PERSON IDENTIFICATION

PROJECT GOALS

- Person Identification in the industrial setup only based on the CCTV footage (i.e Computer vision based)
- Lorem ipsum dolor sit amet, consectetur adipiscing elit. Duis vel dolor ante. Nullam feugiat egestas elit et vehicula.

CHALLENGES

- Low Resolution of the CCTV Camera. (2 MP)
- No Proper Lightning Conditions
- Less Distinctive Appearence features due to the uniform and Distance

INITIAL APPROACHES

1. **Facial Recognition**
2. **Feature Embeddings**

Limitations Summary

Method	Key Limitations
Facial Recognition	• Low-resolution cameras • Occlusion from headgear and obstacles. • Ineffective beyond a 4m detection range.
Feature Embeddings	• Inadequate data for reliable feature extraction • Most of the workers wear the same kind of gear (dress code at industry) so get maximum similarity. • Extensive enhancement techniques did not yield consistent improvements.

RESULTS

ARUCO ID BASED IDENTIFICATION

1. Get the MetaData from the video.
2. Crop the Person.
3. Preprocess this crops.
4. Detect the ArucoId
5. Database check

ARUCO ID PLACEMENT

1. Primary
    a. Upper Back
    b. Front Chest
2. Secondary
    a. Sholders
    b. Helmets

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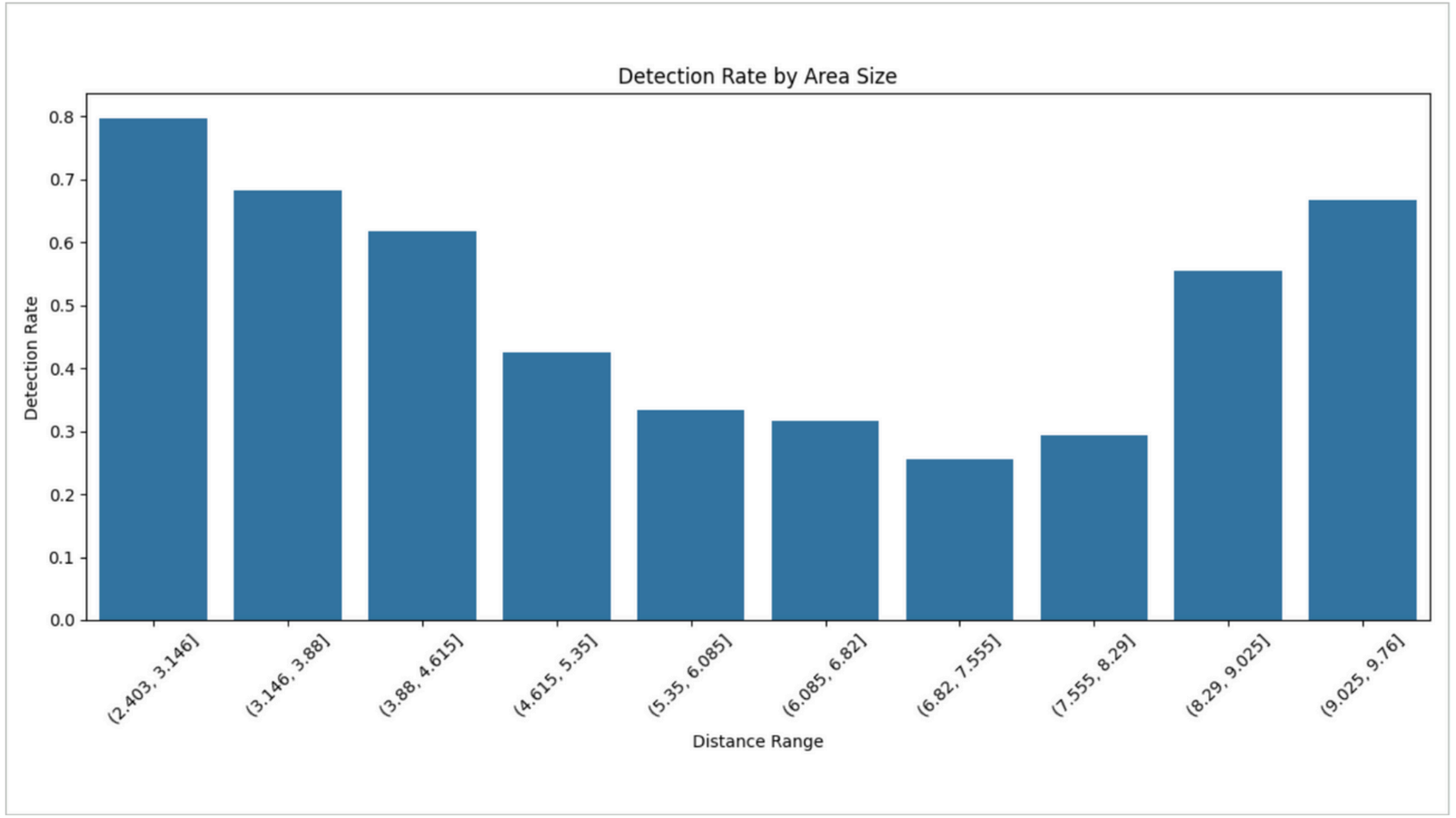
ANALYSIS


Detection Rate by Area Size
Detection Rate
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
(2.403, 3.146]
(3.146, 3.88]
(3.88, 4.615]
(4.615, 5.35]
(5.35, 6.085]
(6.085, 6.82]
(6.82, 7.555]
(7.555, 8.29]
(8.29, 9.025]
(9.025, 9.76]
Distance Range

ISSUES

- Got the constrain on the ArucoID placement.

FURTHER PROPOSALS

1. Facial Recognition + Gait/Body Analysis
2. 10cm Long-Range Visual Markers (Helmet Mounted)
3. Combination: 10cm Markers + Gait/Body Analysis + Facial Rec
4. Gait/Body Analysis + Tag Technology (RFID/BLE/UWB)
5. Gait/Body Analysis + Speech Recognition

IN PROGRESS

Gait/Body Analysis

Step 1: Creating the database and training some models

Step 2: Identifying the person

IN PROGRESS

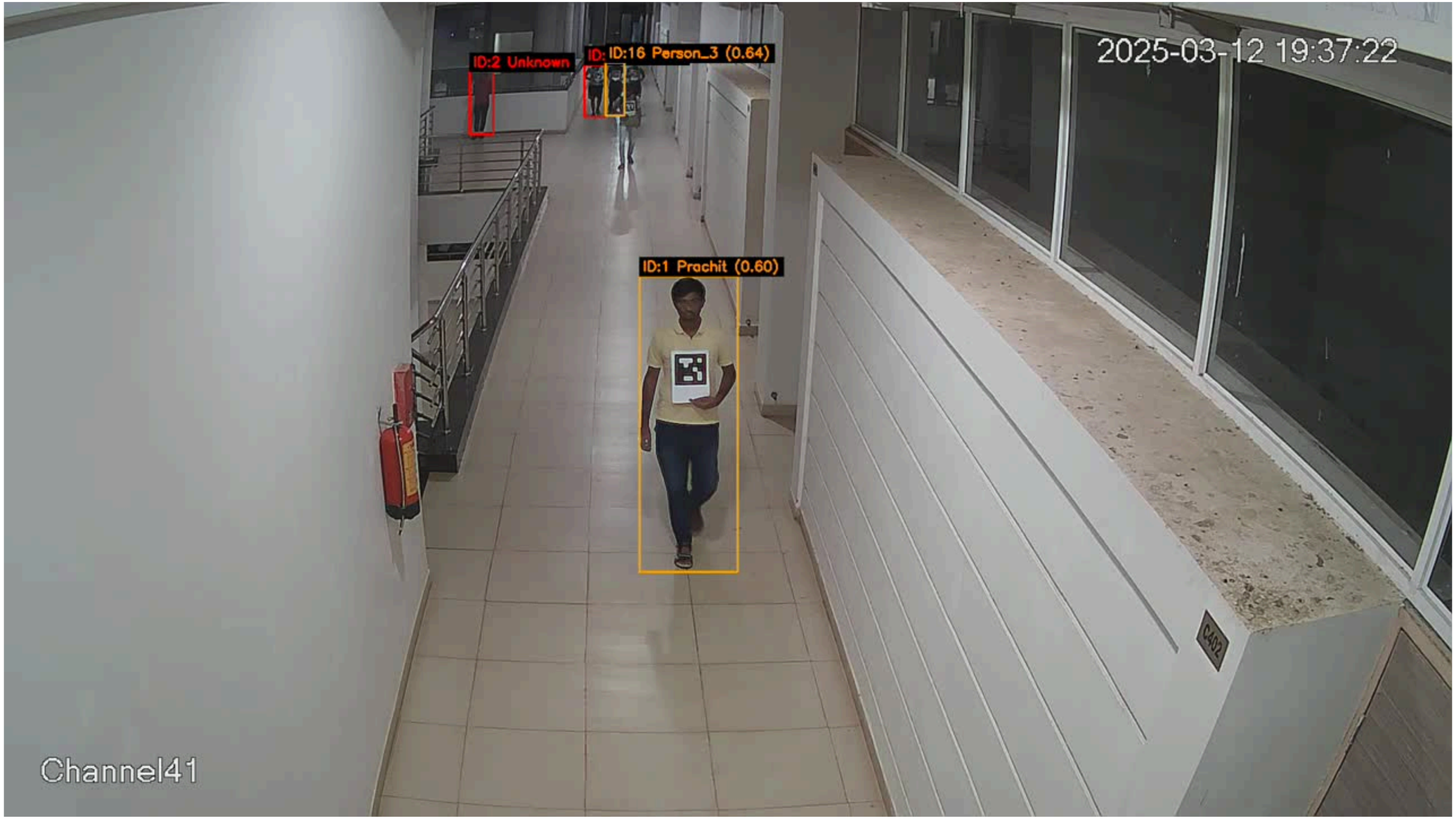
Till Last week we use multiple features for for dataset and Identification

IN PROGRESS

Feature Type	Weight	Rationale
OpenGait	35%	Most stable across clothing/lighting changes
Skeleton Gait	25%	Captures unique walking patterns
3D Skeleton	15%	Body structure invariant to clothing
Industrial Pose	8%	Work-specific posture indicators
Height	7%	Physical characteristic
Body Ratios	5%	Proportional measurements
Industrial Color	3%	Safety equipment detection
2D Skeleton	2%	Fallback when 3D unavailable

IN PROGRESS

Approach in this was to take the best one for each track throughout the video


ID:2 Unknown
ID:16 Person_3 (0.64)
ID:1 Prachit (0.60)
2025-03-12 19:37:22
Channel41
C402

CHALLENGES FACED

- Missing features
- Identity conflicts
- Temporal consistency
- Varying Camera angles (View Invariance)

WHAT NEXT

Instead of using the only one we will train an LSTM over the sequence of data for that individual this will overcome the Issue of missing features and temporal consistency

THANK YOU