Project Design Phase-II

Technology Stack (Architecture & Stack)

Date	**25 June 2025**
Team ID	**LTVIP2025TMID24654**
Project Name	**Shopez : one-stop shop for online purchases**
Mentor Name	**Dr Shaik Salma Begam**
Maximum Marks	**4 Marks**

Technical Architecture

Pattern Sense is a deep learning–based web application designed to classify fabric patterns with high accuracy and scalability. The system allows designers, manufacturers, and quality controllers to upload fabric images and receive precise pattern classification results. It combines a modern web frontend, backend services, a trained deep learning model, and cloud storage for large image datasets.

Table 1: Technology Stack Components

S.No	Component	Description	Technology / Service Used
1	User Interface	Web UI for users and admins	React.js, HTML5, CSS3, JavaScript
2	Application Logic-1	User authentication, registration, session management	Node.js, Express.js, JWT
3	Application Logic-2	Fabric image upload, management, classification request handling	Node.js, Express.js
4	Database	Storage for user data, image metadata, classification results	MongoDB, Mongoose
5	Cloud Database	(Optional/Scalable) Cloud-hosted MongoDB	MongoDB Atlas

6	File Storage	Fabric image storage	AWS S3 (preferred), local filesystem
7	External API-1	(Optional) Email notifications	SendGrid, Nodemailer
8	Machine Learning Model	Pattern classification using trained CNN model	Python (Flask or FastAPI), TensorFlow, Keras
9	Infrastructure	Application deployment, scalability, CI/CD	Docker, AWS EC2, AWS Lambda (model serving), GitHub Actions
10	Monitoring & Logging	System and application performance monitoring	AWS CloudWatch, ELK stack (Elasticsearch, Logstash, Kibana)

Table 2: Application Characteristics

S.No	Characteristics	Description	Technology / Approach Used
1	Open-Source Frameworks	Use of widely adopted frameworks and tools for faster development and community support	React.js, Node.js, Express.js, TensorFlow
2	Security Implementations	JWT authentication, encrypted storage, secure API endpoints, role-based access	JWT, bcrypt, HTTPS, Helmet, CORS
3	Scalable Architecture	Modular microservice-ready design, RESTful APIs, containerized deployments, model decoupling	Docker, AWS Lambda for model inference, MongoDB Atlas
4	Availability	High uptime using cloud infrastructure and auto-scaling	AWS EC2, AWS Elastic Load Balancer, MongoDB Atlas
5	Performance	Optimized image preprocessing and model inference, efficient API handling, CDN for static assets	TensorFlow optimizations, S3 storage, CloudFront CDN