Project Design Phase
Solution Architecture

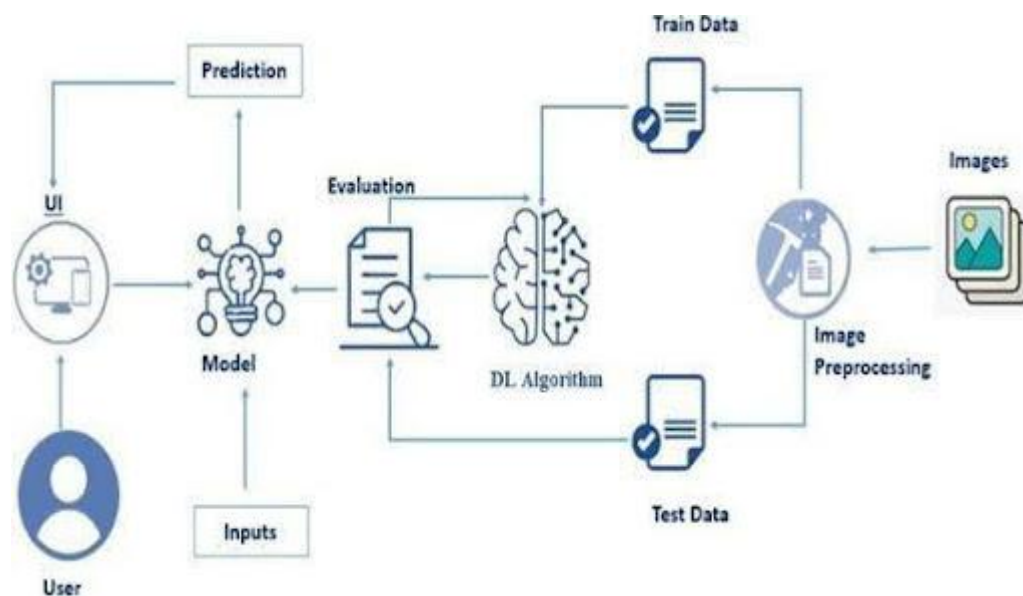| Date	15 February 2026
Team ID	LTVIP2026TMIDS49741
Project Name	HematoVision: Advanced Blood Cell Classification Using Transfer Learning
Maximum Marks	4 Marks

Solution Architecture:

Solution architecture is a complex process – with many sub-processes – that bridges the gap between business problems and technology solutions. Its goals are to:

- Find the best tech solution to solve existing business problems.

- Describe the structure, characteristics, behavior, and other aspects of the software to project stakeholders.

- Define features, development phases, and solution requirements.

- Provide specifications according to which the solution is defined, managed, and delivered.

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Solution Architecture Diagram:

HematoVision: Advanced Blood Cell Classification Using Transfer Learning

Reference:

https://aws.amazon.com/blogs/industries/voice-applications-in-clinical-research-powered-by-ai-on-aws-part-1-architecture-and-design-considerations/

1 Data Collection Layer

Haemovision dataset (microscopic blood cell images)

Classes:

Neutrophil

Lymphocyte

Eosinophil

Monocyte

2 Data Preprocessing Layer

Image resizing (e.g., 224x224 for CNN models)

Normalization

Data augmentation:

Rotation

Flipping

Zooming

Train–Validation–Test split

Purpose: Improve model accuracy and prevent overfitting.

3 Model Layer (Transfer Learning)

Use pre-trained CNN model:

MobileNet / ResNet50 / VGG16 (any one you used)

Freeze base layers

Add:

Global Average Pooling

Dense layer

Dropout layer

Softmax output layer

Purpose: Reuse learned features from large datasets (like ImageNet) to improve performance with limited medical data.

4 Training Layer

Loss Function: Categorical Crossentropy

Optimizer: Adam

Metrics: Accuracy

Epochs & Batch size defined

Model learns to classify blood cell types.

5 Evaluation Layer

Accuracy

Confusion Matrix

Precision

Recall

F1 Score

6 Deployment Layer

Option 1:

Web Application (Flask / Streamlit)

Option 2:

Desktop Application

Workflow: User uploads blood cell image → Model predicts → Displays cell type with probability**.**