**ENHANCING CUSTOMER EXPERIENCE WITH AI-DRIVEN INSIGTHS**

**PROJECT REPORT**

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**Abstract**

This project aims to develop an AI-driven system that enhances in-store customer experience using real-time video analytics. The system tracks customer movement, analyzes behavior, and provides actionable insights for optimizing product placements and promotional strategies. By leveraging Intel’s AI hardware and video analytics tools, we ensure real-time processing with minimal latency. The prototype successfully identifies high-traffic areas and assists in inventory management, leading to improved operational efficiency.

**Introduction**

* **Background:** The rise of e-commerce has challenged brick-and-mortar stores due to the lack of personalized experiences.
* **Problem Statement:** Retail stores struggle with optimizing customer engagement due to the absence of real-time behavioral insights.
* **Objectives:** To develop a smart AI system that personalizes in-store experiences using real-time video analytics.
* **Scope:** The system works with existing CCTV cameras and provides actionable insights for retailers.
* **Intel Relevance:** The system utilizes Intel AI hardware and OpenVINO toolkit for real-time analytics.

**Literature Review**

* Overview of video analytics for customer tracking.
* Review of AI models such as YOLOv5, SSD, and OpenPose for behavior recognition.
* Challenges in real-time processing and edge deployment.

**System Design and Architecture**

* **Hardware:** Intel® AI PC with GPU/NPU, CCTV cameras.
* **Software:** OpenCV, TensorFlow/PyTorch, OpenVINO.
* **Architecture Diagram:** [Insert System Architecture Diagram]

**Methodology / Implementation**

1. **Real-time video capture** using OpenCV and Intel OpenVINO.
2. **Customer behavior analysis** using deep learning models.
3. **Heatmap generation** for high-traffic areas.
4. **Actionable insights** delivered via a dashboard.
5. **Alerts for restocking and customer assistance** based on behavior trends.

**Code Snippet**

import cv2

from openvino.inference\_engine import IECore

ie = IECore()

model = ie.read\_network(model='customer\_behavior.xml', weights='customer\_behavior.bin')

**Conclusion**

The AI-driven system successfully personalizes in-store customer experiences by utilizing real-time video analytics. Intel’s AI hardware significantly enhances inference speed and efficiency, making it a scalable solution for retailers. Future improvements include multi-store integration and augmented reality-based recommendations.

**References**

1. [1] YOLOv5 GitHub Repository
2. [2] OpenVINO Documentation - Intel
3. [3] Retail AI Trends Journal, 2024

**Appendix**

* **GitHub Repository:** https://github.com/ImadabathuniMohanPhaniKishore/INTEL\_UNNATI\_BATCH4\_project
* **Sample UI Screenshot:**



