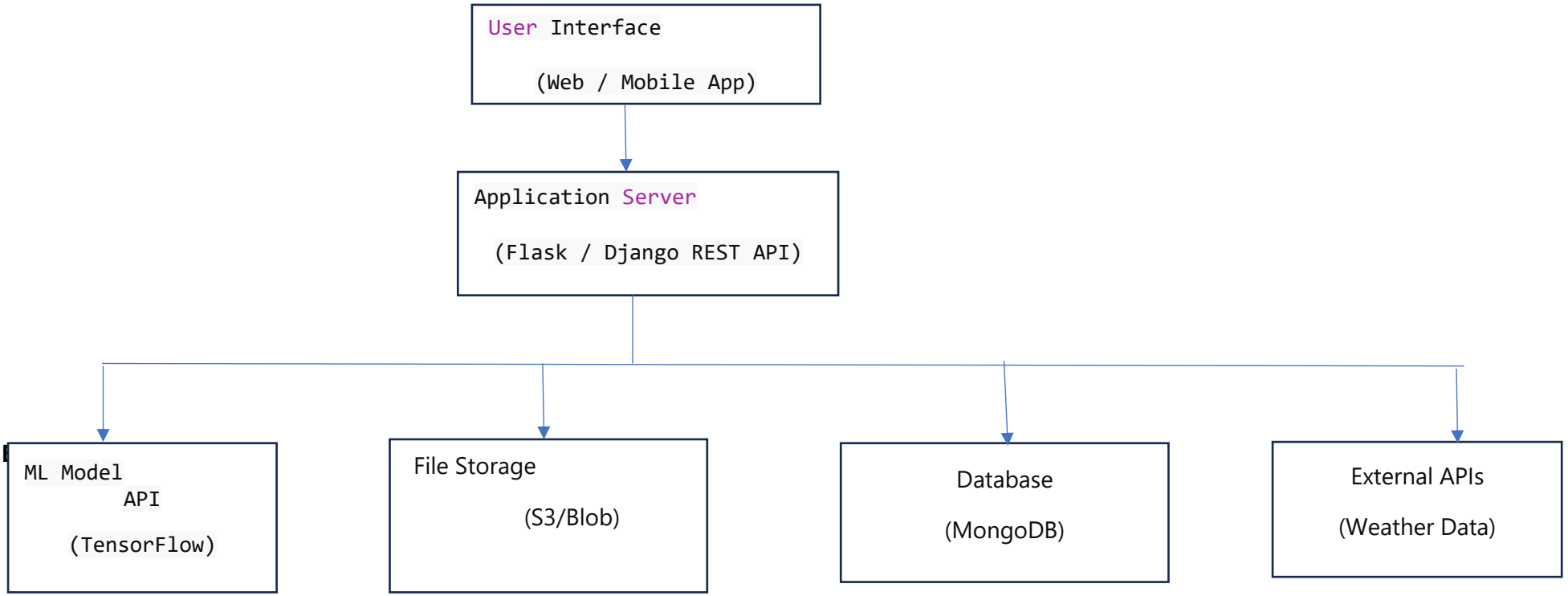
Project Design Phase-II
Technology Stack (Architecture & Stack)

Date	24 June 2025
Team ID	LTVIP2025TMID35526
Project Name	Smart Sorting: Identifying Rotten Fruits and Vegetables Using Transfer Learning
Maximum Marks	4 Marks

Technical Architecture:

The Deliverable shall include the architectural diagram as below and the information as per the table1 & table 2



Guidelines:

- UI Layer: Web app to upload images.
- Backend Layer: Python Flask API for prediction.
- ML Model Service: TensorFlow/Keras REST API serving pre-trained transfer learning model (e.g., MobileNetV2).
- Storage: Cloud storage (AWS S3, Azure Blob) for images.
- Database: NoSQL (MongoDB) to store predictions and logs.
- Scalability: Containerized deployment (Docker) on Kubernetes/Cloud Foundry.
- Security: HTTPS, authentication, access controls**.**

Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	Web UI for image upload, results display	HTML, CSS, JavaScript, React.js
2.	Application Logic-1	Backend API for handling requests, prediction calls	Python (Flask / Django REST Framework)
3.	Application Logic-2	Image preprocessing and transformation pipeline	OpenCV, Pillow
4.	Application Logic-3	Transfer learning inference	TensorFlow / Keras Model Serving
5.	Database	Store prediction logs, user data	MongoDB

S.No	Component	Description	Technology
6.	Cloud Database	Managed database service	MongoDB Atlas / Firebase Firestore
7.	File Storage	Store uploaded images	AWS S3 / Azure Blob Storage
8.	External API-1	Optional: Weather API to link spoilage probability (future)	OpenWeather API
9.	External API-2	Optional: Notifications API (Email/SMS)	Twilio / SendGrid API
10.	Machine Learning Model	Predict rotten vs fresh produce using transfer learning	MobileNetV2 trained on custom dataset
11.	Infrastructure	Application hosting and scaling	Docker, Kubernetes, AWS EC2 / Azure App Service

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology/Approach
1.	Open-Source Frameworks	Backend, ML, and frontend frameworks	Flask, TensorFlow, React.js
2.	Security Implementations	Data encryption, HTTPS, authentication, access control	SSL/TLS, JWT Authentication, IAM Policies

S.No	Characteristics	Description	Technology/Approach
3.	Scalable Architecture	Containerized microservices, independent scaling of backend and ML model	Docker, Kubernetes, REST APIs
4.	Availability	High availability via load balancer, redundant instances	AWS Load Balancer, Auto-Scaling Groups
5.	Performance	Optimized prediction pipeline, caching, preloaded model, CDN for static assets	Redis Caching, CloudFront CDN, TensorFlow Model Server