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Blistering past horizons.

Coding Club
IIT Guwahati

SAPTANG™
Proactive Threat Defence

Saptang Labs - Product Development Challenge

Challenge Overview:

Modern campuses produce vast, diverse data—swipes, Wi-Fi logs, library checkouts, helpdesk notes, bookings, CCTV snapshots—yet these stay siloed, hindering activity tracking for students, staff, or assets. Security and operations teams need a privacy-aware, explainable system that unifies records, resolves identities across sources, and delivers accessible insights. This challenge asks participants to design a Campus Entity Resolution & Security Monitoring System that links identifiers, reconstructs activity histories, predicts missing data, and proactively alerts anomalies via an interactive, user-friendly interface.

Product Development

Objectives

The primary aim of this project is to build a Cross-Source Entity Resolution System with Security UI that can:

1. Entity Resolution – Resolve campus entities (student, staff, asset, or device) across heterogeneous datasets, handling multiple identifiers such as name variants, student_id, email, card_id, device hash, or face_id.
2. Cross-Source Linking – Link matching records and images across structured data, text notes, and visual inputs, using both direct and inferred relationships.
3. Multi-Modal Fusion – Integrate all retrieved records into a unified view enriched with provenance and confidence scores.
4. Timeline Generation – Build a chronological timeline of activities for the chosen window (e.g., today until now) and summarize it into a clear, human-readable format.
5. Predictive Monitoring with Explainability – When data is missing at a given time, predict the most likely state or location using ML-based inference, and justify predictions with evidence (e.g., last seen access point, swipe sequence, nearby device logs).
6. Security & Alerting – Provide a dropdown-based dashboard for queries (asset type, ID/name, time T/current time), display complete daily history, and trigger alerts if an entity/asset has not been observed in any logs for the past 12 hours.

Requirements for Round 1

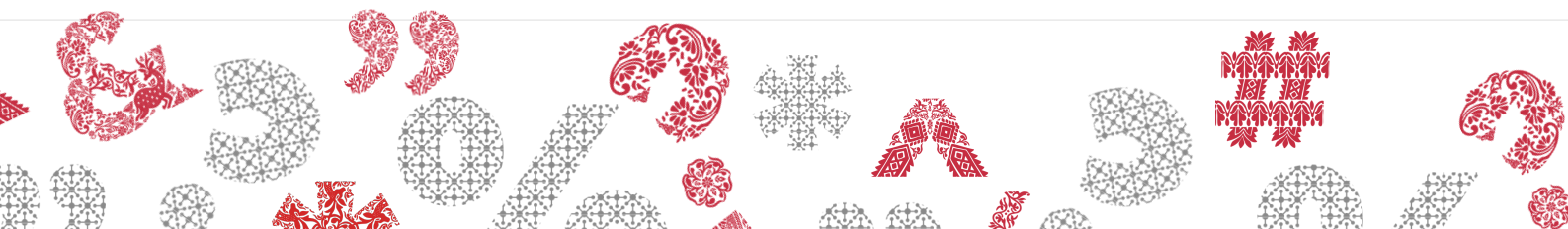
1. GitHub Repository – Submit complete runnable code with a clear structure and basic documentation.
2. Demo Video (3–5 minutes) – Showcase sample queries, timeline generation, predictive inference, and a brief UI walkthrough.
3. Technical Report (<10 pages) – Cover system architecture and entity resolution algorithms, multi-modal fusion and timeline generation, predictive monitoring with explainability, performance analysis (accuracy, runtime, scalability), and privacy safeguards/failure mode analysis.

Dataset

A synthetic dataset will be provided, containing simulated records such as:

- Student and staff profiles (IDs, emails, departments, etc.)
- Campus card swipe logs (card_id, location_id, timestamp)
- Wi-Fi association logs (device_hash, ap_id, timestamp)
- Library checkouts and room/lab bookings
- Free-text notes (helpdesk tickets, RSVPs)
- Synthetic face images, embeddings, and CCTV frame extracts

This dataset will be made available to all registered participants via the whatsapp group given in the end.



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Evaluation Criteria

- Entity Resolution Accuracy (25%) – Correct resolution of entities across heterogeneous datasets, handling multiple identifier types and name variants effectively.
- Cross-Source Linking & Multi-Modal Fusion (25%) – Quality of linking records across structured data, text notes, and visual inputs, with accurate confidence scoring and provenance tracking.
- Timeline Generation & Summarization (20%) – Completeness and clarity of chronological activity reconstruction, with effective human-readable summarization.
- Predictive Monitoring & Explainability (15%) – Quality of ML-based inference for missing data points, with clear justification and evidence-based reasoning.
- Security Dashboard & User Experience (10%) – Effectiveness of the dropdown-based interface, alert mechanisms, and overall usability for security teams.
- Robustness & Privacy Safeguards (5%) – Handling of noisy data, partial identifiers, and implementation of appropriate privacy measures.

Important Dates

- Doubt Clearing Session: 27th September, 7 PM
- Final Submission: 8th October EOD

Contact Details

For any further queries or doubts related to the problem statement, we have created a dedicated WhatsApp group. You can simply scan the QR code below to join and stay connected for discussions and updates.

Whatsapp Group