# Project Progress Report: Team Contributions

Here is a summary of the progress made by each team member on the project.

### Abhishek Kumar (Full Stack)

Abhishek laid the foundational groundwork for the project, focusing on architecture and documentation. His contributions include:

* **Project Setup:** Initialized the main code repository.
* **Architecture:** Defined the initial project and repository structure, module breakdown (ingestion, preprocessing, model, dashboard), and the high-level data flow.
* **Development Templates:** Created preliminary backend (FastAPI/Flask) and frontend (Streamlit/Dash) templates to accelerate the development of the prototype.
* **Comprehensive Documentation:** Prepared the detailed project report, which serves as the central reference for all technical specifications, patent concepts, prototype plans, and ML strategies.

### Abdul Kadir (Machine Learning)

Abdul focused on the initial machine learning model development to establish a baseline. His accomplishments include:

* **Model Training:** Successfully trained an initial **"AI-based habitat suitability model" (Model A)** to create predictive maps.
* **Algorithm:** Utilized an **XGBoost regression model** for this task.
* **Data Inputs:** The model was trained using key NASA satellite data, specifically **Sea Surface Temperature (SST)** and **Chlorophyll-a**.
* **Model Output:** The model predicts a continuous value, the **"Foraging Suitability Index,"** which quantifies how favorable an ocean location is for shark foraging based on environmental conditions.

### Rajdeep Ghosh (Machine Learning)

Rajdeep conducted critical research into advanced datasets to enhance the model's predictive power and feature engineering. His findings include:

* **Data Sourcing:** Identified and researched supplementary satellite datasets and their connection to the project's goals, focusing on dynamic ocean features.
* **Key Datasets Identified:**
  + **NASA PACE:** For more detailed chlorophyll concentration and phytoplankton functional type proxies.
  + **SWOT:** For high-resolution sea-surface height anomalies, which are crucial for identifying mesoscale ocean eddies (foraging hotspots).

### Mansi Kumari (Data Science)

Mansi focused on the research and strategic positioning required for the intellectual property. Her work involved:

* **Patent Research:** Conducted research to establish the project's novelty and uniqueness, focusing on prior art and existing solutions.
* **Innovation Framing:** Helped lead team discussions to define the "uniqueness vectors" for the patent, such as the multi-source satellite feature fusion and the adaptive telemetry concepts.
* **Concept Validation:** Ensured the core ideas being drafted into the patent were technically sound, innovative, and clearly articulated.

### Sania (Data Scienc)

Sania was responsible for translating the team's technical concepts into formal patent language. Her contributions include:

* **Patent Drafting:** Began drafting the core components of the project's patent application.
* **Key Sections Drafted:** Produced the initial versions of the patent's **Title** ("Adaptive Oceanic Telemetry System..."), **Abstract**, **Background of the Invention**, and **Summary of the Invention**.
* **Claims Skeleton:** Created the initial skeleton for the patent claims, outlining the system, methods, and the conceptual tag device.

### Team-wide Contributions

In addition to their specific tasks, the entire team actively participated in group discussions to:

* Refine the core concepts of the project, including the simulation-based prototype plan.
* Define and validate the project's innovative edge and uniqueness against existing technologies.
* Align on technical details, data flow, and the overall project strategy.