**Project Design Phase**

**Solution Architecture**

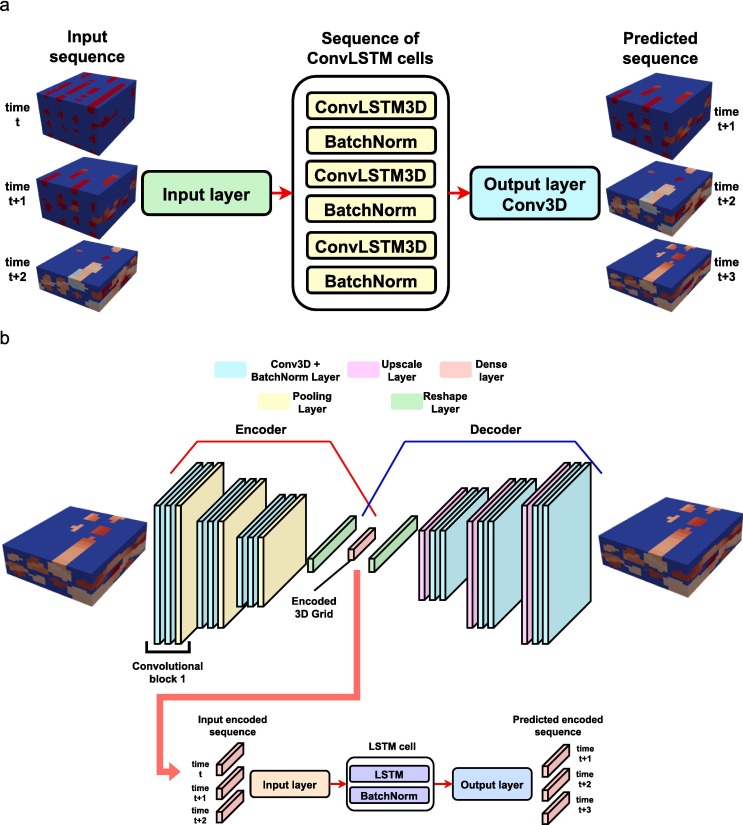
|  |  |
| --- | --- |
| Date | 15 February 2025 |
| Team ID | LTVIP2025TMID43376 |
| Project Name | Pattern sense classifying fabrics using deep learning |
| Maximum Marks | 4 Marks |

**Solution Architecture:**

1. The system begins with collecting a large, diverse dataset of fabric images representing various pattern types such as floral, striped, checkered, and plain.
2. Each image is manually annotated with its correct pattern label to form a high-quality labeled dataset.
3. The images are then preprocessed by resizing, normalizing, and augmenting them to improve model robustness and generalization.
4. The dataset is split into training, validation, and test sets to ensure unbiased model evaluation.
5. A deep learning model, typically a CNN or a pre-trained model like ResNet or EfficientNet, is selected for pattern classification.
6. The model is trained using supervised learning with appropriate loss functions and optimizers to learn pattern features.
7. Evaluation is performed using metrics such as accuracy and F1-score, along with confusion matrices and visual explainability tools.
8. Once validated, the model is deployed via an API using frameworks like FastAPI or Flask for real-time inference.
9. Users can upload fabric images to receive pattern classification along with confidence scores.
10. Feedback from users is collected and used to retrain and improve the model over time, creating a continuous learning loop.

Top of Form

**Example - Solution Architecture Diagram:**

****