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

Date	31 January 3035
Team ID	LTVIP2025TMID32512
Project Name	Classifying fabric patterns using deep 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

Example: Order processing during pandemics for offline mode

Reference: https://developer.ibm.com/patterns/ai-powered-backend-system-for-order-processing-during-pandemics/

Guidelines:

By leveraging convolutional neural networks, it can identify and categorize patterns like stripes, florals, and geometric designs, saving time and resources in manual review processes

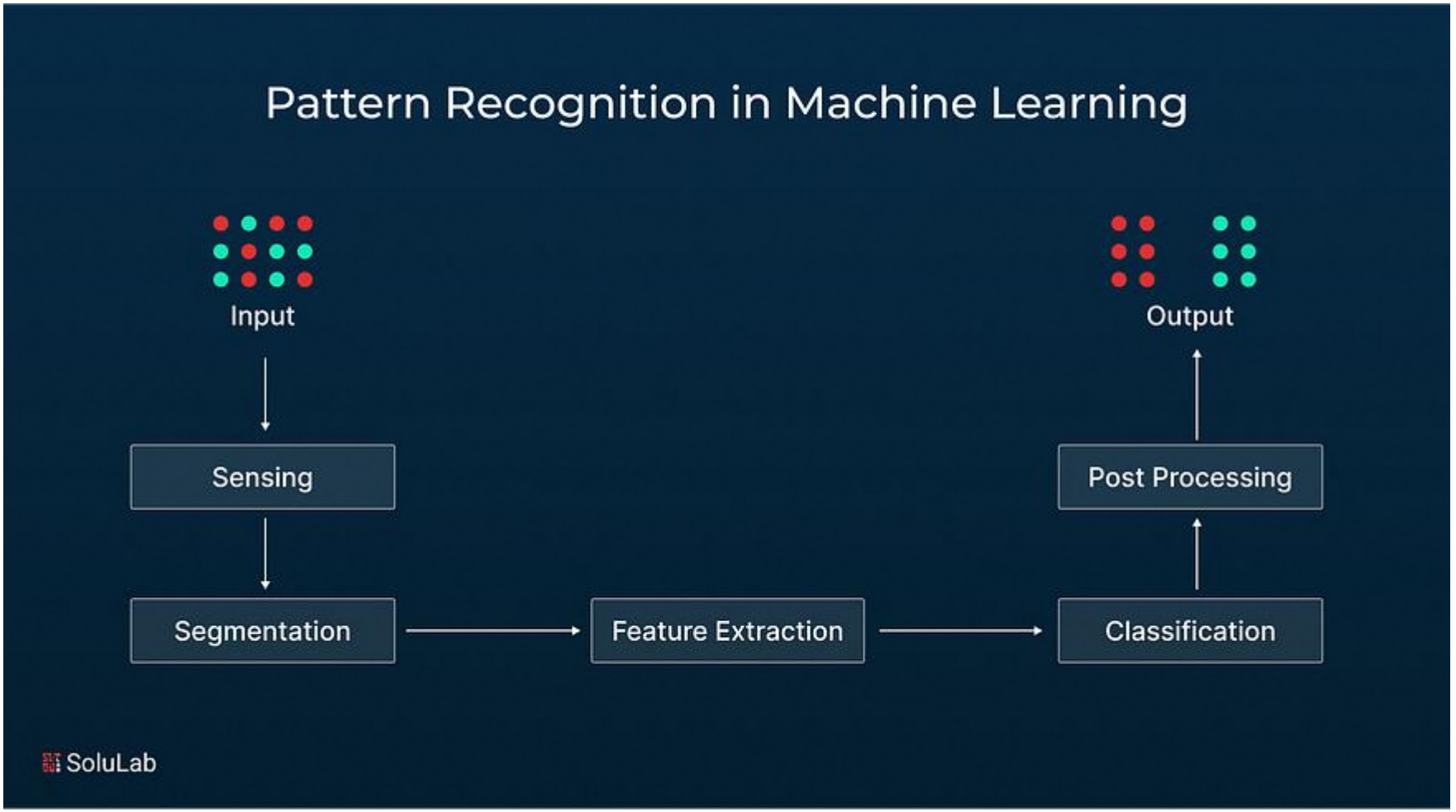
Pattern Recognition in Machine Learning
Input
Sensing
Segmentation
Feature Extraction
Classification
Post Processing
Output
SoluLab

Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	Interface for uploading fabric images and displaying predictions	HTML, CSS, JavaScript, React.js
2.	Application Logic-1	Handles image preprocessing, resizing, and normalization	Python, OpenCV
3.	Application Logic-2	Deep learning model for pattern classification	TensorFlow / Keras
4.	Application Logic-3	Defect detection in fabric patterns	Python, Custom CNN-based anomaly detection
5.	Database	Stores user data, pattern labels, and classification results	MySQL or MongoDB
6.	Cloud Database	Cloud storage for scalable access to fabric images and results	Firebase, AWS RDS
7.	File Storage	Stores raw and processed images	AWS S3, Local Filesystem
8.	External API-1	API for real-time pattern suggestion or design matching	Custom Recommendation API / Google Vision API
9.	External API-2	Integration with fabric libraries for label reference	FabricNet API (if available) or dummy API
10.	Machine Learning Model	Classifies patterns into categories	Convolutional Neural Network (CNN)
11.	Infrastructure (Server / Cloud)	Hosting and deployment of the full-stack application	Heroku, AWS EC2, Google Cloud Run

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Frameworks used for development	TensorFlow, Keras, Flask, React.js
2.	Security Implementations	Data privacy, image protection, and authentication	SHA-256, JWT, OAuth 2.0, SSL/TLS Encryption
3.	Scalable Architecture	Supports microservices and modular development	Docker, Kubernetes (optional for scaling)
4.	Availability	Cloud-hosted with redundancy and auto-recovery	AWS Elastic Load Balancer, Firebase Hosting
5.	Performance	Fast classification, use of caching and optimized models	Redis Cache, Model Quantization, CDN (Cloudflare)

References:

https://c4model.com/

https://developer.ibm.com/patterns/online-order-processing-system-during-pandemic/

https://www.ibm.com/cloud/architecture

https://aws.amazon.com/architecture

https://medium.com/the-internal-startup/how-to-draw-useful-technical-architecture-diagrams-2d20c9fda90d