PARS – PACKAGE ANALYSIS & REROUTING SYSTEM

AGENDA

- Problem Statement
- Solution Approach
- Physical Architecture
- Logical Architecture
- Tech Stack
- Assumptions
- Visualization
- Demonstration
- Return on Investments

PROBLEM STATEMENT

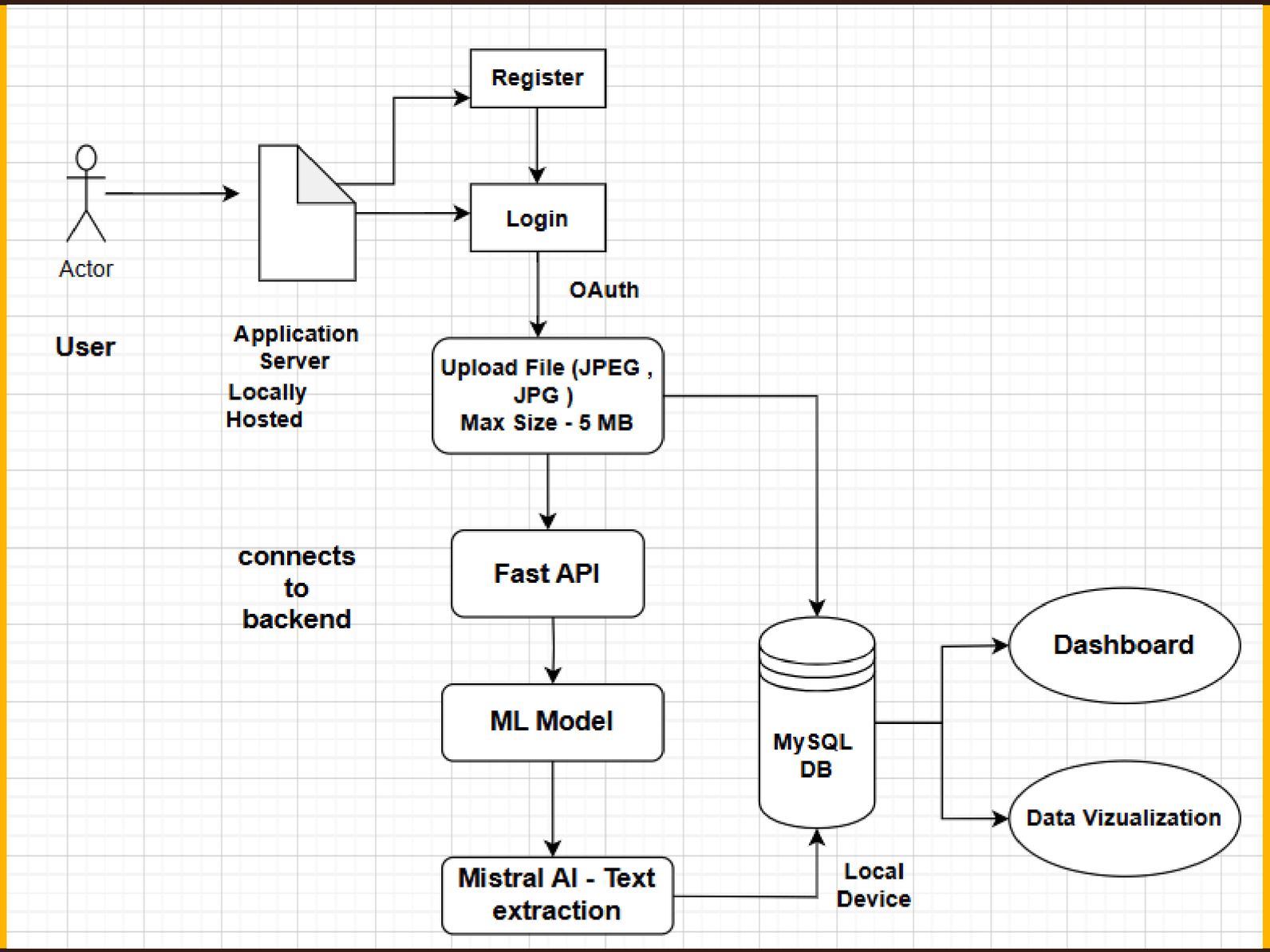
- In large-scale logistics operations like UPS, damaged or missing barcodes disrupt automated sorting thereby forcing a manual inspection and redirection. This slows processing, increases labor costs, and risks routing errors. A solution is needed to extract shipment details directly from package surfaces to restore efficiency and ensure timely delivery at the absence of readable barcode
- The goal is to enable accurate, automated rerouting even when barcodes are damaged or missing.

SOLUTION APPROACH

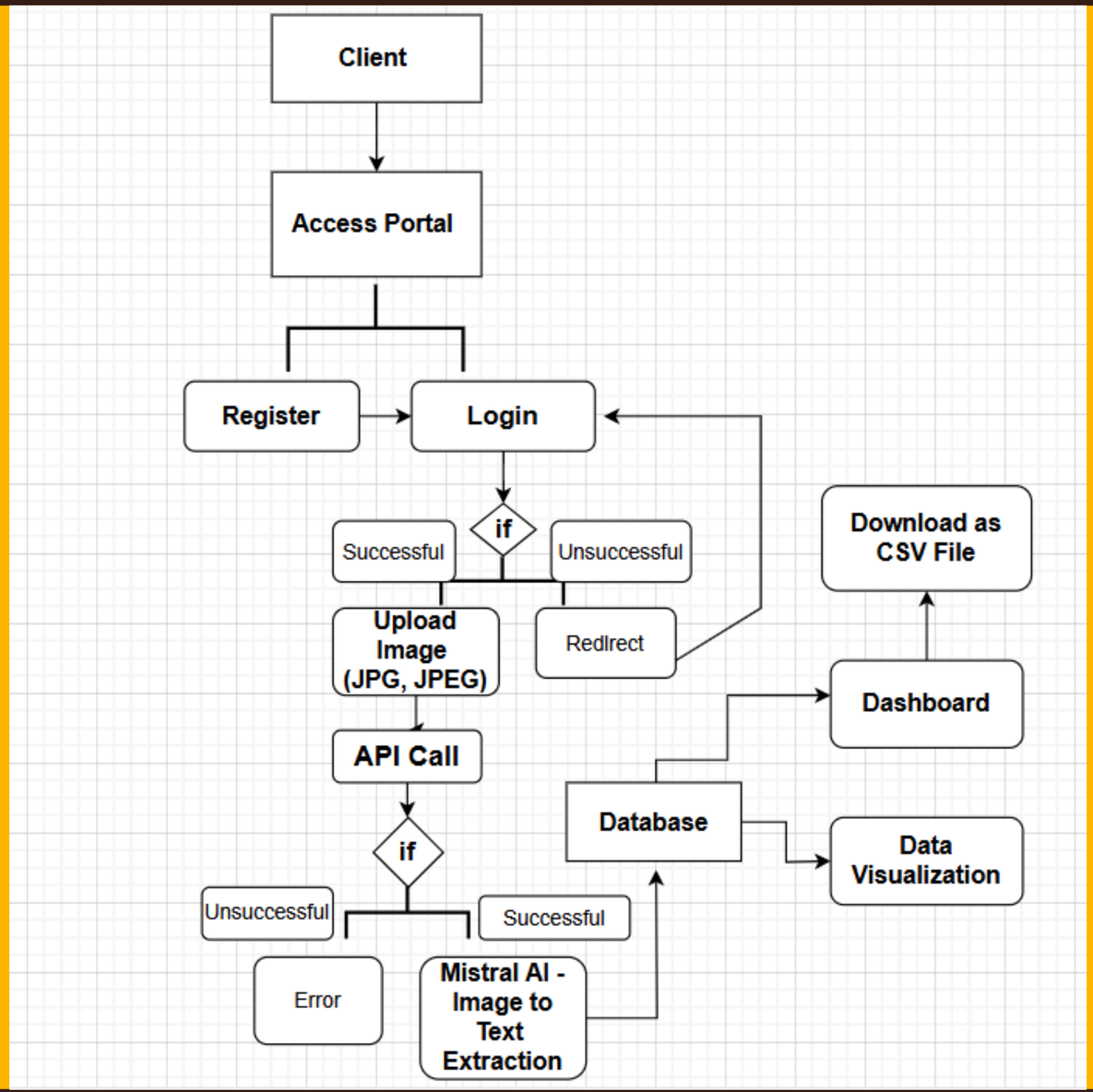
Our system enables automated rerouting of packages by analyzing shipment labels in the absence of readable barcodes through the following workflow:

1. Image Upload
   - Users upload images of damaged shipment labels through an intuitive interface.
2. Detail Extraction
   - The system processes each image to extract critical shipment information like tracking ID and recipient address using advanced parsing techniques.
3. Data Presentation & Insights
   - Extracted data is structured for review, while an analytics dashboard provides real-time insights on damage trends and routing performance.

PHYSICAL ARCHITECTURE



LOGICAL ARCHITECTURE



TECH STACK

LAYER	TOOLS & TECH
Frontend	React
OCR and Extraction	Mistral AI
Backend	Python and Fast API
Database	MySQL
Analytics and Visualization	Google Looker Studio
Version Control	GitHub
Hosting	Public Hosting

ASSUMPTIONS

- The uploaded shipment label image is clear, upright, and adequately lit to ensure effective processing.
- Accepted image formats are JPG/JPEG/PNG with a maximum file size of 5MB.
- Shipment labels must be moderately visible; the system may not yield accurate results for severely damaged or obscured labels.
- A stable internet connection is assumed throughout the upload and processing stages to prevent timeouts or disruptions.

VISUALIZATION

- Delivers real-time insights into shipment routing performance for enhanced operational visibility.
- Identifies critical trends such as high-damage zones, peak failure periods, and rerouting frequency.
- Facilitates data-driven decision-making to optimize logistics workflows and minimize manual intervention.
- Enables continuous monitoring of system and OCR accuracy, allowing early detection of performance issues.
- Empowers management with clear visual summaries to support reporting and strategic planning.

RETURN ON INVESTMENTS

- Reduces manual labor costs by automating label inspection and rerouting.
- Accelerates delivery by minimizing delays from unreadable barcodes.
- Improves operational efficiency without extra infrastructure.
- Prevents losses from misrouted or undelivered packages.
- Provides actionable insights to reduce recurring damage.
- Cost-effective and scalable, with minimal implementation overhead.
- Boosts customer satisfaction and strengthens competitive edge.

THANK YOU