AgriMind: AI-Powered Mental Health Assistant for Farmers

1. Project Overview

AgriMind is an AI-powered mental health assistant designed to support farmers in rural areas.
The system utilizes sentiment analysis to detect emotional states from text inputs and provide appropriate, empathetic responses.
It also logs interactions to a Supabase backend for trend analysis and reporting.

This project aligns with UN SDG 3 (Good Health and Well-being) and SDG 2 (Zero Hunger) by addressing the mental strain that affects farmers' productivity and quality of life.

2. Objectives

- Offer accessible, AI-driven emotional support to farmers.
- Analyze mental wellness trends using sentiment classification.
- Store and visualize mood data securely via a cloud backend.
- Equip stakeholders (e.g., NGOs) with insights through a dashboard.

3. Tools and Technologies Used

- Frontend: Streamlit (Python)
- Backend: Supabase (PostgreSQL + REST API)
- AI/ML: Scikit-learn (Logistic Regression), TfidfVectorizer
- Deployment: Streamlit Cloud (or Render/Heroku)
- Other Libraries: dotenv, pandas, joblib, supabase-py

4. System Architecture

The system comprises:
- A Streamlit frontend where users interact with the chatbot and admins view dashboards.
- A lightweight ML model trained on simple labeled text for mood prediction.
- A Supabase backend that stores user messages and mood classifications.

- A secure admin dashboard accessible via login to view aggregated mood trends.

5. Key Features

- Real-time mood detection from text input.
- Intelligent chatbot that responds with personalized messages.
- Dashboard with login-based access for data visualization.
- Daily mood trend line chart and mood distribution bar chart.

6. Model Training

We trained a Logistic Regression model using TfidfVectorizer on a small dataset of labeled messages. The model was serialized using joblib and loaded during runtime.

Example labels: ['positive', 'neutral', 'negative']

7. Supabase Database

The 'messages' table schema:
- id (uuid)
- timestamp (timestamptz)
- user_name (text)
- message (text)
- mood (text)

Environment variables SUPABASE_URL and SUPABASE_KEY are securely loaded from a `.env` file.

8. Ethical Considerations

- User data is anonymized and securely stored.
- No personally identifiable information (PII) is exposed.
- Model fairness and accessibility in low-resource settings are prioritized.

9. Expected Impact

AgriMind enables farmers to express emotional concerns safely, get instant support, and connect with mental health tips. Over time, trends from communities can be analyzed to inform mental health interventions and policies.

10. Conclusion

AgriMind demonstrates the potential of lightweight AI tools in enhancing health and well-being in agricultural communities. It combines machine learning, ethical design, and software engineering to address SDGs practically.