PROJECT OVERVIEW STATEMENT	Project Name: **Investigator Toolkit for Transaction Monitoring**	Student Name: **AAYUSH DESAI**

Problem/Opportunity:
Financial institutions struggle with identifying fraudulent transactions while reducing false positives. Traditional monitoring systems often miss evolving fraud patterns and overlook negative news insights. This project aims to enhance transaction monitoring using machine learning and web scraping.

Goal:
To develop a Python-based Investigator Toolkit that enhances fraud detection by integrating machine learning-based anomaly detection, rule-based risk scoring, and web scraping for negative news analysis within the given timeline.

- Specific: Build a transaction monitoring system that detects fraudulent activities using anomaly detection techniques and integrates real-time risk assessment.
- Measurable: Improve fraud detection accuracy by at least 20% while reducing false positives by 15%.
- Assignable: The project will be developed by a team of data scientists and engineers responsible for implementing machine learning models, web scraping, and a dashboard.
- Realistic: The system will be built using Python, Flask, and open-source ML libraries, ensuring feasibility with available data and computational resources.
- Time-related: The project will require almost 2 months.

Objectives:

Enhance Fraud Detection Accuracy
- **Outcome:** Develop a fraud detection model using **Isolation Forest** for anomaly detection.
- **Time Frame: Jan 31 – Mar 1, 2025**
- **Measure:** Achieve **20% improvement** in fraud detection accuracy.
- **Action:** Train and evaluate the model on transaction datasets to detect suspicious activities.

Reduce False Positives in Transaction Monitoring
- **Outcome:** Implement a **risk scoring system** to improve detection precision.
- **Time Frame: Feb 15 – Mar 10, 2025**
- **Measure:** Reduce false positives by **15%**.
- **Action:** Develop and integrate rule-based risk assessment techniques into the fraud detection system.

Integrate Web Scraping for Negative News Analysis
- **Outcome:** Automate the extraction of **negative news insights** for risk assessment.
- **Time Frame: Feb 20 – Mar 20, 2025**
- **Measure:** Achieve at least **90% accuracy** in identifying risk-related news.
- **Action:** Use **BeautifulSoup and Scrapy** to collect relevant financial news for analysis.

Develop a Real-Time Dashboard for Fraud Insights
- **Outcome:** Create a **Flask-based web dashboard** for fraud visualization.
- **Time Frame: Mar 5 – Mar 25, 2025**
- **Measure:** Ensure **100% functionality** with real-time transaction monitoring.
- **Action:** Implement Flask and **Plotly** to build an interactive dashboard displaying fraud insights.

Testing, Final Evaluation & Report Preparation
- **Outcome:** Conduct end-to-end testing and finalize project documentation.
- **Time Frame: Mar 26 – Apr 5, 2025**
- **Measure:** Ensure system accuracy, usability, and completeness before submission.

- **Action:** Perform testing, fix bugs, finalize reports, and submit before **April 10, 2025**.

Success Criteria:

1. **Fraud Detection Improvement**
    - **Indicator:** The fraud detection model must show a **20% accuracy improvement** over rule-based systems.
    - **Completion Date: Mar 1, 2025**
    - **Demonstrated Skills:** Machine learning, anomaly detection, model evaluation.
2. **Reduction in False Positives**
    - **Indicator:** The false positive rate must be reduced by at least **15%**.
    - **Completion Date: Mar 10, 2025**
    - **Demonstrated Skills:** Risk scoring implementation, model optimization.
3. **Successful Web Scraping for Risk Assessment**
    - **Indicator:** The web scraping module must achieve **90% accuracy** in identifying relevant negative news.
    - **Completion Date: Mar 20, 2025**
    - **Demonstrated Skills:** Web scraping, text analysis, NLP.
4. **Fully Functional Dashboard**
    - **Indicator:** The Flask-based dashboard must provide **real-time fraud insights** with a **100% operational** UI.
    - **Completion Date: Mar 25, 2025**
    - **Demonstrated Skills:** Flask development, data visualization, UI design.
5. **Final Testing & Submission**
    - **Indicator:** The project must pass all evaluation criteria before submission.
    - **Completion Date: Apr 5, 2025**
    - **Demonstrated Skills:** Debugging, testing, and report writing.

Assumptions, Risks, Obstacles:

1. **Availability of Quality Transactional Data**
    - Assumption: Sufficient transaction records will be available for training and testing.
    - Risk: Lack of real-world data could impact model performance.
2. **Regulatory Compliance in Web Scraping**
    - Assumption: Web scraping of financial news will adhere to legal policies.
    - Risk: Potential restrictions or legal challenges could limit access to news data.
3. **Adaptability to Evolving Fraud Patterns**
    - Assumption: The model can generalize to new fraud trends.
    - Risk: Fraud tactics may evolve faster than the system can adapt, requiring frequent updates.
4. **Integration with Financial Institutions' Infrastructure**
    - Assumption: The system can be integrated with existing transaction monitoring frameworks.
    - Risk: Compatibility issues with legacy systems may cause delays in implementation.

Prepared By	Date	Approved By	Date
AAYUSH DESAI	February 6, 2025		