Dr Vishwanath Karad MIT World Peace University

Ignisia

24 HOUR NATIONAL LEVEL AI HACKATHON

Mid-Hackathon Twists

Each problem statement has two twists.

Twists are additions to the problem scope.

SME-01 Multi-Format Knowledge Retrieval Agent for SME Operations

Tools for SME

TWIST 1

The agent must now be integrated into a mocked CRM interface. When an employee searches for a client's information, the agent must autonomously auto-fill a Support Ticket form — populating the issue, relevant context, and suggested resolution — entirely from the retrieved documents, without any manual input.

TWIST 2

Introduce a scenario where two documents contain conflicting information — for example, an old email quoting one price and a newer policy PDF quoting a different one. The agent must detect the conflict, identify which source is more recent, prioritize it, and explicitly explain its reasoning to the user rather than silently returning one answer.

SME-02 Autonomous RFP Response & Competitive Quotation Orchestrator

Tools for SME

TWIST 1

The RFP arrives from an international client. The pipeline must dynamically apply live currency conversion and add the correct regional tax brackets to the final quotation PDF — without any manual reconfiguration by the user.

TWIST 2

The competitor suddenly drops their price below the SME's base production cost. The agent must recognize that matching this price is impossible and autonomously pivot strategy — rewriting the proposal to bundle a value-added offer (such as a free warranty or extended service) to win the bid on value rather than price.

SME-03 Few-Shot Visual Quality Inspection System for Micro-Manufacturing

Tools for SME

TWIST 1

After the system correctly flags what appears to be a defect, the supervisor recognizes it as a natural, acceptable grain or crease in the leather — not a real flaw. The UI must provide an 'Accept as Normal' button that, when clicked, dynamically updates the model's learned distribution on the fly to include this variation going forward, without stopping the production line for a full recalibration.

TWIST 2

The product line switches mid-shift — from leather goods to ceramic tiles. Without any new calibration set, the system must detect that its current 'Golden' distribution no longer applies and prompt the supervisor to provide a new reference batch, then seamlessly re-adapt within one minute.

FT-01 Webhook Reconciliation Engine with Autonomous Ledger Healing

FinTech

TWIST 1

Not all duplicate webhooks are innocent retries — some may be malicious replay attacks attempting to trigger a refund event twice. Introduce an anomaly detection layer into the ingestion pipeline that analyzes duplicate metadata (timing deltas, payload patterns) to distinguish a harmless network retry from a suspicious replay. The dashboard must include a security flag: harmless duplicates are silently dropped, while anomalous duplicates are surfaced with a fraud probability score and blocked from touching the ledger.

TWIST 2

The gateway experiences a full outage and then floods the system with thousands of backlogged, duplicated webhooks at once. The system must handle this surge without database locking — applying dynamic rate-limiting and enforcing idempotency under high-concurrency conditions so no transaction is double-counted.

FT-02 Real-Time MSME Credit Scoring via Alternative Business Signals

FinTech

TWIST 1

Multiple MSMEs are found to be rotating the same UPI funds in a circle among themselves to artificially inflate their transaction velocity scores. The system must model these transactions as a network graph — with businesses as nodes and payments as edges — and detect closed-loop money rotation patterns. The dashboard must visually display the fraud ring, showing the connected entities and the funds flowing between them, so a loan officer can see the topology of the fraud directly.

TWIST 2

The government introduces a GST amnesty scheme for a specific quarter. The model must dynamically adjust its feature weights so that late filings during that window are not penalized — without retraining the entire model from scratch.

HC-01 Agentic Diagnostic Risk Assistant for ICU Complication Detection

Healthcare & Accessibility

TWIST 1

The technical Diagnostic Risk Report produced by the agents is packed with clinical jargon that is incomprehensible to the patient's family. Add a secondary output to the pipeline: a compassionate, jargon-free summary of the patient's last 12 hours — written as if explaining to a non-medical family member and translated into both English and a regional language. This output must be surfaced in a separate 'Family Communication' tab on the dashboard.

TWIST 2

A new lab result arrives that directly contradicts three prior days of consistent data — likely a lab error. The Chief Synthesis Agent must detect this statistical outlier, flag it as a probable mislabeled result, and refuse to revise the diagnosis until a confirmed redraw is received. It must not silently incorporate the anomalous value.

HC-02 Contact-Free Cardiac Stress Monitoring via Facial Video Analysis (rPPG)

Healthcare & Accessibility

TWIST 1

rPPG is unreliable when the patient is moving or lighting is poor. Rather than failing silently, the system must build a Triage Decision Agent: when the signal-to-noise ratio of the rPPG feed drops below a confidence threshold, the pipeline automatically switches to a Visual Assessment Mode — using a lightweight CNN or Vision-Language Model to analyze visible physical signs of distress such as pallor, sweating, or labored breathing, and output a Visual Stress Score as a fallback. The dashboard must display which mode is currently active and why, toggling dynamically between Biometric Mode and Visual Assessment Mode based on whichever signal the agent deems more trustworthy in the current environment.

TWIST 2

Real-time inference is disabled due to device overheating. The system must fall back to accepting a pre-recorded 10-second MP4 video upload, processing it fully in the backend to extract a static average BPM — maintaining accuracy without any live tracking.

HC-03 Golden-Hour Emergency Triage & Constraint-Based Hospital Routing System

Healthcare & Accessibility

TWIST 1

Before the EMT enters any vital signs, they photograph the accident scene — a crushed vehicle, a visible wound. Add a lightweight image classification model that instantly estimates trauma severity from the scene photograph alone. If a high-severity scene is detected, the system must automatically filter the hospital list to Level 1 Trauma Centers only, overriding the standard routing before the EMT completes the vitals form.

TWIST 2

Three major arterial roads close suddenly mid-journey due to an emergency road block. The routing engine must detect the closure, recalculate ETAs in real-time, and re-route any ambulance currently en route if a better hospital is now reachable — without requiring dispatcher intervention.

ED-01 AI-Assisted Answer Clustering & Grading Acceleration Engine

Education & Skill

TWIST 1

Once a professor assigns a grade and a short shorthand note to a cluster — for example, 'Forgot to carry the negative sign, 4/10' — a background LLM must expand this into a fully personalized, empathetic tutoring paragraph for every student in that cluster. The output must explain the specific mistake, provide a concept recap, and generate a new practice question tailored to that error. These must be exportable as individual student PDFs or email texts.

TWIST 2

Students are now permitted to answer in a mix of English and a regional language. The clustering engine must map semantic equivalence across languages — a correct answer in Hindi must cluster with a correct answer in English, not be isolated as a separate unknown group.

ED-02 Real-Time Procedural Skill Coach Using Hand-Tracking & Spatial Analysis

Education & Skill

TWIST 1

Skill decay is a bigger risk than a failed attempt: a student who passes today may forget the procedure in three weeks. Using each student's historical hand-tracking session data — number of attempts, hesitation points, micro-tremor patterns — build a predictive model that forecasts when that specific student is likely to fall below competency. The dashboard must display a projected decay date and automatically schedule a refresher session before that threshold is reached.

TWIST 2

The camera angle shifts unexpectedly from top-down to a side angle, partially occluding several hand joints. The tracking logic must adapt — inferring likely positions of hidden joints based on the visible ones — rather than failing or halting feedback entirely.

EN-01 Satellite-Based Urban Tree-Equity Auditor & Planting Prioritization Engine

Environment & Sustainability

TWIST 1

Planting a tree in the wrong microclimate means it dies within a year, wasting the entire budget. Introduce a survival prediction model that takes the localized Land Surface Temperature, soil moisture proxies, and historical weather trends for each candidate zone and outputs a species-specific 5-year survival probability. The dashboard must recommend not just where to plant, but which tree species to plant and its projected survival rate under local conditions.

TWIST 2

A severe drought is declared. The system must cross-reference all high-priority planting zones against municipal water-line proximity data and filter out any zone that cannot support the irrigation requirements for sapling survival — automatically revising the ranked intervention list.

EN-02 Hyperspectral Methane Super-Emitter Detection, Quantification & Source Attribution

Environment & Sustainability

TWIST 1

The satellite feed goes offline. Without real imagery, the system must pivot: build a synthetic data generator that produces a stream of mocked methane alert JSON objects — each with GPS coordinates, estimated flux rate, wind vector, and a confidence score. A multi-agent pipeline must then triage this stream: one agent filters false positives by cross-referencing alerts against a mocked industrial facility database, and another agent drafts a Regulatory Intervention Brief for the top 5 highest-risk leaks identified.

TWIST 2

The satellite sensor is degraded by heavy Gaussian noise. The pipeline must apply a denoising step before segmentation to prevent the noise from generating false positives across the entire image.

SC-01 Predictive Last-Mile Transit Synchronizer with Dynamic Fleet Positioning

Smart Cities

TWIST 1

A breakdown at one station does not just affect that station — it ripples through the network, creating unnatural demand surges at downstream stations 30–60 minutes later. The system must model this contagion effect: when a disruption is triggered at one node, the model must predict how demand shifts across all connected stations over the next hour and pre-position the fleet to intercept those future surges. The dashboard must include a simulation mode where a judge can trigger a breakdown and watch the demand ripple play out visually in real-time.

TWIST 2

The entire fleet of e-bikes drops to 15% battery. The routing engine must dynamically restrict assignments to trips under 2 km that end near a designated charging hub, refusing longer requests until battery levels recover.

SC-02 Drone Image-Based 3D Infrastructure Defect Detection & Severity Scoring

Smart Cities

TWIST 1

Every detected defect must be automatically tagged with its real-world geographic coordinates — derived from the drone's flight metadata or GPS EXIF data embedded in the image. The inspection report must display each defect pinned on an interactive map at its exact physical location on the structure.

TWIST 2

The inspection report must include a heatmap overlay on the structure showing defect severity distribution — not just individual flagged points, but a continuous color gradient from green (structurally sound) to red (critical) across the entire inspected surface, so an engineer can immediately see the worst zones at a glance.