Smart Sorting: Transfer Learning

Team ID: LTVIP2025TMID33417

Date : 17 July 2025

1. Technical Architecture Diagram

The architecture is inspired by IBM’s pandemic-order-processing pattern. It supports offline order processing using Transfer Learning for Smart Sorting, and includes cloud/local deployment flexibility.

Architecture Overview:

User Interface (Web App/Mobile App)

↓

Application Logic-1 (Order Input & Processing - Python/Java)

↓

Application Logic-2 (Voice Commands - IBM Watson STT)

↓

Application Logic-3 (Smart Chat Assistant - IBM Watson Assistant)

↓

Data Storage:

→ Local DB (MySQL)

→ Cloud DB (IBM DB2)

↓

Machine Learning Layer:

→ Transfer Learning Smart Sort Model (TensorFlow/PyTorch on IBM Watson ML)

↓

External APIs:

→ IBM Weather API

→ Aadhar API

↓

Infrastructure:

→ Local Server or Cloud (IBM Cloud Foundry/Kubernetes)

2. Table-1: Components & Technologies

S.No

Component

Description

Technology

1

User Interface

Web / Mobile App for order processing

HTML, CSS, React JS

2

Application Logic-1

Pre-processing orders / input logic

Python, Java

3

Application Logic-2

Voice input for hands-free interaction

IBM Watson Speech to Text

4

Application Logic-3

Conversational AI for order management

IBM Watson Assistant

5

Database

Structured order/customer info storage

MySQL

6

Cloud Database

Backup & remote availability

IBM DB2, IBM Cloudant

7

File Storage

Store offline order files, logs

IBM Block Storage, Local Filesystem

8

External API-1

Weather data for delivery feasibility

IBM Weather API

9

External API-2

User identity verification

Aadhar API

10

Machine Learning Model

Transfer Learning for Smart Sorting of Orders

PyTorch, TensorFlow, IBM Watson Studio

11

Infrastructure

Hybrid deployment flexibility (on-prem/cloud)

Cloud Foundry, Kubernetes, Local Server

3. Table-2: Application Characteristics

S.No

Characteristics

Description

Technology / Strategy

1

Open-Source Frameworks

ReactJS, TensorFlow, PyTorch, Flask

MIT/BSD Licenses

2

Security Implementations

Authentication, data encryption, identity access, firewall protection

SHA-256, IAM Controls, HTTPS, OAuth2

3

Scalable Architecture

Modular, supports microservices and containerized deployment

Docker, Kubernetes, 3-tier architecture

4

Availability

Redundant servers, load balancing

NGINX Load Balancer, Multi-region deployment

5

Performance

Caching, CDN for UI assets, optimized DB queries, async order processing

Redis, IBM CDN, Efficient I/O architecture

4. Architecture Inspirations & References

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

- IBM Online Order System During Pandemic: https://developer.ibm.com/patterns/online-order-processing-system-during-pandemic/

- IBM Cloud Architecture Center: https://www.ibm.com/cloud/architecture

- Amazon Reference Architecture: https://aws.amazon.com/architecture

- C4 Model: https://c4model.com/

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

-