# Project Design Phase
## Proposed Solution Template

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| Date | 29 June 2025 |
| Team ID | LTVIP2025TMID46471 |
| Project Name | Hematovision : advanced blood cell classification using transfer learning |
| Maximum Marks | 2 Marks |

**Proposed Solution Template:**

Project team shall fill the following information in the proposed solution template.

| S.No. | Parameter | Description |
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| 1. | Problem Statement (Problem to be solved) | Manual classification of blood cells is a time-consuming and error-prone task typically performed by pathologists and lab technicians. This process often results in delays and inaccuracies, affecting the overall diagnosis and treatment plan. There is a growing need for an automated system that can classify blood cells quickly and accurately. |
| 2. | Idea / Solution description | Manual classification of blood cells is a time-consuming and error-prone task typically performed by pathologists and lab technicians. This process often results in delays and inaccuracies, affecting the overall diagnosis and treatment plan. There is a growing need for an automated system that can classify blood cells quickly and accurately. HematoVision proposes a deep learning-based solution to automate the classification of blood cells. The system leverages MobileNetV2, a pre-trained deep learning model, fine-tuned on a dataset of blood cell images. The solution is designed as a web-based tool where users can upload blood cell images, and the system will classify them into one of four categories: Eosinophil, Basophil, Monocyte, and Lymphocyte. The tool offers quick and accurate predictions, significantly reducing manual efforts and errors in diagnosis. |
| 3. | Novelty / Uniqueness | The uniqueness of this solution lies in its use of MobileNetV2 with transfer learning for classifying blood cells. By leveraging a lightweight pre-trained model, the solution can provide accurate classifications while requiring minimal computational resources. This approach not only speeds up the process but also makes the solution accessible to medical |

| | | facilities with limited infrastructure. Additionally, the web-based interface makes it easy to use in various healthcare settings. |
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| 4. | Social Impact / Customer Satisfaction | HematoVision has a significant social impact by providing a tool that enhances diagnostic efficiency and accuracy in medical labs. Pathologists and technicians can now classify blood cells faster, leading to quicker diagnoses and improved patient outcomes. By automating a critical yet time-consuming task, HematoVision can help reduce human error, optimize workflow, and free up medical professionals for more complex tasks. The system is user-friendly, enabling professionals with limited technical knowledge to use it effectively, thereby improving customer satisfaction and trust in the healthcare system |
| 5. | Business Model (Revenue Model) | The proposed solution can be offered as a Software-as-a-Service (SaaS) platform, where medical facilities and laboratories can subscribe to the system for a monthly or annual fee. Alternatively, it could be integrated into lab equipment sales as a bundled offering. Another revenue stream could include licensing the technology to large-scale hospitals and diagnostic centers. Additionally, a freemium model can be introduced, offering basic features for free with premium services such as advanced analytics and integration with lab management systems available through paid plans. |
| 6. | Scalability of the Solution | HematoVision is designed to be scalable in terms of both data volume and application usage. The model can be trained on a larger dataset to improve its accuracy and robustness over time. The system is also capable of handling a high number of users concurrently, as it is built on a web-based architecture with Flask. As the adoption of the solution grows, additional servers or cloud hosting can be integrated to scale the solution. Furthermore, the system's flexibility allows for the addition of more blood cell classes or integration with other medical imaging tools, expanding its applicability to other areas of healthcare. |