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**TECHNOLOGY-PROJECT NAME : AI DRIVEN QUALITY IN CONTROL**

**MANUFACTURING**

**SUBMITTED BY : K.FARHEEN FATHIMA**

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**Phase 5: Project Demonstration & Documentation**

**TITLE: AI-Driven Control in Quality MANUFACTURING**

**Abstract:**

The **AI-Driven Control in Quality Manufacturing** project aims to revolutionize industrial production quality assurance through the integration of Artificial Intelligence, machine learning, and Internet of Things (IoT) technologies. In its final phase, the system leverages advanced AI models to detect production anomalies, analyze sensor data in real-time, and maintain secure, scalable data systems. It also ensures compatibility with existing Enterprise Resource Planning (ERP) platforms. This report provides comprehensive coverage of the completed project, including a full system demonstration, technical documentation, performance metrics, source code, and testing results. The project is engineered to support large-scale industrial operations with high reliability, providing real-time quality feedback and process optimizations. Screenshots, architecture diagrams, and codebase visuals are included to fully illustrate the system’s capabilities.

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**1. Project Demonstration**

**Overview:**

The AI-Driven Control in Quality Manufacturing system will be demonstrated to stakeholders, showcasing its ability to detect quality issues, improve production consistency, and analyze real-time IoT data from manufacturing equipment.

**Demonstration Details:**

* **System Walkthrough:** A live walkthrough showing the platform's use by operators and managers, from data input to the output of AI-driven quality assessments.
* **AI Inspection Accuracy:** Demonstrating how the AI model identifies defects, inconsistencies, or performance anomalies based on real-time data and visual inputs.
* **IoT Integration:** Real-time metrics (e.g., vibration, temperature, surface roughness) from factory-floor sensors will be captured and processed live.
* **Performance Metrics:** Displaying system response time, ability to handle concurrent data streams, and performance under simulated production load.
* **Security & Privacy:** Highlighting the encryption protocols and secure data storage mechanisms to protect proprietary manufacturing data.

**Outcome:**

By the end of the demonstration, the system’s real-world effectiveness in enhancing quality assurance, data integrity, and process optimization in a smart factory environment will be clearly exhibited.

**2. Project Documentation**

**Overview:**

Detailed documentation is provided to explain every aspect of the project — from AI training to real-time process control and ERP integration.

**Documentation Sections:**

* **System Architecture:** Diagrams showing AI pipelines, data flow between IoT sensors, the central platform, and ERP modules.
* **Code Documentation:** Source code for all modules, including defect detection AI, real-time data processing scripts, and API connections with factory sensors.
* **User Guide:** Instructions for machine operators and quality assurance personnel on how to interact with the system and respond to AI-flagged issues.
* **Administrator Guide:** Guidelines for managing the AI system, performing updates, integrating new sensors, and monitoring performance.
* **Testing Reports:** Performance tests for detection accuracy, latency analysis, false-positive/negative rates, and ERP sync validations.

**Outcome:**

The documentation ensures clear understanding and usability of the system for developers, operators, and future integrators.

**3. Feedback and Final Adjustments**

**Overview:**

Stakeholder and user feedback will be used to make final adjustments, addressing usability issues, accuracy gaps, or integration limitations.

**Steps:**

* **Feedback Collection:** Using structured surveys and observational reports during the demonstration to collect stakeholder input.
* **Refinement:** Refining the AI algorithms, fixing any integration bugs, and improving user interfaces based on feedback.
* **Final Testing:** Re-evaluating the system after updates to ensure seamless operation across all modules.

**Outcome:**

A polished and optimized version of the system, ready for deployment in real-world manufacturing environments.

**4. Final Project Report Submission**

**Overview:**

A comprehensive report detailing the full journey of the AI-Driven Control in Quality Manufacturing project.

**Report Sections:**

* **Executive Summary:** A high-level overview highlighting goals, innovations, and achievements.
* **Phase Breakdown:** Detailing model training, sensor integration, dashboard development, and ERP interfacing.
* **Challenges & Solutions:** Discussing issues such as inaccurate AI predictions, sensor calibration problems, or ERP syncing delays — and how they were resolved.
* **Outcomes:** Summarizing the system’s performance, operational readiness, and advantages over traditional quality control methods.

**Outcome:**

A complete and detailed report supporting future replication or scaling of the project in other industrial domains.

**5. Project Handover and Future Works**

**Overview:**

The system will be handed over for real-world implementation, along with guidelines for continuous development and scaling.

**Handover Details:**

* **Next Steps:**
  + Scaling the AI system to handle more production lines and sensor types.
  + Enhancing defect classification models using larger datasets.
  + Implementing multilingual UI for global operations.
  + Integrating predictive maintenance modules.

**Outcome:**

The project concludes with a roadmap for future innovation, continuous improvement, and expanded use across diverse manufacturing environments.

PROGRAM :

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A screen shot of a computer program

AI-generated content may be incorrect.

A computer screen shot of a program code

AI-generated content may be incorrect.

A screen shot of a computer program

AI-generated content may be incorrect.

OUTPUT :

A screenshot of a computer

AI-generated content may be incorrect.