**2. IDEATION PHASE**

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| **Date** | **25 MAY 2025** |
| **Team ID** | **LTVIP2025TMID59890** |
| **Project Name** | Pattern sense: Classifying fabric pattern using Deep Learning |
| **Maximum Marks** | **2 Marks** |

**2.1 Problem Statement**

Manual inspection of fabric patterns is still prevalent in many manufacturing units and textile mills across the globe. Although human inspectors have years of experience and a trained eye for defects, their ability to maintain consistent accuracy over long shifts is limited. Factors such as eye strain, fatigue, and the inherent subjectivity of human evaluation can lead to inconsistencies in the identification of pattern types and errors. As textile industries scale up their production to meet increasing market demands, relying solely on manual methods proves to be inefficient and unsustainable.

Another challenge arises from the complexity of modern fabric patterns. With design trends shifting towards intricate, multilayered visuals, and subtle textures, the margin for human error increases. The growing diversity of fabric styles makes it even more difficult for inspectors to accurately recognize and classify patterns quickly. Consequently, the existing manual process struggles to keep up with the pace and complexity of industrial production.

This project seeks to address this issue by proposing an automated deep learning system that is capable of classifying fabric patterns with a high degree of accuracy. Using a CNN-based model implemented through TensorFlow, the system aims to minimize the drawbacks of manual inspection while offering consistency, scalability, and rapid processing. The solution will also help identify any anomalies or inconsistencies in real-time, enabling quicker decision-making and reducing waste in production.

**2.2 Empathy Map Canvas**

To better understand the real-world challenges and emotions experienced by fabric inspectors and quality assurance teams, an empathy map was created. This tool provides insights into their behaviors, attitudes, thoughts, and needs, which in turn shape the design and functionality of the proposed solution.

* **Says:** “We have to inspect hundreds of meters of fabric daily—it's tiring and repetitive.” This highlights the volume of work and the monotony associated with visual inspection.
* **Thinks:** “There must be a faster, more reliable way to identify patterns and defects.” The desire for automation and intelligent tools reflects their openness to technological solutions.
* **Does:** Spends several hours per shift visually scanning fabrics under artificial lighting, using magnifiers, comparing samples against printed templates, and documenting results manually.
* **Feels:** Overwhelmed due to continuous visual strain, under pressure to maintain consistency, and uncertain when patterns are too complex or borderline defective.

This empathy map reaffirms the importance of developing a deep learning-based system that not only automates inspection but also improves user experience for factory workers. It validates the need for AI tools that work alongside humans to support—not replace—them in their roles.