

AI-Powered Behavioral Analysis for Suicide Prevention, Substance Use, and Mental Health Crisis Detection with Longitudinal Geospatial Crisis Trend Analysis [AI4MH (AI for Mental Health Crisis Monitoring)]

Google Summer of Code 2026 – Contributor Selection Task

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Purpose of This Task

This assessment evaluates architectural thinking, responsible AI reasoning, and communication clarity. It is designed to reflect the type of systems-level work required during GSoC.

This is not a model-building competition.

Project Context

AI4MH has completed its prototype phase (data ingestion, sentiment analysis, geocoding, dashboard visualization).

The next phase focuses on governance readiness. The system must operate in a public health environment where reliability, auditability, bias mitigation, and human oversight are mandatory.

This task simulates the type of design and reasoning work expected during the GSoC coding period.

Scenario

AI4MH monitors aggregated public sentiment across Alabama counties.

Within a 72-hour window, three counties show a significant increase in negative sentiment associated with depression and suicide-related language.

The State Behavioral Health Office asks: “Is this a credible signal requiring attention?”

Design the logic layer that determines whether escalation to human review is warranted.

Required Deliverables

1. Crisis Signal Design (Core Component)

- Design a structured crisis scoring framework integrating:
- Sentiment intensity
- Volume spike detection
- Geographic clustering
- Your framework must include:
- Minimum sample size threshold
- Smoothing or stabilization method
- Confidence or uncertainty estimate
- Pseudocode is acceptable. Advanced machine learning is not required.

2. Governance & Risk Controls

- Explain how the system addresses:
- Bot amplification or coordinated activity
- Media-driven spikes
- Rural underrepresentation or sparse data
- Define escalation thresholds and human-in-the-loop processes.
- Specify audit logging structure.

3. Governance Reflection (Short Section)

- Identify the primary risk of premature deployment.
- Identify the single most important safeguard.

Submission Requirements

- 3–4 pages maximum (excluding optional diagram)
- Optional single architecture diagram
- Clear section headings required
- Submit as a single PDF via the GSoC portal
- Estimated time: 6–8 hours over one week
- Work must be original.
- Use of generative AI tools must be disclosed.
- Plagiarized or template-based submissions will not be considered.

Evaluation Criteria

- Submissions will be evaluated on:
 - Systems thinking and architectural clarity
 - Responsible AI and governance awareness
 - Bias identification and mitigation strategy
 - Treatment of uncertainty and confidence modeling
 - Professional written communication
- Strong submissions demonstrate constraint discipline, clear logic, and understanding of public-sector responsibility.