

TRANSFORMING FARMING WITH VOICE AI ASSISTANT FOR KANNADA-SPEAKING FARMERS WITH LOW LITERACY

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Keywords:

Voice AI, Speech Recognition, Text-to-Speech, Natural Language Processing, Kannada Language Processing, Smart Agriculture, Knowledge Base, Voice-Based Interface.

Introduction:

Agriculture is the backbone of India's economy, employing more than 50% of the population. In the state of Karnataka, agriculture is not just a means of livelihood, but a way of life for millions of rural households. Despite significant advances in agricultural science and technology, many farmers—especially small and marginal landholders—are unable to fully benefit from modern knowledge, tools, and government schemes. One of the most critical reasons for this gap is the lack of accessible, localized, and understandable information.

Voice-based technologies offer a unique solution to bridge this gap. In recent years, advances in artificial intelligence (AI), natural language processing (NLP), and speech technologies have made it possible to build intelligent voice assistants that understand and respond in regional languages. A Voice AI Assistant tailored for Kannada-speaking farmers can enable users to ask questions in their natural language and receive spoken responses, completely removing the barrier of text-based interaction.

Objectives:

1. Farmers are facing lot of issues even in the era of Digital disruptions. Conversational Generative AI bots powered by natural language processing have the potential to always assist farmers regarding all the intricacies involved in farming which positively impact the economy.
2. This project applying a similar approach for agriculture on which more than 70% of the rural Indian population is dependent and many are illiterate.
3. Conversational Generative AI internally uses Natural Language Processing which is a subdivision of Artificial Intelligence (AI) that powers computers to understand, comprehend and process human languages. In addition, Farmers are also affected by

climate change, economic issues, environmental issues that affect whether like Soil quality, water quality, climate, and terrain etc.

4. Despite all these issues farmer community is striving hard to supply food to the growing world population. To provide timely help to all the farmers on the various aspects related to farming and market conditions, we can develop a Farmers Friend including Text/Image/Voice- A Generative Conversational AI BoT for smart agriculture.

Methodology:

NLP is at the heart of conversational AI.

1. NLP Engine: Natural Language Processing (NLP) engine makes use of artificial intelligence technology to better understand a sentence or phrase based on the user input query. Chatbots are developed based on a rule- based engine that requires detailed queries to be provided which results in results being large and inefficient. NLP engine extracts data and returns actionable results that comprises of predictable intents, entities (both standard and custom) and user requests from expressions.
2. Bot Builder: The Bot builder which is also indicated as the runtime of the dialogue, which is a Graphical User Interface (GUI) where the interaction flow can be created by the user. This is the place where user would indicate the bot how to respond to user's Input messages. A bot builder provides a distinctive user experience environment which accelerates the complete bot development process.
3. Bot Logic: It is Cloud platform, which is responsible for invoking and consuming OData services or APIs from the back-end database and system and exposing that Information to conversational AI, the Bot logic can be written and exposed as a web API in any Programming language of the developer's choice.
4. Bot Connector: It is an adaptor that enables CAI to connect to many channels of communication, like messenger, webchat, slack, Microsoft Teams, etc. Based on customer specifications, the Bot connector may be hosted on on-premises System also.

Result and Conclusion:

Transforming farming with a Voice AI Assistant for Kannada-speaking farmers with low literacy holds the power to bridge the digital and knowledge divide in rural India. By using natural voice communication in the local language, farmers can access critical agricultural information—such as crop advisories, weather forecasts, market prices, and government schemes—without needing to read or write. This solution empowers farmers to:

1. Make informed decisions,
2. Increase productivity and income, and
3. Reduce dependency on intermediaries.

Ultimately, Voice AI in Kannada helps create a more inclusive, self-reliant, and technologically empowered farming community, ensuring that language and literacy are no longer barriers to agricultural program.

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Future Scope:

1. In the future, the system can be scaled to support multiple Indian languages, enabling national level adoption. Integration with government e-agriculture portals and NGOs could create a nationwide rural support network. It may also serve as a foundation for AI-based voice training modules, helping farmers learn digital skills through Kannada audio guidance.
2. Furthermore, as speech technology advances, the assistant could evolve into an offline, solar powered smart device usable in areas with poor connectivity. The future scope also includes partnerships with agri tech startups, agricultural universities, and local cooperatives for continuous data improvement. Ultimately, the project can contribute to a digitally empowered rural economy aligned with India's "Digital Bharat" vision, promoting inclusive growth through technology.