Brainstorm & Idea Prioritization Template

Date: 26 June 2025

Team ID: LTVIP2025TMID42022

Project Name: Hematovision: Advanced Blood Cell Classification using Transfer Learning

Maximum Marks: 4 Marks

1. Project Goal

"To automate and enhance the accuracy of blood cell classification using transfer learning and deep neural networks, aiding pathologists in early detection of blood disorders while ensuring medical data integrity."

2. Brainstorming: Key Feature Ideas

Feature Idea	Problem Solved	AI/Tech Used	Notes
Blood Cell Image Classifier	Automates classification of WBCs, RBCs, etc.	CNN-based Transfer Learning (ResNet)	Reduces diagnostic errors
Anomaly Detection Engine	Detects rare/abnormal cells	Autoencoders + TL	Useful for rare disease cases
Dataset Augmentation Utility	Handles class imbalance	Image transformations, GANs	Boosts model accuracy on minority classes
Explainable AI Visualizer	Improves trust in AI decisions	Grad-CAM, SHAP	Visual heatmaps for transparency
Report Generation Module	Saves pathologist time	NLG, Template-based summarization	Auto-generates PDF or EHR-compatible reports
Real-time Microscopy Scanner	Live prediction during slide analysis	Edge AI + Transfer Learning	Portable diagnostic support
Mobile App Interface	Brings AI to mobile pathologists	Flutter + TensorFlow Lite	Remote diagnosis potential

3. ⍰ Evaluation Criteria

- Impact: How beneficial is this to pathologists/lab technicians?
- Feasibility: Can we implement this using transfer learning + medical images?
- Compliance: Can it meet medical data handling and privacy standards?
- Differentiation: Is it unique vs traditional/manual blood analysis systems?
- Time to Market: Can we build a working prototype quickly?

4. ⍰ Prioritization Matrix

Feature	Impact (×2)	Feasibility	Compliance	Differentiation	Time to Market
Blood Cell Classifier	10	4	4	5	3
Anomaly Detection Engine	8	3	5	5	2
Data Augmentation Utility	8	5	5	3	4
Explainable AI Visualizer	10	4	4	5	2
Report Generator	8	4	5	4	3
Real-time Scanner	10	3	4	5	2
Mobile Interface	6	4	4	4	5

✅Top Priorities: Blood Cell Classifier, Explainable AI Visualizer, Data Augmentation Utility

⍰ High Potential But Needs Effort: Real-time Scanner, Anomaly Detection Engine

5. ⍰ Next Steps

1. Select top 3 ideas: Blood Cell Classifier, Explainable AI, Data Augmentation
2. Define MVP boundaries for each
3. Collect annotated blood cell image datasets
4. Evaluate data governance and compliance with medical standards
5. Prototype using PyTorch or TensorFlow + pre-trained models (ResNet, EfficientNet)

6. 🔗 Resources

- NIH Blood Cell Dataset
- TensorFlow Hub / PyTorch Hub
- Grad-CAM & SHAP Documentation
- WHO Classification Guidelines
- HIPAA & Medical Imaging Compliance Toolkit