**3. Requirement Analysis**

**3.3 Data Flow Diagram & User Stories**

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| **Date** | 28 June 2025 |
| **Team ID** | LTVIP2025TMID35678 |
| **Project Name** | Pattern Sense: Classifying Fabric Patterns using Deep Learning |
| **Maximum Marks** | 4 Marks |

**Data Flow Diagram:**

A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It shows how data enters and leaves the system, what changes the information, and where data is stored.

User

1. Upload Image

Web Application

2. Preprocess Image 3. Send to Model for Prediction

Image Preprocessing

(Resize, Normalize)

Pattern Classification

4. Send Prediction Result

User

Display Result

**🔁 Explanation of the Flow:**

1. **User uploads an image** to the system via a user-friendly interface.
2. The **Web Application** receives the image and sends it to the **Image Preprocessor**.
3. The preprocessed image is then passed to the **Pattern Classification Model**.
4. The model returns the **predicted fabric pattern** (e.g., "Polka-Dotted") and confidence level.
5. The result is **displayed back to the user** via the frontend UI.

**🔁 DFD Components for Pattern Sense**

**🧠 1. Processes**

These represent activities or functions that transform data within the system.

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| **Process ID** | **Process Name** | **Description** |
| P1 | Image Upload & Input Handling | Accepts image files from users (mobile/web) and validates them |
| P2 | Image Preprocessing | Resizes, normalizes, and prepares the image for classification |
| P3 | Pattern Classification | Uses the trained CNN model to predict the fabric pattern |
| P4 | Result Display & Feedback | Shows the predicted label and confidence score to the user; accepts feedback |

**📦 2. Data Stores**

These represent where the system data is stored either temporarily or permanently.

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| **Data Store ID** | **Data Store Name** | **Description** |
| D1 | Image Dataset | Stores uploaded images for future training, testing, or audit logs |
| D2 | Model Data | Stores trained CNN model (model\_cnn.h5) used for real-time predictions |
| D3 | Prediction Logs | Stores history of predictions and user interactions (optional) |
| D4 | Feedback Repository | Stores user feedback and ratings (optional, for model improvement) |

**🧠 3. Model (in the context of DFD)**

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| **Component** | **Name** | **Role in the System** |
| M1 | Convolutional Neural Network (CNN) Model | The trained deep learning model (model\_cnn.h5) that classifies fabric patterns |

* The CNN model is stored in D2: Model Data.
* It's invoked by **P3: Pattern Classification** to classify images.
* It outputs labels such as **"Striped"**, **"Polka-Dotted"**, **"Plain"**, etc.

**🧾 User Stories**

* **User stories** are short, simple descriptions of features told from the perspective of the user. They help bridge the gap between user needs and system functionality. For the *Pattern Sense* project, user stories were written based on expected interactions with the system by different types of users.

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| **User Type** | **Functional Requirement (Epic)** | **User Story Number** | **User Story / Task** | **Acceptance Criteria** | **Priority** | **Release** |
| Customer (Mobile user) | Image Upload | USN-1 | As a user, I want to upload a fabric image from my mobile device | Image is uploaded and preview is shown | High | Sprint-1 |
| Customer (Mobile user) | Classification | USN-2 | As a user, I want the app to analyze the image and detect the pattern | Pattern is correctly displayed with label and confidence | High | Sprint-1 |
| Customer (Mobile user) | Retry / Feedback | USN-3 | As a user, I want to upload another image or give feedback on the result | Option to retry and rate the output is available | Medium | Sprint-2 |
| Customer (Web user) | Image Upload | USN-4 | As a web user, I want to drag and drop images directly into the browser | Image drop zone works as expected | High | Sprint-2 |
| Customer Care Executive | Monitoring | USN-5 | As support, I want to view logs of user activity to ensure predictions are working | Admin panel displays recent uploads and logs | Medium | Sprint-2 |
| Administrator | Model Updates | USN-6 | As an admin, I want to upload new model files to improve accuracy | Model updates take effect without breaking old flow | Low | Sprint-2 |