Solution Approach

Home Loan Application Conversational Chatbot

This project implements a smart conversational interface that collects home loan application data using a natural multi-turn dialogue. The system is built using LangChain, LangGraph, and Streamlit, and powered by a local LLM (LLaMA3 via Ollama). It dynamically adapts the flow based on user responses.

Objective

Design a system that can:

- Collect all relevant data for a home loan application
- Ask only for missing or unclear fields
- Adapt questions based on employment type, property type, and previously filled values following multi-level, multi-branch flow
- Support free-form, unordered user inputs

Solution Approach

Requirement	Implementation
Conversational Form Filling	Uses a Streamlit chat interface to collect loan data step-by-step.
Adaptive Prompting	Uses conditional logic to ask only for missing fields.
Multi-level, Multi-branch Flow	Distinguishes salaried vs business and new vs resale properties, dynamically invoking the relevant agents.
Handles Partial Inputs	Users can provide partial data; already-collected fields are preserved.
Unordered Input Support	User can type any information at any stage; all agents are re-triggered smartly to extract whatever is possible.
Local Deployment	Runs entirely on local machine with LLaMA3 via Ollama, no API keys or internet needed.
Live Application Summary	Sidebar shows a real-time overview of collected details.
Final Structured Output	Summarises the application and generates final Application form along with final offer once completed.

Workflow

Input Captured: The user enters free-form text via chat.

Smart Routing Engine (LangGraph + LangChain): Triggers relevant agents based on current state.

Agent Execution: Each agent extracts specific structured information (as in table below).

State Update: Each agent only updates missing fields. Existing values are preserved.

Prompt Engine: Based on missing fields, the next prompt is dynamically generated.

Final Step: When all necessary fields are filled, the system generates a loan offer and displays a structured summary.

Agents Execution Details

Agent	Responsibility	Data Extracted
IncomeTypeAgent	Determine income classification	Employment type (salaried or business)
SalariedAgent	Extract salaried income details	Employer, income amount, income mode
BusinessAgent	Extract business income details	Company name, annual turnover, annual profit
PropertyTypeAgent	Identify property type	Property classification: new or resale
NewPropertyAgent	Extract new property information	Builder name, market value
ResalePropertyAgent	Extract resale property details	Previous owner, property age, market value
PersonalInfoAgent	Extract personal geographic data	City of residence
CreditAgent	Analyze financial credit history	Credit score, past defaults, recent defaults

Key Features

- Conversational form filling for home loan application
- Multi-level, multi-branch dynamic flow
- Adapt prompts based on user inputs
- Intelligent field extraction using multiple LLM chain
- Partial input handling across all agents
- Live chat history tracking in the sidebar
- Final structured summary of the collected loan application details

Possible Improvements

- Fine-tuning with a dataset of general user inputs to improve extraction accuracy and adapt the chatbot to diverse patterns.
- PDF Export: Auto-generate downloadable PDF summary with mapped offers for reference.
- Allow users to edit the collected summary details directly, enabling quick corrections to increase accuracy.
- Backend API: Connect to actual loan provider APIs to fetch personalised offers and map accordingly.