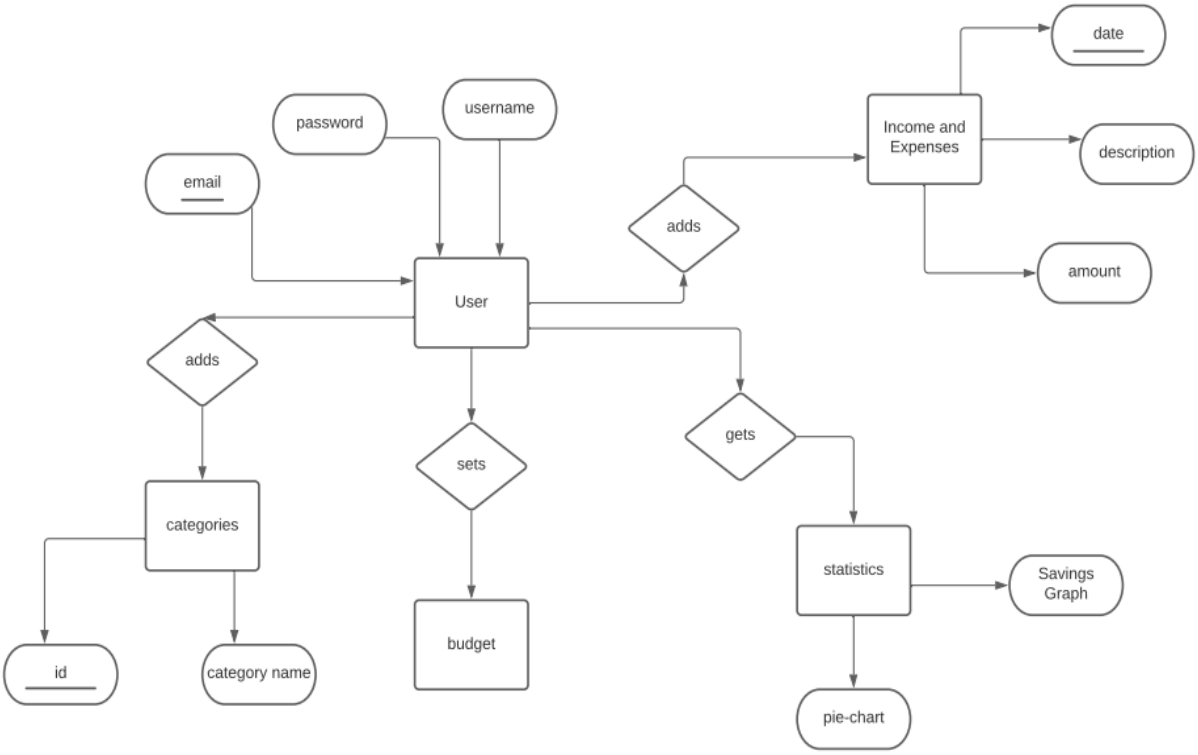

Figure 2: ER Diagram of the system

3.3.3. Work Flow Diagram

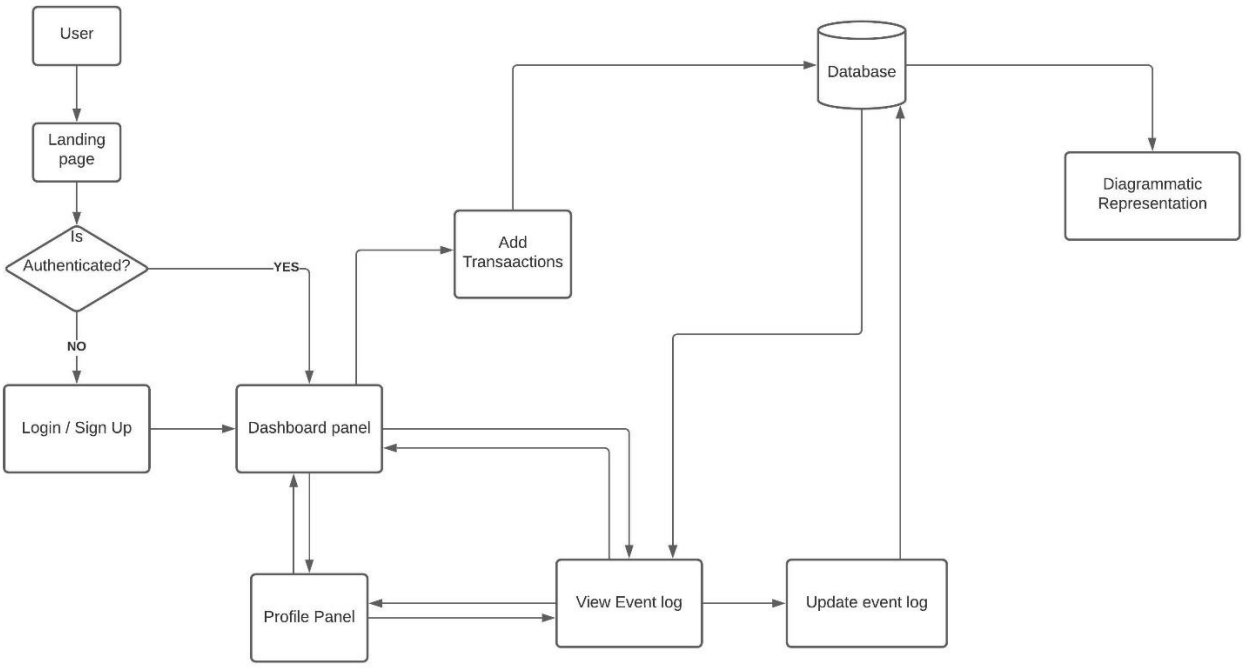

Figure 3: Work Flow diagram of the system

3.3.4. Sequence Diagram

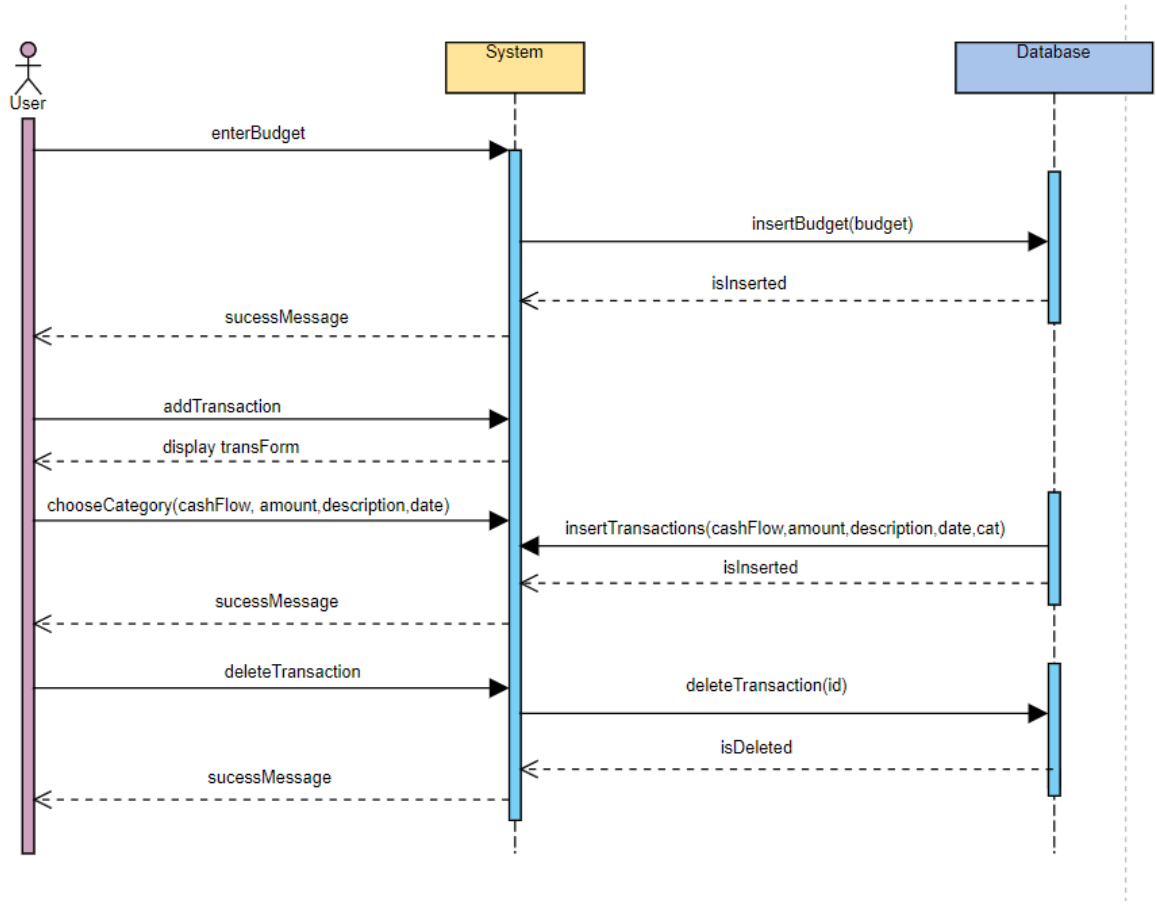

Figure 4: Sequence Diagram of the System

CHAPTER 4: IMPLEMENTATION AND EVALUATION

4.1. TOOLS AND TECHNOLOGY

Following are the tools used for the development of the system:

- PyCharm Community Edition – PyCharm was used as the main code editor for application development.
- VS Code – VS Code was used for basic HTML and CSS implementation.
- Windows PowerShell – PowerShell was used as a terminal to install packages and run the scripts of the application.
- MS-PowerPoint – PowerPoint was used to create and manage Gantt chart of the project.
- LucidChart – This web app was used to create various diagrams of the project.

Following are the technologies used for the development of the system:

- Python 3.8 – Python was used as interpreter environment for the project.
- Flask 1.1.2 – Flask was used to create a backend server.
- PIP 21.1.2 – PIP was used as a package manager to install modules / packages for the project.
- SQLITE: SQLITE was used for manipulating data from the database and visualizing to the user.
- JavaScript – JavaScript was used for development of frontend.
- Bootstrap – Bootstrap was used for making webpages more attractive and user friendly.

Following are some of the packages used for the development of the system:

- WTForms 2.3.3 – WTForms was used for flexible web form rendering.
- Werkzeug 1.0.1 – Werkzeug was used to create a WSGI compatible web application in Python.
- SQLAlchemy – SQLAlchemy was used as SQL toolkit and Object Relational Mapper for Python.

- Plotly 4.12.0 – Plotly was used to create data visualization in the form of pie-chart and line graphs.
- Flask Migrate 2.5.3 – Flask Migrate was used for SQLAlchemy database migrations for Flask applications using Alembic.
- Pillow 8.4.0 – Pillow was used for opening, manipulating, and saving images.

4.2. IMPLEMENTATION

The Web App consists of 3 major components:

1. The User Interface (Front-end)
2. Backend

The User Interface of the project is built using HTML and JavaScript. To design the front end of the project Bootstrap was used. The web app consists of major pages namely: Landing page, Login page, Sign Up page, Dashboard panel page, Transaction page, Event Log page and Profile page.

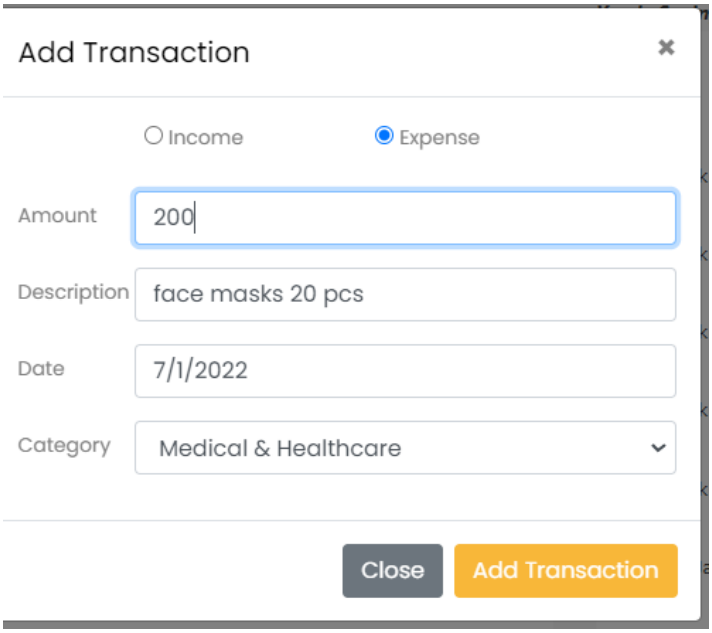

Figure 5: Add Transaction Box

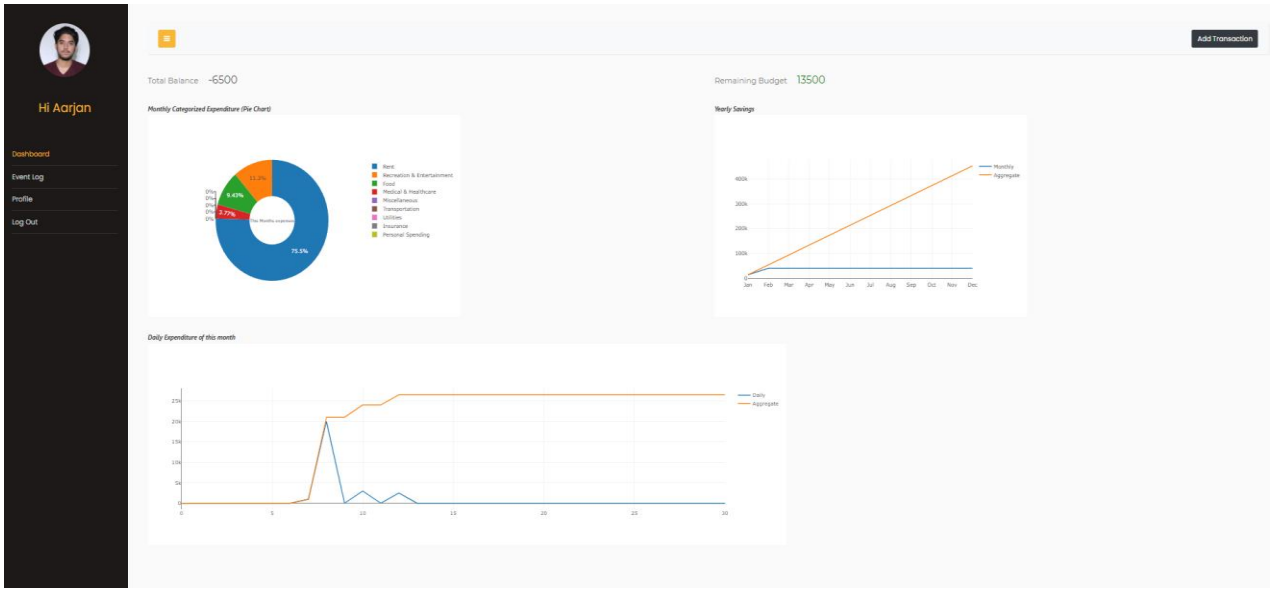

Figure 6: Dashboard Panel

The backend of the system is made through Flask, the handling of routes and authentication was handle using Flask, the database system that was used during the system was SQLITE.

Name	Type	Schema
Tables (3)		
alembic_version		CREATE TABLE alembic_version (version_num VARCHAR(32) NOT NULL, CC
version_num	VARCHAR(32)	"version_num" VARCHAR(32) NOT NULL
transactions		CREATE TABLE transactions (id INTEGER NOT NULL, "cashFlow" INTEGER,
id	INTEGER	"id" INTEGER NOT NULL
cashFlow	INTEGER	"cashFlow" INTEGER
amount	INTEGER	"amount" INTEGER
description	VARCHAR(64)	"description" VARCHAR(64)
cat	VARCHAR(64)	"cat" VARCHAR(64)
date	DATETIME	"date" DATETIME
userId	INTEGER	"userId" INTEGER NOT NULL
users		CREATE TABLE users (id INTEGER NOT NULL, email VARCHAR(64), name V
id	INTEGER	"id" INTEGER NOT NULL
email	VARCHAR(64)	"email" VARCHAR(64)
name	VARCHAR(64)	"name" VARCHAR(64)
pasword_hash	VARCHAR(128)	"pasword_hash" VARCHAR(128)
income	INTEGER	"income" INTEGER
budget	INTEGER	"budget" INTEGER
profile_image	VARCHAR(128)	"profile_image" VARCHAR(128) NOT NULL
Indices (1)		
ix_users_email		CREATE UNIQUE INDEX ix_users_email ON users (email)
Views (0)		
Triggers (0)		

Figure 7: Main Database

4.3. EVALUATION AND RESULT

Different white box testing was done to check the validation in the forms, the different results are as shown below:

Table 1: Whitebox testing for form validation

Name	Email	Password	Confirm password	Result	Expected Output
Aarjan Pokharel	abc@gmail.com	123456	123456	Success	Success
Roshan		pqrst	pqrst	Error	Error
Gauri Pandey	xxx	q%3gCM	q%3gCM	Error	Error
Hari Shrestha	abc@gmail.com	-7J=hj	-7J=hj	Error	Error
Nishan	nishan@gmail.com	Asd78d	Asd78d	Success	Success
	john@gmail.com	\tSJ3Y	\tSJ3Y	Error	Error
Becky Gautam	bkg@gmail.com	147258	147852	Error	Error

CHAPTER 5: CONCLUSION

Many teens and interns who have just started earning money don't have any idea of tracking and organizing their expenses in order to save for future purpose. So this applications helps users manage and record their daily expenses. This app allows users to set a budget and are notified when they exceed the set budget. Through diagrams such as pie-chart, users are able to view their expense in various categories and through line-graphs, they are able to analyze their daily expenditure. This app attempts to manage our daily expenses in a more efficient and manageable way.

It is user-friendly and easy to use system of a web-based application. Anyone who knows how to use web browser can register and then login to set a budget, add transactions based on various categories, view the event log with detailed information about the transaction and view the transaction data in diagrammatic form.

Thus, in general this project is able to solve the main problem i.e. overspending on less important things and sticking to assigned budget.

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[4] 2022. [online] Available at: <https://www.cnbc.com/select/best-expense-tracker-apps/> [Accessed 13 January 2022].

APPENDIX

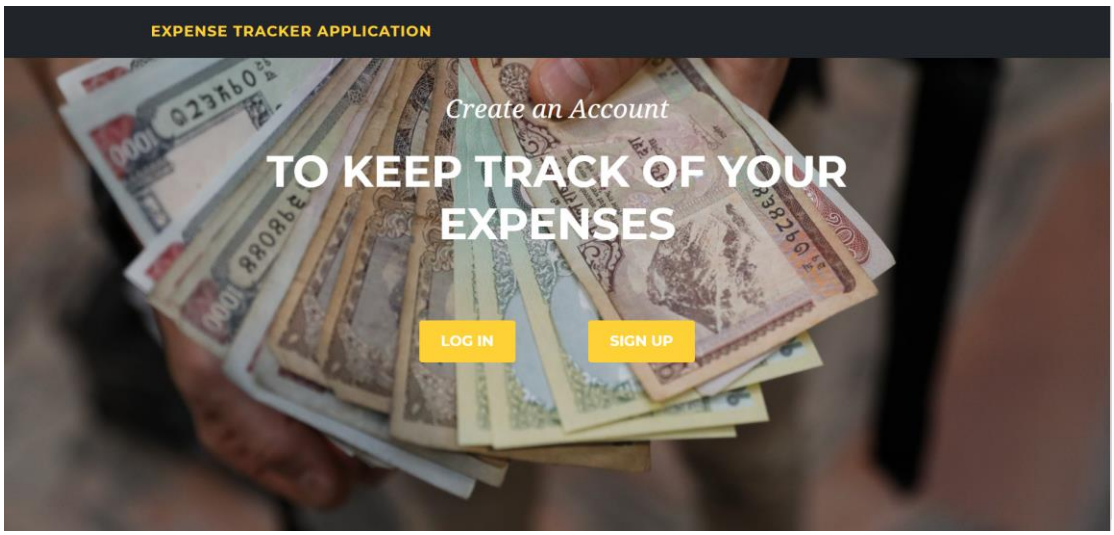

Figure A: Landing Page

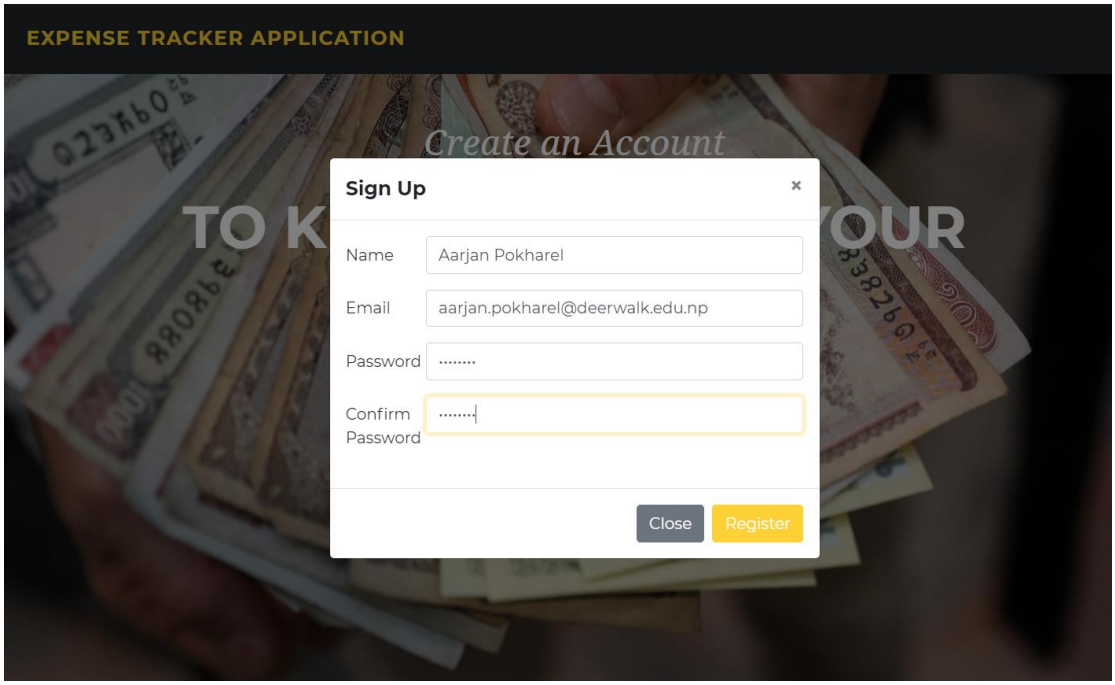

Figure B: Sign Up Box

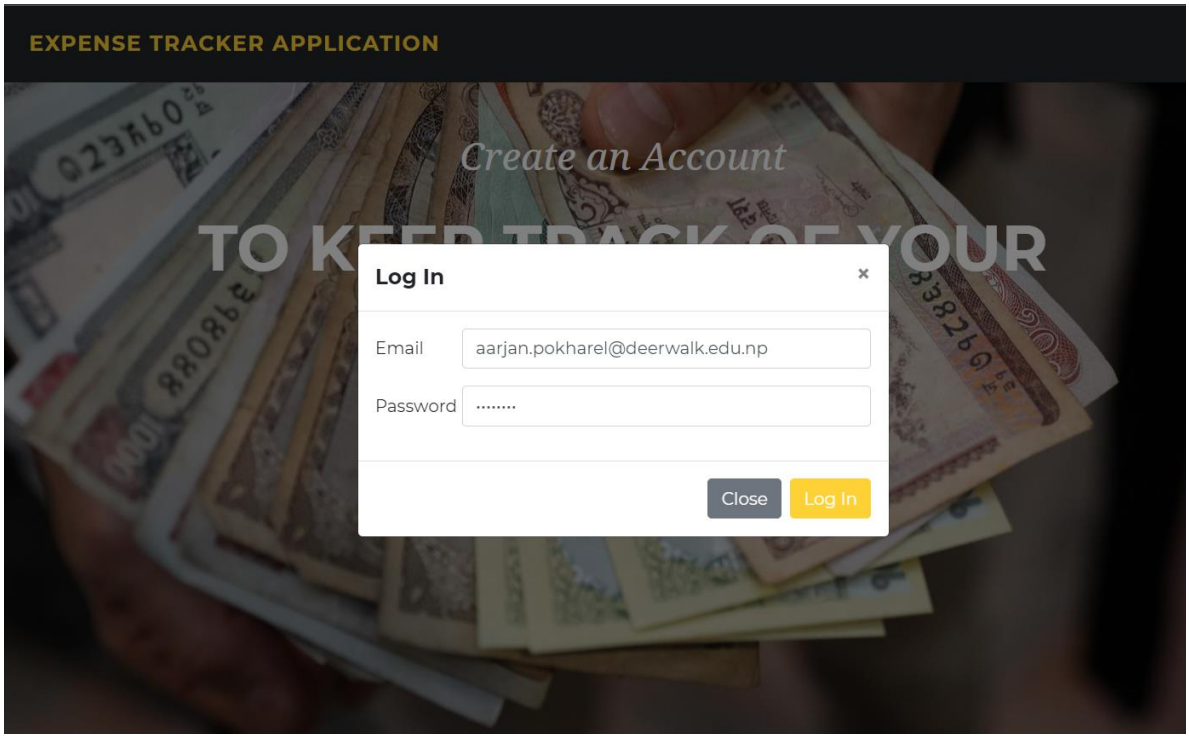

Figure C: Login Box

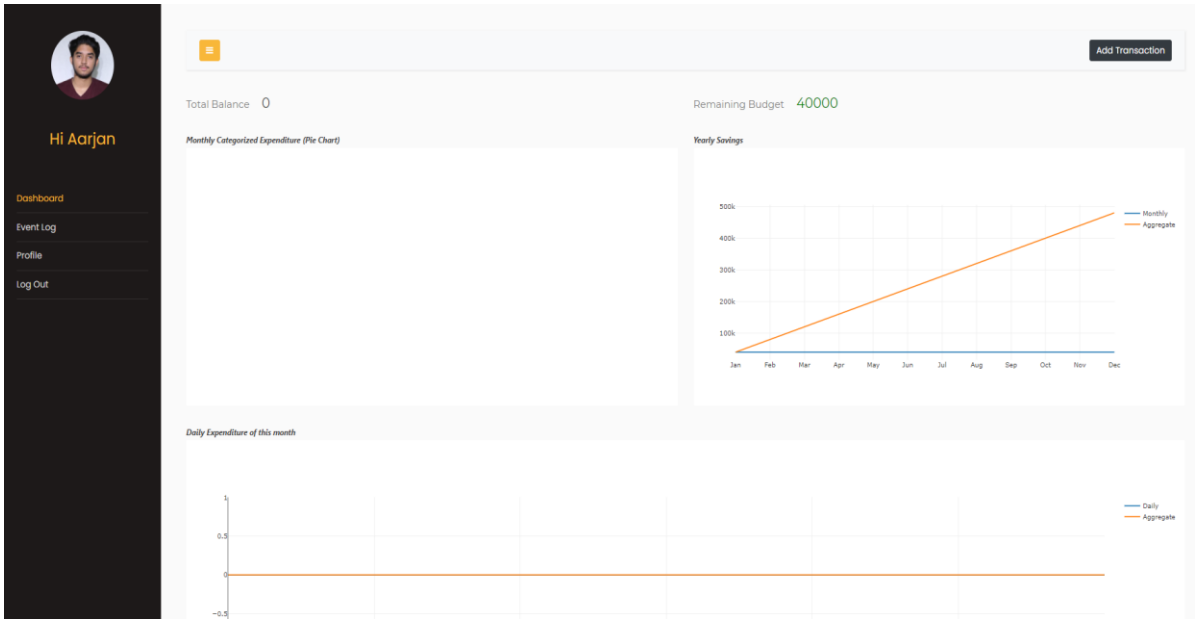

Figure D: Dashboard Panel (before adding transactions)

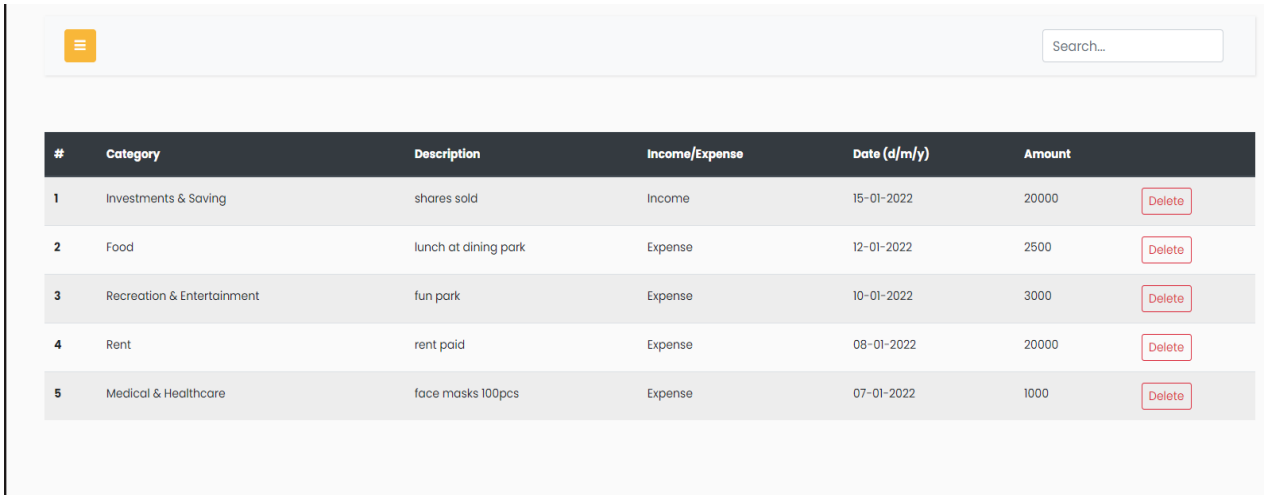

Figure E: Event Log Panel

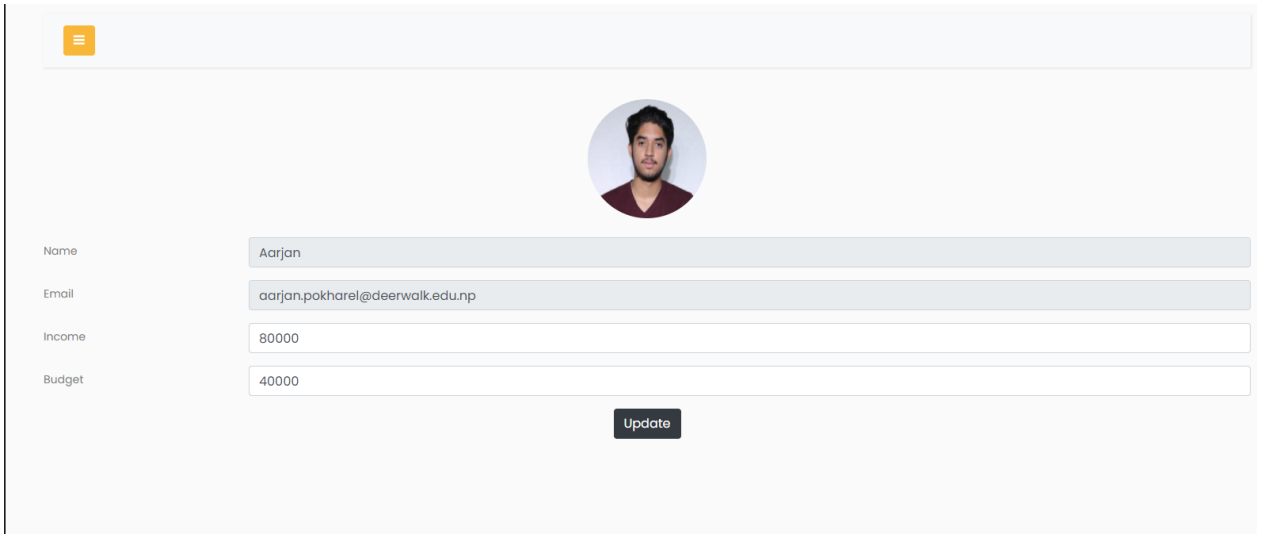

Figure F: Profile Panel