Problem Statements

P01 – Real-time Intelligent Traffic Management for Congestion Reduction in Kochi

Problem:
Kochi experiences frequent traffic congestion due to fixed-time traffic signals, poor lane discipline, illegal parking, and lack of real-time traffic monitoring, especially at major junctions such as Vyttila, Edappally, Palarivattom, and Kakkanad. Existing CCTV cameras and traffic data are not systematically analyzed to dynamically control traffic flow or prioritize emergency vehicles, leading to increased travel time, fuel wastage, pollution, and commuter stress.

Objectives:

1. Use sample traffic data such as CCTV feeds, vehicle counts, peak-hour logs, and congestion reports from major junctions in Kochi.

2. Apply AI-assisted analysis to detect vehicle density, congestion levels, and lane violations in real time.

3. Dynamically optimize traffic signal timings based on real-time traffic conditions.

4. Generate simple, clear traffic status summaries for authorities (e.g., “High congestion at Vyttila: average waiting time exceeds 6 minutes”).

Expected Output:

- An AI-assisted smart traffic monitoring and control system.

- Automated detection of congestion, lane violations, and abnormal traffic patterns.

- Dynamic traffic signal optimization with priority for emergency vehicles.

- Human-readable traffic summaries to support faster decision-making and improved commuter experience.

P02 – Real-time Residential Infrastructure Intelligence for Safety & Quality Assurance

Problem:
Home buyers and tenants often have limited visibility into hidden defects in new or under-construction buildings, such as damp walls, exposed wiring, cracked beams, and poor finishing. Inspection photos, videos, and notes are rarely analyzed systematically, leading to unsafe housing decisions and delayed identification of risks.

Objectives:

1. Use a sample inspection dataset containing properties, rooms, findings, and labeled images (e.g., crack, leak, ok).

2. Apply AI-assisted classification and tagging of potential defects from text or image metadata.

3. Aggregate inspection findings into a simple risk score per property or room.

4. Generate clear, plain-language inspection summaries describing observed risks (e.g., "High risk: visible damp in 3/5 rooms, exposed wiring in kitchen").

Expected Output:

- An AI-assisted inspection workspace.

- Automated defect tagging and classification.

- Risk scores at room and property levels.

- Human-readable inspection summaries for early risk identification.

P03 – Automating the Patient Discharge Procedure in Hospitals Using AI

Problem:

The patient discharge process in many hospitals is manual and involves multiple departments such as doctors, nurses, billing, pharmacy, and medical records. Even after a discharge order is issued, patients experience long waiting times due to delays in bill preparation, insurance clearance, pharmacy processing, document verification, and coordination. This leads to patient dissatisfaction, inefficient bed utilization, increased administrative workload, and operational bottlenecks. Lack of real-time communication, automation, and intelligent coordination further contributes to delays and errors, affecting healthcare quality.

Objectives:

1. Coordinate tasks across hospital departments using AI.
2. Predict and prioritize discharge activities to minimize waiting times.
3. Automate documentation, billing, and pharmacy workflows.
4. Provide real-time status updates to patients and staff.

Expected Output:

- AI-based automated discharge management system.
- Reduced patient waiting time and improved operational efficiency.
- Enhanced patient satisfaction and timely bed availability.
- Intelligent coordination and automation of hospital workflows.

P04 – AI-based Student Readiness and Interest Assessment System

Problem:

Coaching institutions offering long-term programs for competitive exams (e.g., JEE, NEET) face challenges in providing realistic, stage-appropriate guidance. Existing career aptitude tests give generic advice, fail to consider the student's current academic stage, and do not measure readiness for highly competitive exams. Advising students prematurely can lead to stress and poor outcomes. There is a need for an AI system that evaluates students realistically and recommends suitable academic pathways.

Objectives:

1. Assess the student's current standard (class/grade).
2. Measure conceptual readiness in subjects such as math, science, and logical thinking.
3. Identify the student's genuine academic interests over time.
4. Evaluate readiness for high-level competitive preparation.
5. Recommend:
    - Immediate suitable learning path
    - Long-term roadmap (if applicable)
6. Avoid unrealistic recommendations that may cause stress or failure.

Expected Output:

- An AI-assisted student assessment system.
- Accurate evaluation of academic readiness and interest.
- Personalized learning pathways and long-term roadmaps.
- Stage-appropriate guidance for students, reducing stress and improving outcomes.