Project Documentation: Smart AI Expense tracker

1. Audience and Goals

As most students now rely on UPI for 90% of their daily transactions, they often lose track of micro-spends that accumulate into significant budget deficits by month-end. The goal of SmartStudent is to evolve the traditional 'passive' expense tracker into an 'Active Financial Advisor.' Rather than simply recording history, the system aims to predict future financial strain. By identifying mandatory academic costs (like assignments or project fees) ahead of time, the project seeks to instill financial discipline and prevent students from overspending on non-essential categories like snacks or entertainment during high-priority weeks.

2. Technical Specifications

The project is built on a robust Python-based data science stack. For data handling and transformation, Pandas and NumPy are utilized to manage the transaction ledgers. The core innovation lies in the Regex-based SMS Parsing Engine, which automates data entry by extracting transaction amounts and merchant names from standard bank SMS alerts. The intelligence layer employs Unsupervised Machine Learning (K-Means Clustering) to group unknown merchants into spending categories without manual tagging. For the supervised 'Advisory' component, a Decision Tree Classifier or Random Forest model is used to label transactions as 'Approve,'' 'Warn,' or 'Restrict' based on a multi-dimensional feature set including remaining balance, day type (Holiday/Weekday), and category priority

3. Methodology

The requirements for this system were derived from a 'User-Centric Design' approach, analyzing the cyclical spending habits of Indian students. Information gathering involved identifying two key variables: Academic Deadlines (where spending on stationery/printing peaks) and Social Cycles (weekends and festive holidays). To overcome the lack of public banking datasets, the project utilizes a Hybrid Data Generation Methodology..

4. User Experience (UX)

By automating the transition from a 'Notification' (SMS) to an 'Insight' (Dashboard), the system eliminates the manual effort that usually leads to user drop-off. The interface is dominated by visual story-telling rather than raw tables. Using Matplotlib and Seaborn, the app provides a 'Burn Rate' chart that compares the current spending trajectory against a 'Safety Line'. A unique 'Contextual Warning' pops up during transaction attempts: for example, if a student spends on a luxury snack, the UI displays a prompt stating, 'Spending 50rs now may leave you 20rs short for your Wednesday assignment.' This immediate feedback loop bridges the

Project Documentation: Smart AI Expense tracker

gap between digital spending and physical financial consequences.