Project Brief
Product-based Capstone Project

[Melaut]

[Product Capstone]

Team ID : **C242-PS150**

Selected Themes/Case : Smart Agri-Fishery Solution: Agrotech and Fisheries Technology ...

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Member Name :

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BACKGROUNDER:

Our team developed *Melaut* after learning about the challenges faced by fishermen dealing with unpredictable weather and tidal changes, especially in coastal communities where many depend on fishing for their livelihood. Some of us have family or friends who fish, so we're familiar with the risks they face when reliable weather and ocean condition guidance isn't available. We wanted to design a simple, accessible recommendation system to help fishermen make safer, better-informed decisions. *Melaut* combines technology and traditional knowledge to give practical advice on fishing times and locations, driven by our commitment to supporting these communities through effective, data-based solutions for their daily challenges at sea.

1. Machine Learning: collects weather and tidal datasets from various available open sources. Then, we carry out a variety of data processing until the dataset is integrated and can be used for model training. We create 2 models. The first is a deep learning regression model to get real-time tidal predictions based on weather data pattern analysis. After getting the tidal data, we use this data combined with weather data to perform clustering for seafaring safety recommendations.
2. Mobile App Development: Built an Android app using Android Studio, incorporating key features such as onboarding, secure registration, a home page, profile editing, and real-time weather predictions. Integrated a "Pantau Laut" feature that informs users about the safety of going fishing, using color-coded indicators and detailed explanations. Leveraged Retrofit for API communication, thoroughly testing endpoints with Postman. Implemented Firebase for secure authentication and real-time database management. Designed a user-friendly interface guided by Figma, focusing on delivering a seamless and functional experience tailored to fishermen
3. Cloud Computing: Develop a Node.js backend using Express.js to integrate with a Flask API hosting a machine learning model by forwarding client inputs for inference and returning responses. Containerize the Flask API and Node.js server with Docker and deploy them to Google Cloud Run. Use supporting services like Cloud Storage for model files to ensure scalability and enable seamless communication through Google Cloud's managed solutions.

PROJECT STATUS:

90% Completed based on Project Plan

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TECH STACK CHECKLIST

A. Main Quest

1) Android stack

- ☑ ~~**Implement a basic workflow** to access the main feature.~~
- ☑ ~~**Integrate AI/ML capabilities** as the app's main feature, either via on-cloud or directly on-device.~~
- ☑ ~~**Implement networking calls** to interact with the project's API.~~
- ☑ ~~**Ensure the implementation** of the main features you aim to address in the project without causing the application to crash.~~
- ☑ ~~**Add a custom app icon** to your application.~~
- ☑ ~~**Provide a downloadable APK** file of the app.~~

2) Machine Learning Stack

- ☑ ~~**Utilize TensorFlow architecture** for building machine learning models.~~
- ☑ ~~**Vertex AI** can only be used if you intend to build Generative AI.~~

3) Cloud Computing Stack

- ☑ ~~**Utilize Google Cloud services** to support application needs, such as:~~
  - Compute services for hosting APIs or other web services.
  - Database services for database applications.
  - Storage services for storing data, etc.
- ☑ ~~**Utilize Google Cloud services** for the machine learning workflow, including analysis, training, and serving models. For example:~~
  - Use computer services for hosting machine learning deployments.
  - Utilize data services for data solutions, etc.
- ☑ ~~**Build cloud architecture** to illustrate all necessary components and technologies required by the applications and machine learning models.~~
- ☑ ~~**Calculate the costs** via Google Cloud Pricing Calculator to avoid sudden credit running out, and use the minimum costs.~~
- ☑ ~~**Manage access** to your Google Cloud Project to ensure only the Cloud Computing team has access and can manage the costs.~~

B. Recommendation Quest (Optional)

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SCREENSHOTS/DEMO VIDEO:
Our Demo Video

DATASET LINK:
Our Dataset

DEPLOYED LINK:
Deployed Link

GITHUB REPO LINK:
Our Repo

10-MIN VIDEO PRESENTATION LINK:
Our Presentation Video

SLIDE PRESENTATION LINK:
Our Slide Presentation

GO-TO-MARKET PROPOSAL

a. **TARGET MARKET**
   - **Profession:** Fishermen
   - Why does your target market need your solutions?
     1. Purpose-driven : The primary purpose is to enhance the safety of fishermen by providing them with accurate and timely information about weather and tidal conditions.
     2. Data-driven : Melaut leverages real-time weather and tidal data to provide accurate and up-to-date recommendations.
     3. Government Reasoning : The government has a responsibility to promote safety at sea, and Melaut aligns with this goal by providing tools for fishermen to make informed decisions.
     4. Stakeholders related to and benefitted from your solutions : The primary beneficiaries, gaining access to valuable information for safer and more efficient fishing.

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b. MARKETING STRATEGY

- **Target Audience**
  - **Primary:** Fishermen in coastal communities.
  - **Secondary:** Government agencies, NGOs (Non-Governmental Organizations), and maritime stakeholders.

- **Value Proposition**
  - **Safety:** Real-time weather and tidal updates for safer fishing.
  - **Efficiency:** Data-driven insights to optimize fishing trips.
  - **Sustainability:** Encourage responsible fishing practices.

- **Key Marketing Channels**
  - **Local Outreach:** Community workshops and training.
  - **Government Partnerships:** Integrate Melaut into maritime safety programs.
  - **Digital Channels:** Social media campaigns and mobile-friendly websites.

- **Strategic Partnerships**
  - Partner with mobile network providers for subsidized data.
  - Collaborate with NGOs and weather institutes for funding and credibility.

- **Monetization**
  - Promote local businesses and fishing-related products.
- **Success Metrics**
  - Adoption Rates: Number of active users.
  - Safety Impact: Reduction in sea accidents.
  - Community Feedback: Positive testimonials from fishermen.
  - Partnerships: Engagement with government and NGOs.

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c. **COMPARISON WITH SIMILAR SERVICE/APPS (if any)**

- Fishing Point (50%) : We have advantages in predicting tides and recommendations for safety at sea. But we have similarities with these applications in terms of displaying real-time weather data.
- Laut Nusantara (30%) : This application provides a feature to show fish distribution forecasts, which also our feature design. But we make adjustments for this feature according to our remaining time.

d. **SWOT Analysis of the project**

- **Strengths**

  - Can provide recommendations about the safety of the sea situation for going to sea
  - Easy to use
- **Weaknesses**
  - Need internet connection to get the weather information
  - Only effective in certain area
- **Opportunities**
  - Could be a replacement option for radar that detects tides
- **Threats**
  - Unexpected changes in sea water conditions

MENTORING REMARK(S), IF ANY:

Machine Learning Mentoring: Determining the project scope. The mentor suggested providing a disclaimer that the scope of the project taking into account the dataset used was still limited to certain areas (South Bali Sea)

Did the implemented capstone project differ from the original plan, and if so, how did these changes impact the project's success and outcomes?

Just a few adjustments such as determining the scope of the project as stated in the mentoring remarks. But these adjustments do not affect our main feature "Pantau Laut" as a safety recommendation system for going to sea. We only have to provide a disclaimer that perhaps the recommendation results are only effective in the area where the dataset is used