**Project Design Phase**

**Problem – Solution Fit Template**

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| Date | 01 july 2025 |
| Team ID | LTVIP2025TMID40229 |
| Project Name | Hematovision |
| Maximum Marks | 2 Marks |

**Problem – Solution Fit Template:**

Manual microscopic analysis of blood cells is a time-consuming and error-prone process that relies heavily on the expertise and availability of trained pathologists. In many rural and resource-limited healthcare settings, there is a shortage of skilled technicians, which further delays accurate diagnosis and patient care. Additionally, even experienced professionals can misclassify cells due to fatigue, leading to inconsistent results. The traditional approach is not scalable, particularly in emergency scenarios or during large-scale testing when speed and reliability are critical.

HematoVision addresses these challenges by offering an AI-powered blood cell classification system built using transfer learning techniques. Leveraging pre-trained models like EfficientNet, the system quickly and accurately identifies various blood cell types, including red blood cells, white blood cells, and platelets. With a simple and user-friendly web interface built on Flask, the tool enables even non-experts to upload microscope images and receive predictions with high confidence in seconds. This significantly reduces the time and effort required for diagnosis, ensures consistency, and scales efficiently without the need for expensive equipment or extensive training. HematoVision presents a practical, costeffective, and scalable solution that fits seamlessly into modern laboratory workflows and can transform hematology diagnostics, especially in underserved regions.

**Purpose:**

The purpose of the HematoVision project is to develop an AI-powered system that can automatically classify blood cells from microscope images using transfer learning techniques. This project aims to assist medical professionals—especially in resourceconstrained environments—by providing a fast, accurate, and consistent method to identify blood cell types such as red blood cells, white blood cells, and platelets.

By integrating deep learning with a user-friendly web interface, HematoVision seeks to reduce dependency on manual analysis, minimize human error, and accelerate diagnostic workflows in clinical laboratories. The project also promotes accessible and cost-effective healthcare technology by making advanced image classification usable even in rural and remote settings.

