|  |  |
| --- | --- |
| **Date** | **28 MAY 2025** |
| **Team ID** | **LTVIP2025TMID59890** |
| **Project Name** | Pattern sense: Classifying fabric pattern using Deep Learning |
| **Maximum Marks** | **2 Marks** |

**3 Brainstorming**

During the ideation process, multiple team discussions and brainstorming sessions were conducted to explore innovative ways to address the problem. The team explored a range of hardware and software solutions, eventually converging on the use of CNN-based deep learning models trained on fabric datasets. Key ideas and features proposed during this phase included:

* **High-Resolution Image Capture:** Install industrial-grade cameras along production lines to continuously capture fabric surfaces in detail.
* **Real-Time Processing:** Use TensorFlow models optimized to run on GPUs or edge devices for instant classification and feedback.
* **Model Architecture:** Implement CNNs (e.g., VGG16, ResNet50) for image classification and fine-tune them using transfer learning techniques.
* **Dataset Development:** Curate a diverse and well-labeled dataset covering multiple fabric patterns, with enough samples to ensure generalization.
* **Data Augmentation:** Apply rotation, scaling, flipping, and color jittering to artificially expand the training set and improve model robustness.
* **User Interface:** Design a dashboard that visualizes prediction results, highlights potential errors, and allows factory workers to validate outcomes.
* **Edge Deployment:** Explore the feasibility of deploying models to edge devices or microcontrollers installed on inspection machines.

This extensive brainstorming phase laid the foundation for technical planning, resource allocation, and the development timeline. It helped identify potential challenges early and provided a creative space to ideate breakthrough features that enhance usability and performance.

After comparing several approaches, the decision was made to use Convolutional Neural Networks (CNNs) with the TensorFlow framework due to its robustness, community support, and flexibility in handling image-based datasets. Additionally, tools such as TensorFlow Hub and pre-trained models were considered to accelerate development and achieve higher accuracy through transfer learning.

The ideation phase concluded with the definition of the project scope, selection of a suitable dataset (either custom-collected or from platforms like Kaggle), and outlining the overall architecture of the system.