Smart Parking & Surveillance AI Model Challenge

*Submission Deadline: 11th April 2025*

This document outlines the tasks, rules, and evaluation criteria for candidates participating in the Smart Parking & Surveillance AI Model Challenge. Shortlisting for Stage 2 will be based on the interview.

# TASK 1: Vehicle Detection in Parking Spaces

Objective: Build an AI-based model to detect:

* Number of cars currently parked
* Number of empty parking slots

Reference Video for Inspiration: https://youtu.be/9WQxWdaL6vw?feature=shared

Rules:

* You are free to use pre-trained models (YOLO, etc.) but must justify any retraining or fine-tuning.
* Model should run on at least one sample video input.
* Submit code, trained weights, and demo video.

# TASK 2: Deployment Demonstration on Edge Devices

Objective: Create a short demo video showing how the model works on any edge device (CCTV, Raspberry Pi, Jetson Nano, mobile phone, etc.)

Rules:

* Focus on performance, latency, and optimization.
* Show model prediction in real-time or near real-time.
* Mention tools used for deployment (e.g., TensorFlow Lite, ONNX, etc.)

# TASK 3 (Bonus): YOLO Extension for Action Detection

Objective: Train a custom YOLO-based model to recognize specific human actions like 'falling down'.

Rules:

* Use any human action dataset or create a small one (if feasible).
* Showcase output on 2-3 short clips.
* This section is optional but will boost your overall score.

# Marks Distribution (Total: 100 marks)

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| **Stage** | **Description** | **Marks** |
| 1 | Functional car detection model running on video | 10 |
| 2 | Correct parking space count (occupied vs empty) | 10 |
| 3 | Accuracy > 90% on test clip | 10 |
| 4 | Clean and readable code submission | 5 |
| 5 | Model architecture and logic explanation (PDF or video) | 10 |
| 6 | Efficient deployment on edge device | 10 |
| 7 | Demonstrated deployment performance (fps, memory usage, etc.) | 10 |
| 8 | Bonus: Trained YOLO model for fall detection or similar action | 15 |
| 9 | Innovation in UI, visualizations, or insights shown | 10 |
| 10 | Submission on time, well-organized repo or folder structure | 10 |

Minimum Marks Required to be Shortlisted for Stage 2: 65 / 100

Submission Format:

* GitHub/GitLab repo link with README.md explaining everything
* Google Drive link with videos, if needed
* Optional: short presentation/slides of your approach