AI / AR Vehicle Install Optimization — Project Proposal

Overview

This project proposes an AI-augmented and AR-guided vehicle install and quality assurance system for automotive logistics and production facilities. The concept integrates AR glasses, VIN-based vehicle authentication, real-time SOP compliance tracking, and AI-based workflow validation to improve efficiency, safety, and traceability during install operations.

Objectives

- Automate and validate install processes using AI-guided AR workflows.
- Ensure SOP compliance through digital validation and visual inspection prompts.
- Gate vehicle access via VIN verification to prevent unauthorized handling.
- Digitally record torque specs, parts usage, and completion data for traceability.
- Integrate system data with central QA dashboards and production analytics.

System Workflow

1. Technician locates assigned vehicle via grid coordinates.
2. AR glasses display visual overlay for physical inspection and VIN barcode scan.
3. Vehicle access unlocks automatically only after QA, SOP, and parts checks validate as 'green.'
4. Install tasks appear sequentially in AR view, requiring sign-off per step.
5. Torque specifications, parts consumption, and photo verification recorded in real time.
6. Upon completion, QA performs final validation using AR-assisted checklist.

Technical Architecture

The system integrates several key components: - AR hardware (glasses) for visual guidance and VIN scanning. - AI engine for SOP compliance validation and defect detection. - Secure API for VIN-gated access control. - Cloud-based database for recording install metrics and QA data. - GitHub-hosted codebase for CI/CD management and collaboration.

GitHub Repository Structure

Repository: AreteDriver/AI_AR_Install_Optimization Folders: - /docs — Technical specifications, SOPs, and AR workflows - /src — Core code for AI validation and AR interface - /data — Sample install datasets and VIN records - /tests — Unit and integration tests - /ci — GitHub Actions for automated testing and deployment The README will document system architecture, setup, and developer notes.

Implementation Steps

1. 1. Initialize GitHub repo with base structure and README.

2. 2. Configure AR device SDK and integrate VIN scanning functionality.
3. 3. Develop AI compliance module for SOP validation and defect detection.
4. 4. Connect to secure vehicle access API for conditional unlock logic.
5. 5. Create front-end AR workflow display for install and QA steps.
6. 6. Build and deploy CI/CD pipeline for continuous validation.
7. 7. Conduct pilot test with limited production units to verify performance.

Expected Outcomes

- Reduced install time and error rates.
- Digitized traceability for QA, parts, and SOP adherence.
- Improved operator safety and accountability.
- Scalable model adaptable to multiple vehicle platforms and facilities.

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