

## Project Design Phase Solution Architecture

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

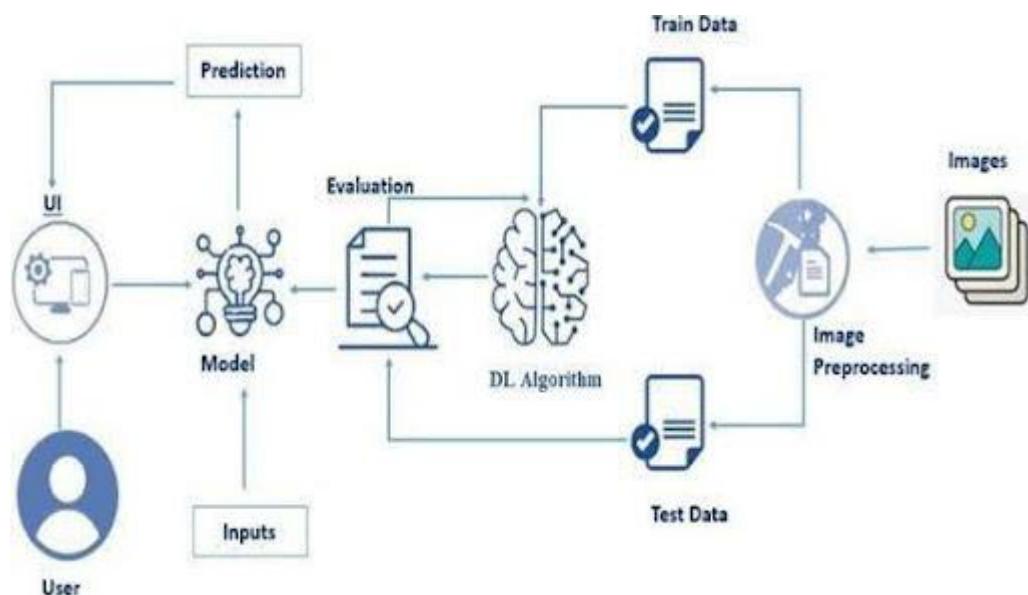
### Solution Architecture:

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.
- 

### 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.