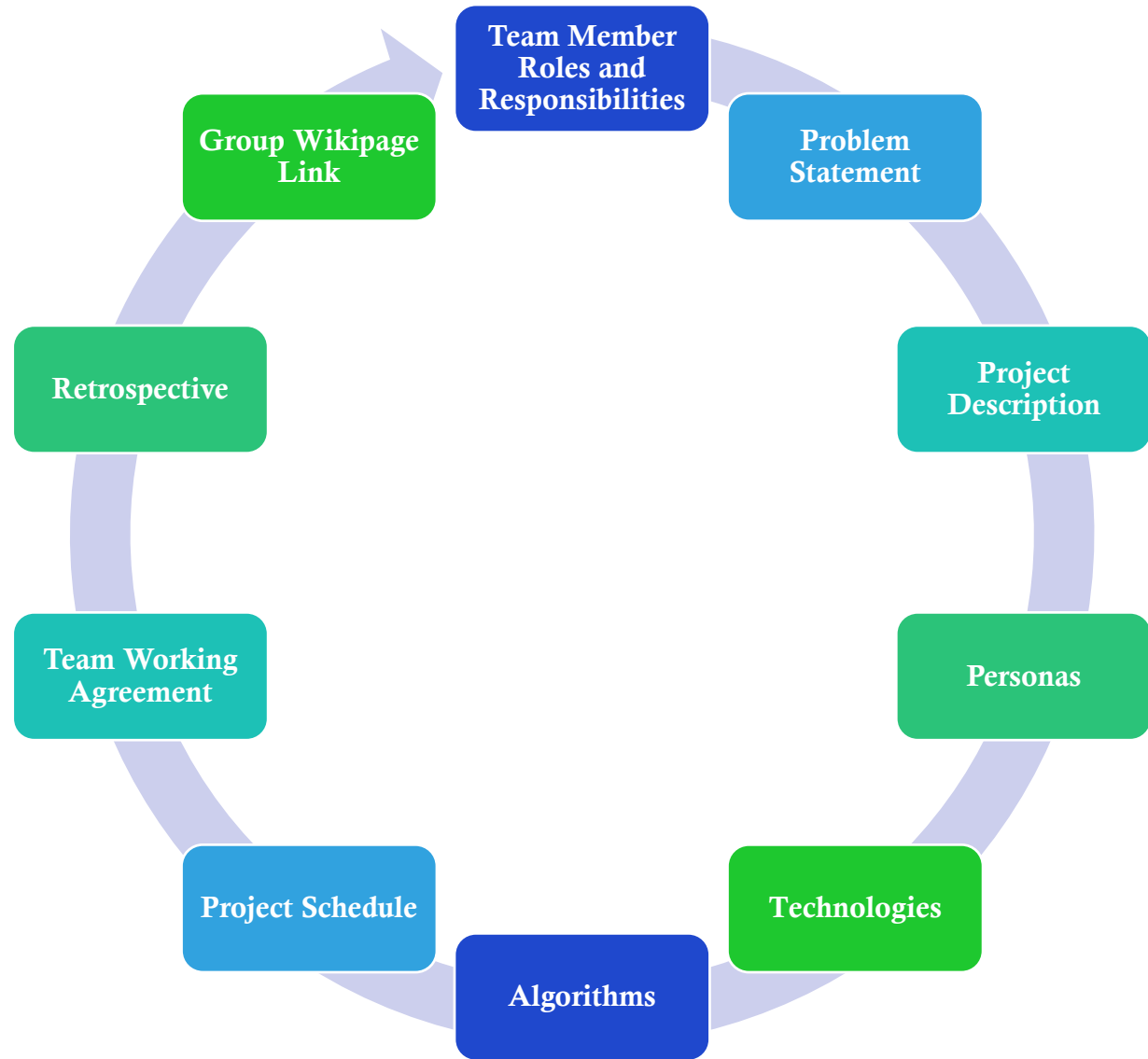# IMAGEMEDIX

By Team 5 The Minions

Sprint 0

AGENDA

TEAM MEMBERS – MACHINE LEARNING

Vaishnavi Chandrasekar

Christiana Heden Kothuru

Deepika Mothkuri

Greeshma Kenche

TEAM MEMBERS – BACKEND

Yucong Hu

Lingyi Luan
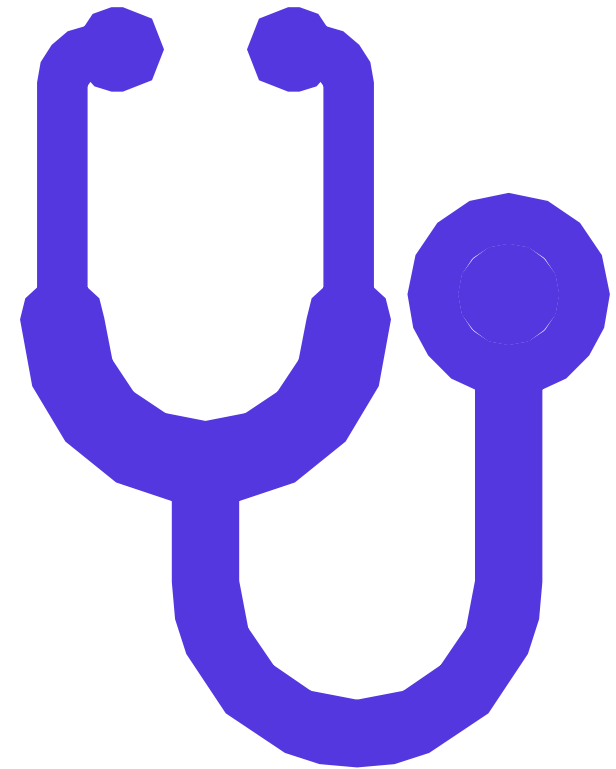
TEAM MEMBERS – FRONTEND

Yash Bhanubhai Panchani

Rameez Ahmed Shaik

PROBLEM STATEMENT

- Many healthcare facilities face challenges in diagnosing pneumonia and brain tumors quickly and accurately, often due to limited access to specialists and high workloads. Current solutions typically require separate systems to analyze different types of medical images. This leads to inefficiencies in diagnosis and delays in providing critical care. There is a need for an automated system that can efficiently classify medical images and provide preliminary diagnoses to support healthcare professionals in making timely decisions.

PROJECT DESCRIPTION

Project Name:	**ImageMedix**
Team:	The Minions
Project Description:	For **healthcare professionals** who **need to diagnose pneumonia and brain tumors efficiently,** the **Dual-Stage Medical Image Classification System** is a **two-step image analysis tool** that **automatically classifies medical images as lung X-rays or brain MRIs and provides a diagnosis**. Unlike **separate diagnostic systems that handle only one type of image,** our application **streamlines diagnosis by analyzing both image types within a single system, saving time and improving diagnostic accuracy**.
Benefit Outcomes:	**Faster Diagnosis:** Automates image classification and diagnosis, reducing the time needed for manual analysis. **Improved Accuracy:** Provides consistent and reliable preliminary diagnoses, minimizing human errors. **Resource Optimization:** Assists medical facilities with limited access to specialists, enabling quicker and more informed decisions.
Github Link:	https://github.com/htmw/2025S-The-Minions/wiki

PERSONAS

Dr. James Patel (Radiologist)

- **Age:** 45

- **Occupation:** Senior Radiologist at a metropolitan hospital

- **Background:** Over 20 years of experience in diagnostic imaging, specializing in lung and brain disorders. Known for mentoring junior doctors in radiology.

- **Goals:** To reduce the time spent analyzing large volumes of medical images while maintaining high diagnostic accuracy.

- **Challenges:** Overloaded with image analysis requests and administrative duties, leading to delays in diagnosis and increased stress.

- **How the System Helps:** Automates initial image classification and diagnosis, allowing Dr. Patel to prioritize critical and complex cases efficiently.

PERSONAS

Dr. Suzen Chen (General Practitioner)

- **Age:** 38

- **Occupation:** General Practitioner at a rural healthcare clinic

- **Background:** Has served in underserved regions for over a decade, often working without the immediate support of medical specialists. Committed to improving healthcare access in remote areas.

- **Goals:** To provide fast, accurate diagnoses for patients despite limited access to specialists.

- **Challenges:** She m ust handle a wide variety of cases on her own, making it difficult to diagnose complex conditions such as brain tumors and pneumonia accurately.

- **How the System Helps:** The AI system offers reliable preliminary diagnoses for brain and lung conditions, helping Dr. Chen make timely and informed treatment decisions.

PERSONAS

Dr. Raj Aryan (Healthcare Director)

- **Age:** 50

- **Occupation:** Director of a large hospital chain in India

- **Background:** A visionary healthcare leader who has overseen the expansion of multiple hospitals across the country. Inspired by challenges faced in rural and semi-urban healthcare delivery.

- **Goals:** To improve diagnostic efficiency, reduce patient wait times, and implement AI-based healthcare solutions across all branches.

- **Challenges:** Delays in diagnosis caused by a shortage of skilled radiologists, leading to overcrowded hospitals and slow patient care.

- **How the System Helps:** The automated system accelerates diagnosis processes across multiple hospitals, enabling faster and more efficient patient care, particularly in resource-constrained facilities.

TECHNOLOGIES

Frontend: React.js

- Used to create a user-friendly interface that allows healthcare professionals to upload and view medical images easily.

**Backend: Node.js (API), Flask (Model Inference), MongoDB**

- **Node.js:** Handles API requests and manages communication between the frontend and backend services.

- **Flask:** Supports model inference by running machine learning models for image classification and diagnosis.

- **MongoDB:** Stores user data, images, and diagnostic results, enabling secure and scalable data management.

Machine Learning:

- Built using **PyTorch** and trained on datasets for lung X-rays and brain MRIs.

Cloud Infrastructure:

- Deployed using **AWS.**
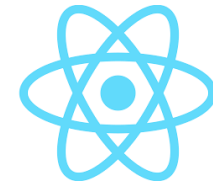
ALGORITHMS

The system uses two core algorithms based on pre-trained deep learning models. A **ResNet** model, fine-tuned on a dataset of medical images, is used to classify whether the uploaded image is a lung X-ray or a brain MRI. Depending on the classification result, the system proceeds to a second stage. For lung X-rays, a **fine-tuned EfficientNet** model detects and classifies pneumonia into normal, viral, or bacterial categories by analyzing lung patterns. For brain MRIs, the same EfficientNet model is used to detect and classify brain tumors into glioma, meningioma, or no tumor by identifying abnormalities in brain structures. These models provide high accuracy and efficiency, ensuring reliable diagnoses for both image types.

PROJECT SCHEDULE

Sprint 0 (Project Initiation): (January 21 – February 10)

- Focus on idea development, project planning, and setting up initial deliverables, including a presentation and wiki update.

Sprint 1 (Core Development): (February 10 – March 10)

- Begin core system design and implementation, including frontend, backend, and machine learning model integration. Deliverables: presentation and wiki update.

Sprint 2 (Advanced Development): (March 10 – April 7)

- Continue development with a focus on refining model performance, system integration, and additional features. Deliverables: presentation, technical paper update, and wiki update.

Sprint 3 (Final Testing and Optimization): (April 7 – April 28)

- Conduct system testing, performance improvements, and final documentation updates. Deliverables: presentation, technical paper update, and wiki update.

TEAM WORKING AGREEMENT

Team Working Agreement - The Minions

1. **Responsibilities:**
   - Each member is responsible for completing their tasks on time and maintaining the quality of their work.
   - Members must inform the group if they encounter any blockers that could delay the project.
2. **Communication:**
   - We will use common platforms like WhatsApp, Discord, or email for quick communication and updates.
   - Weekly meetings will be scheduled to review progress and discuss tasks.
3. **Meeting Attendance:**
   - All members are expected to attend scheduled meetings unless there are unavoidable circumstances.
   - Absentees should catch up on meeting notes to stay informed.
4. **Collaboration:**
   - All members are expected to contribute to their assigned roles (frontend, backend, machine learning).
   - Teamwork will be encouraged by helping each other when someone faces challenges or needs feedback.
5. **Deliverables:**
   - Each sprint will include presentations and documentation updates as required.
   - Work will be reviewed by peers to ensure quality before submission.
6. **Code and Documentation:**
   - Code should follow basic best practices for readability and functionality.
   - Documentation (tech papers, wikis) will be updated regularly by the respective team members.
7. **Decision-Making:**
   - Major decisions will be made collectively during meetings.
   - In case of disagreements, majority voting will determine the final decision.
8. **Conflict Resolution:**
   - Conflicts will be discussed openly during meetings, with all members encouraged to share their views.
   - If unresolved, the issue will be escalated to the **professor** for guidance.

Team Members
Chandrasekar Vaishnavi
Hu Yucong
Kenche Greeshma
Kothuru Christiana Heden
Luan Lingyi
Mothkuri Deepika
Panchani Yash Bhanubhai
Shaik Rameez Ahmed

RETROSPECTIVE

The-Minions

What went well ➕

1. Everyone share their ideas about the project on time +1	2.Roles are assigned, went smoothly +1
3.Good communication between members +1	4.Respecting each peer's ideas +1

What can be improved ➕

1.Time Consistency, whenever we set up a meeting everyone participate actively +0	2.More discussion and collaboration we can have in the future +0
3.Setting up meeting on regular basis, Thu 7:00PM +0	4.Discussing more about development, task allocation +0

Action Items ➕

1.Stick to the deadlines and plan ahead +0	2.Be clear and specific about what need to be done +0
3.Break down tasks and split tasks into small planning +0	4. Start to developing user interface, Deep learning part(Pytorch/Tensorflow), UI/UX: Flask,MongoDB +0

WIKIPAGE LINK

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https://github.com/htmw/2025S-The-Minions/wiki

THANK YOU