Project Implementation Plan: Echo – AI That Hears the Silent Cries

1. System Overview

"Echo" is a Telegram-based AI chatbot designed to support mental health by detecting emotional distress in user conversations. It uses sentiment analysis, standardized clinical assessments (PHQ-9, GAD-7), and a real-time alert system to notify trusted contacts when signs of severe emotional risk are detected.

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2. Chatbot Architecture

Components: - **Telegram Bot**: Interface for user interaction - **Python Backend**: Handles logic and communication with Telegram API - **NLP Engine**: Analyzes sentiment and emotion using TextBlob or VADER - **Assessment Module**: PHQ-9 and GAD-7 scoring system - **Risk Evaluator**: Determines severity based on responses - **Alert Trigger**: Sends notifications via SMS (Twilio) or email (SMTP)

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3. Alert System Workflow

1. User chats with the Telegram bot.
2. The chatbot processes messages using NLP.
3. Users complete PHQ-9 or GAD-7 assessments.
4. Sentiment and scores are evaluated.
5. If risk is high, an alert is triggered to a trusted contact.
6. Alert includes emotional status and safety recommendation.

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4. Technologies Used

- **Python**: Core programming language
- **Telegram Bot API**: Chat interface
- **TextBlob / VADER / HuggingFace**: Sentiment and emotion analysis
- **PHQ-9 / GAD-7**: Clinical assessments
- **Twilio / SMTP**: For sending alerts
- **Flask** (optional): Backend server
- **Firebase / MongoDB**: Data storage
- **GitHub**: Version control
- **Render / Railway**: Cloud deployment

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5. Data Flow

User → Telegram Bot → Python Logic → - Sentiment Analyzer - PHQ-9 / GAD-7 - Risk Evaluation - Normal: Sends support messages - High Risk: Sends alert to guardian (SMS/Email)

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6. Privacy & Security

- Secure API keys using environment variables
- Optional anonymous mode
- No personal identifiers stored unless approved
- Secure cloud database with access control

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7. Development Timeline

Week	Task
1-2	Bot setup, message handlers, sentiment test
3	PHQ-9/GAD-7 integration
4	Risk engine + decision logic
5	Alert system via Twilio/SMTP
6	Cloud storage integration
7	Testing + fine-tuning
8	Deployment + final report/demo

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8. Final Deliverables

- Telegram chatbot that interacts naturally
- PHQ-9 / GAD-7 assessments
- Sentiment and emotion detection
- Alert mechanism to trusted contacts
- Secure backend with optional data storage
- Hosted and ready-to-demo system