Financial Advice Chatbot

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Intended use of the system

- The target users are individuals who want to manage their personal finances more effectively.
- Users will interact with the chatbot by uploading their financial documents, such as bank statements and other relevant documents. They can use it daily or weekly to check spending, savings progress, and budgets.
- The chatbot will be able to support tasks such as:
    - **Transaction categorization**: Automatically groups expenses (food, bills, shopping, etc.) so users don't have to track manually.
    - **Spending analysis**: Detects patterns, like overspending on dining out compared to last month.

Overall Functionality

- This AI model targets to resolve the dominant issue of individual management of finances, particularly for people who face issues in monitoring their expenditure and savings patterns. Many individuals find it boring or rather hectic to classify payments on a personal level or to scrutinize their bank statements in greater detail. Hence, for this section of the population, the AI chatbot will be useful, as it will solve the issue by facilitating an autonomous, interactive platform that eases the process of financial understanding and money management.

The **important functionality** of the system consists of:

- **Payments classification:** The chatbot will classify a group of spending into their respective bucket, like food, electricity bills, shopping, or movie ticket purchases, thereby eliminating the requirement for individual monitoring.
- **Expenditure insights:** The chatbot will be able to analyze the trends in the expenditure process of an individual, trying to make a judgment about which are the areas where the individual spends a lot (e.g. the person has dined-out for 8 times in a month).
- **Communicative questions:** The users of this chatbot can ask direct questions regarding the various categories of their expenditure for the current month, overspending areas, and the savings accumulated at the end of a particular month. The chatbot, in turn, will provide simple, understandable, and individualized responses.
- **Budget creation:** As one of the additional characteristics, the chatbot will have the ability to produce a practical financial monthly budget on the basis of the individual's past records of savings and expenditure.

To fulfill the functionalities of the AI system, various **AI methodologies** will be leveraged:

- **Machine Learning:** will be leveraged for payments classification, as the system can gain the knowledge to recognize spending groups from categorized data and optimize over time.
- **Knowledge representation:** will help in arranging the financial data into well-defined categories, enabling the chatbot to analyze the individual's expenditure and savings.

- **Reasoning under uncertainty:** will help when the classifications won't have any clear description (e.g., any ambiguous payment), making sure the chatbot still gives the highly probable categorization.
- **Natural Language Processing:** will enable the chatbot to understand the users' questions, be it typed or spoken, by recognizing core elements like dates, payment types, and other financial information. It will then transform the data in a structured way, so that the system can use it for deriving insights and valuable feedback.

Main Components of the System

We can break this project down into these components:

- Perception/Input Module
- Knowledge Base
- Inference Engine
- Learning Module
- User Interface (Bonus)

Why this is appropriate for the system:
A financial chatbot is complex, and breaking it down into logical AI components helps us understand how each part works together to deliver a smart, user-friendly experience. This modular approach ensures that each function, from understanding a user's question to providing a personalized financial insight, is handled efficiently. The proposed division into specific AI components is appropriate because it mirrors a classic AI system architecture, allowing us to clearly define the role of each module in achieving the chatbot's overall intelligent behavior. This structure also facilitates future development, debugging, and scaling.

- **Perception/Input Module**: This module uses Natural Language Processing (NLP) to understand user queries, whether they're typed or spoken. The NLP models will parse the text, identify key entities like dates, transaction types, or financial terms ("how much I spent on groceries this month?"), and convert this raw input into a structured format the rest of the system can process.
- **Knowledge Base**: It will store the user's financial data, including transaction history, categorized expenses (food, bills, shopping), savings goals, and established budgets. This data will be organized into a structured database. This structured data is crucial for the chatbot to perform accurate Expenditure insights and provide Communicative questions answers.
- **Inference Engine**: It will use the structured data from the knowledge base to answer user questions and generate insights. The inference engine leverages a combination of Machine Learning algorithms for tasks like payments classification, expenditure insights, budget creation.
- **Learning Module**: This component is responsible for the chatbot's ability to improve over time, a key part of Machine Learning. It will continuously learn from new, categorized data. When a user manually corrects a transaction's category (e.g., changing "Coffee Shop" from "Food" to "Entertainment"), the learning module updates the underlying model. This feedback loop refines the accuracy of the Payments classification and enhances the system's ability to provide more personalized and accurate financial advice in the future.
- **User Interface (UI)**: It's the front-end application (mobile/web) where the user interacts with the chatbot. The UI will display the personalized responses, visualizations (like charts and graphs of spending), and allow users to provide feedback.
