Project Plan for Bangkit 2023 Product-based Capstone

Problem Statement

Increasingly hot temperatures and erratic weather are of concern to the public because they can affect their health and well-being. In emergency situations, such as natural disasters, accurate temperature and weather monitoring can help people take appropriate measures to avoid possible harm. However, the lack of accurate and easily accessible information about temperature and weather in certain areas can make it difficult for people to take preventive measures. Therefore, a solution is needed that can help people monitor temperature and weather in real time to minimize the risks that may occur.

Research question

1. How can the Disastershield application detect natural disasters and climate change in real-time?
2. What features must be present in the Disastershield application to help users get accurate and reliable information about natural disasters and climate change?
3. How can Machine Learning be used in the Disastershield application to predict future natural disasters and climate change?

Team ID **:** C23-PC616

Team Member :

1. **(ML) M241DSX1467**– Affan Dharmawan Nusli – Universitas Mercu Buana - **[Active]**
2. **(ML) M301DSX2137** – Bagja Kurniawan – Universitas Pasundan - **[Active]**
3. **(ML) M131DSY0267** – Elinda – Universitas Ahmad Dahlan - **[Active]**
4. **(CC) C038DSX2701** – Ahmad Hafizh Assa'ad – Institut Teknologi Sepuluh Nopember - **[Active]**
5. **(CC) C301DSX4923** – Mochamad Rafi Ramadhan – Universitas Pasundan - **[Active]**
6. **(MD) A360DKX4360** – Bayu Surya Dharma Sanjaya – Universitas Telkom - **[Active]**

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Final Selected Themes:
Post-Pandemic & Emergency Responses

Title of the Project:
DisasterShield

Excecutive Summary/Abstract:
Disastershield is a mobile-based natural disaster detection application with machine learning and cloud computing. This application was created to assist the public in obtaining information about natural disasters that may occur in their area. In addition, this application is also equipped with weather and temperature prediction features to provide users with more complete information.

The problem that this application aims to solve is the lack of timely and accurate information about natural disasters, so that people are often unprepared for these disasters.

The research question that this project wants to answer is: How to build a mobile-based natural disaster detection application that can provide accurate and timely information about natural disasters and weather?

This project was carried out because of the importance of timely and accurate information about natural disasters for the safety of the community. With this application, it is hoped that the community can be better prepared to face natural disasters and minimize the impact they cause.

How did your team come up with this project?
To produce this project, our team will use a structured and well-planned approach. We will start by conducting research on machine learning and cloud computing for natural disaster detection applications. Then, we will start developing mobile applications by prototyping and developing machine learning models that are appropriate for predicting natural disasters. We will also integrate weather and temperature prediction features. After that, we will carry out testing and evaluation of the application to ensure its reliability. Finally, we will make reports, presentations and documentation of the results of our project.

Project Scope & Deliverables:

No.	Task	Deliverables	Timeline (days)	Person in Charge
1.	Research on machine learning and cloud computing for natural disaster detection applications	Research report and selection of the right machine learning algorithm	3 days	ML
2.	Development of mobile applications for natural disaster detection	Prototype of mobile application that is connected to cloud computing	7 days	CC

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3.	Development of machine learning models for prediction of natural disasters	Machine learning models integrated with mobile applications	10 days	ML , CC
4.	Integration of weather and temperature prediction features	Prototype of a mobile application that can predict weather and temperature	5 days	MD
5.	Application testing and evaluation	Applications that have been tested and evaluated for reliability	5 days	MD
6.	Documentation and presentation of project results	Project reports, presentations and documentation of project results	3 days	Whole team (ML,CC,MD)

Project Schedule:

No	Activity	May 2023															June 2023														
		16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	A. Research																																
1	Research on machine learning and cloud computing for natural disaster detection application																																
	B. Development																																
4	Implementation of System Architecture																																
5	Implementation of Interfaces																																
6	Implementation of backend Logic																																
	C. Testing																																
10	Testing																																
11	Bug fixing																																
	F. Launching																																
14	Launch of the system																																
15	Documentation																																

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Based on your team's knowledge, what tools/IDE/Library and resources that your team will use to solve the problem?

Our team will use several tools, IDEs, libraries, platforms, and resources to complete this project, including:

Category	Name
Tools	Jupyter Notebook, Google Colab
IDE	Visual Studio Code, PyCharm
Library	Pandas, NumPy, Scikit-Learn, TensorFlow
Platform	Google Cloud Platform, Amazon Web Services
API	OpenWeatherMap
Resources	Weather dataset, natural disaster dataset, temperature dataset

Based on your knowledge and explorations, what will your team need support for?

1. Mentors/Experts in Machine Learning and Cloud Computing
2. Accurate and up-to-date disaster data from reliable sources
3. Access to cloud computing resources and infrastructure
4. Funding for potential expenses related to cloud computing and data acquisition
5. Technical support for integrating various tools and libraries
6. Collaborators for testing and validating the application
7. Feedback and guidance from potential end-users to improve the application's usability and effectiveness.

Based on your knowledge and explorations, tell us the Machine Learning Part of your Capstone!

Based on the team's knowledge and exploration, the Machine Learning portion of the Capstone Project will include using Tensorflow as the main framework for modeling. Teams should train their own models or use transfer learning, as AutoML or similar automated model building is prohibited. In its implementation, the team can use AI platforms, such as tensorflow.js and TFLite, as well as other alternatives. However, it is expected to avoid using Google colab or local notebooks/files in production/demo. Using Tensorflow is mandatory, but teams can use other libraries on top of Tensorflow.

Based on your knowledge and explorations, tell us the Mobile Development Part of your capstone?

Based on the team's knowledge and exploration, the Mobile Application Development portion of this capstone will use native Kotlin/Java/C++ technologies and Android Studio to build Android apps. Use of Webview, Appinventor and other auto-generating applications is not permitted. The use of flutter, react, or other multiplatform technologies is allowed to create applications on other platforms (eg Windows/iOS/Linux) based on Android's native technology. Teams can attach Figma or other links related to this plan.

Based on your knowledge and explorations, tell us the Cloud/Web/Frontend/Backend Part of your capstone?

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Based on the team's knowledge and exploration, we will use the right variety of programming languages, frameworks, and libraries to build our project. Our team will create at least one private API or endpoint including authentication, authorization, and API/endpoint documentation. We may use available third-party APIs or services, but we must write documentation about how and why we use certain APIs. In case the API or service is unstable, we will plan to have an alternative endpoint and/or build our own data generator to ensure our project can run on demo/assessment day. Our team will use Figma or other relevant links in planning this project.

Based on your team's planning, is there any identifiable potential Risk or Issue related to your project?

Based on our team's planning, there are several potential Risks or Issues related to our project. One of them is limited resources, especially time, which can affect our ability to complete projects according to a predetermined schedule. In addition, limited access to data resources or APIs can be a hindrance in the development of our models and applications. We also identify possible errors in data collection and processing, as well as errors in modeling and application.

To address this potential Risk or Issue, we have planned several preventive measures, such as optimizing the use of available time and resources, and seeking alternative data and API resources if problems occur. We will also periodically perform data validation and conduct regular testing to ensure the quality of our models and applications. In addition, we have also considered collaborating with experts in the relevant fields to assist us in addressing issues that may arise during project development.

Any other notes/remarks we should consider on your team's application

We are excited to join the Capstone program and develop innovative solutions to solve existing problems. We are confident that this project will provide us with valuable experience and challenge us to improve our technical skills. We are committed to working hard and collaboratively to achieve the set goals within the given timeframe. Thank you for providing this opportunity and we stand ready to answer questions or provide additional information if needed.