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Python Programming Course

B. Tech CSE Semester II

Capstone Student Project

Project Title: Expense Tracker

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Abstract

The Expense Tracker application is a voice-command-based personal finance program enabling the logging and tracking of income (gains) and expenditures with hands-free interaction. The system allows users to command operations using voice recognition and TTS (Text-to-Speech) technologies such as "Add Expense Food 150" or "Show Balance." All information is processed in real-time and stored in a structured MySQL database. This project, by its design, promotes financial literacy and accessibility with the help of an easy-to-operate interface supported by speech technology for daily finance tracking.

Introduction

Indeed, financial skills and budgeting are the last of the life skills that any person should possess. Unfortunately, tracking these skills in conventional ways is quite boring and time-consuming. This is where the Expense Tracker comes into play: by turning the most natural form of communication into the voice-in voice-out mode. Being developed in Python along with MySQL and open-source libraries for speech interaction, this tool records income and expenses just by speaking a sentence. In addition to daily tracking of finances, the application determines the balance in real time and offers spoken summaries. Thus, accessibility and convenience are added to finance tools.

Review of Literature

Budget apps like Walnut, Money Manager, and even Excel need you to sit and type it out and use it as well. Voice interfaces have provided a more convenient, gender-neutral way of dealing with apps. Google Assistant, Amazon Alexa, and Apple Siri are market leaders when promoting a particular form of voice interaction and showing the effectiveness of voice user commands as far as user interaction is concerned. For example, studies have established that although people with disabilities or simply selected individuals appreciate interactive systems, the size of the feature is very massive in voice control systems. The Expense Tracker offers this advanced technology to voice enablement in personal finance.

Methodology

The system follows a modular, event-driven architecture comprising the following key components:

- The comment Input Module: This makes use of the library speech recognition for interpretation of the upper text sound.
- Command Parsing: This part investigates command keywords such as "add gain" "add expense", for example "show balance", and so on.
- Text to Speech Feedback: This part uses pyttsx3 for performing transaction, giving results, and the rest.
- MySQL Database Layer: It creates an entry in the database with regard to transaction type (gain or expense), category, amount, and date.
- Balance Calculator: It adds the only gains and subtracts all the expenses from the total gains to get the net balance.
- Transaction Reporter: Lists out all the past transactions and gives an oral summary when the user desires.

Implementation

The Expense Tracker is coded in Python and is made up of four separate files, each of which serves a purpose:

- **main.py** – Runs the application and controls how things work, detects voice commands, and decides what to do.
- **voice_input.py** – listening on your microphone and writing it out as text with speech recognition.

- **speech_engine.py** – It speaks typed response and acknowledgments aloud with text-to-speech.
- **database.py** – Performs all the database operations on MySQL, i.e., adds and loads transactions and computes the balance.

The system accepts voice commands such as "add gain salary 5000" or "show transactions." It converts what you say into text and determines what type of transaction it is, what category it is in, and how much it is. Then, it spits that information into a MySQL table with the current time. If you need to check your balance or view recent transactions, it can do that as well, and it'll even read it back to you. This configuration makes handling your personal finances a breeze, fast, and hands-free.

Results and Discussion

The Expense Tracker was utilized with the following in mind:

- Understanding voice command
- Getting the transaction type, category, and amount
- Keep data in MySQL,
- Balances and transaction history reading.

Strengths:

- For use with an uninvolved hand,
- In-transaction balance monitoring
- Modular and extensible codebase.

Weaknesses:

- Background noise influences the accuracy of commands recognition;

- An accumulation may cause misunderstanding some accents and unclear pronunciation;
- It is presently in single-user window mode only.

Future Work

The project improvements and expansions are recommended in the following areas:

- Integrating GUI: Combine graphical and verbal interactive interface applications with each other.
- Multi-user Support: Authentication and user profiles need to be incorporated.
- Monthly Reports: Summaries of expenditures need to be generated on a category and days basis.
- Export Options: Enable export in CSV or PDF formats.
- Mobile Application: Porting the system on Android/ iOS platform.
- Smart Alerts: User alert on reaching budget limits.