# **AI Chatbots, Voice Bots, and AI Callers**

## **1. Project Scope & Objectives**

To develop AI-driven chatbots, voice bots, and AI callers that:

* Interact with users through text and voice.
* Leverage AI models to understand intent, generate responses, and execute tasks.
* Match user queries with relevant database entries for enhanced interactions.
* Provide seamless integration into the KAPsurvey platform.

## **2. Architecture (high level that can be followed)**

### **Core Components:**

1. AI Chatbot:
   * Processes text queries using NLP.
   * Connects to a database to provide relevant information.
   * Supports multilingual capabilities.
2. AI Voice Bot:
   * Converts speech to text (STT) and text to speech (TTS).
   * Understands user intent using AI-driven natural language understanding (NLU).
3. AI Callers:
   * Automates outbound calls using AI-generated voices.
   * Understands spoken responses and provides relevant replies.

### **Tech Stack:**

| **Component** | **Technology** |
| --- | --- |
| Chatbot Framework | Rasa, Dialogflow, LangChain |
| Voice Bot & AI Caller | Amazon Polly, Google TTS, OpenAI Whisper, Twilio |
| AI Model | OpenAI GPT, Llama2, BERT, T5 |
| Database | PostgreSQL, MySQL, MongoDB |
| Backend | Python (FastAPI), C# |
| Cloud & Deployment | AWS Lambda, ECS, SageMaker |

## **3. Implementation Approach**

### **Step 1: Data Collection & Preparation**

* Gather survey datasets and past user interactions.
* Preprocess text data for NLP training.

### **Step 2: Chatbot & Voice Bot Development**

* Train AI models using NLP for intent recognition.
* Integrate database matching to fetch relevant information.
* Implement response generation (predefined + AI-generated).

### **Step 3: AI Caller System**

* Implement speech synthesis for AI-based calling.
* Develop call workflow automation (input processing → AI response → user feedback).

### **Step 4: Testing & Optimization**

* Test accuracy using real user inputs.
* Optimize AI models for speed & efficiency.
* Ensure compliance with ethical AI standards.

### **Step 5: Deployment & Monitoring**

* Deploy on AWS ECS (for scalable inference).
* Train models with SageMaker to ensure adaptability.
* Implement continuous monitoring & feedback-based improvements.

## **4. Expected Outcomes**

AI Chatbot capable of handling complex user interactions.  
Voice Bot that seamlessly converts speech to text and vice versa.  
AI Caller that automates user communication.  
Scalable architecture for future enhancements.

Project Execution Plan: AI-Powered Analysis Engine with Chatbot Integration

## **Phase 1: Requirement Gathering & Planning**

Duration: 1-2 weeks

### **Tasks:**

* Discuss with stakeholders to define key objectives.
* Identify insights required from survey data.
* Define chatbot functionalities (queries, reports, recommendations).
* Choose AI/ML models (NLP, statistical analysis, visualization).
* Select chatbot framework (Rasa, Dialogflow, OpenAI API).
* Finalize database & cloud architecture (AWS/GCP/Azure).

Deliverables:

* Project Scope Document
* Tech Stack Finalization
* High-Level Architecture Diagram

## **Phase 2: Data Collection & Preprocessing**

Duration: 2-3 weeks

### **Tasks:**

* Collect and clean survey data.
* Handle missing values, outliers, and inconsistencies.
* Identify and categorize data (text, numerical, categorical).
* Apply NLP techniques to convert text responses into structured formats.

Deliverables:

* Cleaned & Processed Data
* Data Storage Setup (SQL/NoSQL)

## **Phase 3: AI Engine Development**

Duration: 4-6 weeks

### **Tasks:**

* Implement statistical analysis (descriptive statistics, correlation analysis).
* Develop regression models for trend analysis.
* Train NLP models for sentiment analysis, keyword extraction, and topic modeling.
* Implement named entity recognition (NER) for survey responses.
* Generate dynamic charts, word clouds, and dashboards.

Deliverables:

* AI Engine Prototype
* NLP & Statistical Analysis Models

## **Phase 4: Chatbot Development & Integration**

Duration: 4-5 weeks

### **Tasks:**

* Define chatbot intents ("Show survey trends," "Get top complaints").
* Train chatbot on survey-related queries.
* Connect chatbot to AI engine APIs for real-time insights.
* Enable dynamic report generation via chatbot.

Deliverables:

* Functional Chatbot
* Chatbot-Analysis Engine Integration

## **Phase 5: UI/UX Development & Frontend Integration**

Duration: 3-4 weeks

### **Tasks:**

* Design a user-friendly dashboard for insights.
* Implement dynamic visualization panels.
* Develop frontend using React/Vue.js.
* Ensure mobile responsiveness and accessibility.

Deliverables:

* Web-based UI with chatbot
* Dashboard & Visualization Panel

## **Phase 6: Testing & Performance Optimization**

Duration: 3-4 weeks

### **Tasks:**

* Perform unit and integration testing.
* Validate chatbot responses and AI predictions.
* Conduct performance and load testing.
* Implement security and compliance measures.

Deliverables:

* Fully Tested AI Analysis Engine
* Performance Optimization Report

## **Phase 7: Deployment & User Training**

Duration: 2-3 weeks

### **Tasks:**

* Deploy AI engine on cloud (AWS/GCP/Azure).
* Set up chatbot on the live platform.
* Provide tutorials for end-users.
* Gather initial feedback for improvements.

Deliverables:

* Live AI-Powered Analysis Engine
* User Documentation & Training

## **Phase 8: Post-Launch Support & Enhancements**

Duration: Ongoing (1-2 months post-launch)

### **Tasks:**

* Address reported bugs and issues.
* Optimize AI models based on real-world usage.
* Expand chatbot capabilities (voice support, multilingual features).
* Enhance reporting and visualization options.

Deliverables:

* System Performance Review
* Version Updates

### **Total Estimated Project Duration: 5-6 Months**