**Team ID :** C23-PR526

**Team Member :**

1. (ML) M350DSY1435 – Hajarani Syadzwana – Universitas Sumatera Utara - [Active]
2. (ML) M350DSX1794 – Muhammad Iqbal Aldeena – Universitas Sumatera Utara - [Active]
3. (ML) M125DKY4655 – Azilla Auri Pramesti – UIN Syarif Hidayatullah Jakarta - [Active]
4. (CC) C350DSX1608 – T.M. Rezha Taufiqurrahman, Mx – Universitas Sumatera Utara - [Active]
5. (CC) C058DKX4155 – Afdan Syukron – Politeknik Negeri Banyuwangi - [Active]
6. (MD) A034DKX4179 – Putra Cendikia Subekti – Institut Teknologi Kalimantan - [Active]

**Final Selected Themes:**

Sustainable Living

**Title of the Project:**

EcoScan : An App built to help consumers understand the energy consumption and the environmental impact of their household items.

**Executive Summary/Abstract:**

According to a research paper published in the Journal of Cleaner Production, titled “Environmental impacts of household appliances in Europe and scenarios for their impact reduction”, that as household appliances increase in demand, and therefore their production and consumption, they are considered one of the relevant areas of intervention to ensure sustainable production and consumption. One should expect the same happening in Indonesia, as the nation’s economy grows within the next decade. This growth will certainly involve the continued use of fossil fuels, and therefore increasingly negative impacts toward the environment.

Consumers can contribute towards a green future. As Richard Heede of the Climate Accountability Institute said in an interview with vox, “it’s the consumers that actually burn and demand the fossil fuels that these companies provide”. As such, we would like to assist consumers in making the right choices for the environment.

This project tackles the problem of helping consumers find alternatives to household appliances, by giving them the information necessary to consider, such as energy consumption, and the environmental impact of the production, consumption, and disposal of a product, and giving them alternative suggestions.

**How did your team come up with this project?**

Our team decided to pick this theme because we want to show people how much energy their daily appliances are using. with this app, people can be mindful of their impact on the environment. We hope to encourage people to make more careful decisions about their energy consumption and reduce carbon footprint. Our app will have a positive impact especially on the environment and provide a more sustainable future for all.

**Project Scope & Deliverables:**

| **Machine Learning** | | |
| --- | --- | --- |
| **Weeks** | **Project Scope** | **Project Deliverables** |
| Week 1 | Data collection for training and testing model. | Datasets for training and testing. |
| Week 2 | Building and training of image detection models of appliances | Image detection model for detecting household appliances that have been trained. |
| Week 3 | Additional evaluation and fixing what can be improved from the model | better model built |
| Week 4 | Evaluate the model, data and check it in the implementation to be displayed in the final project | fixed ML models and data that is already accurate |

| **Cloud Computing** | | |
| --- | --- | --- |
| **Weeks** | **Project Scope** | **Project Deliverables** |
| Week 1 | Creating an API | Deployed API |
| Week 2 | Creating landing page | Website landing page |
| Week 3 | Deploying the model | Deployed model |
| Week 4 | Create a backup generator | Data generator program |

| **Mobile Development** | | |
| --- | --- | --- |
| **Weeks** | **Project Scope** | **Project Deliverables** |
| Week 1 | Making the application interface | Application prototype |
| Week 2 | Development of Required application features | Fully functional application for image of household appliances |
| Week 3 | Testing and debugging | Testing and debugging report |
| Week 4 | Build APK and Bundle | APK or Bundle file can be use or publish to Play Store |

**Project Schedule:**

| No | Task | May - June 2023 | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 5 - 12 May | 13-19 May | 20 - 26 May | 27 May-  2 June | 3 June -  9 June | 10-16 June |
| 1 | Looking for ideas, looking for data and references, collecting proposals, waiting for announcements. create wireframes |  |  |  |  |  |  |
| 2 | Revise the project, explore the tools to be used, learn more about the unknown, change things that need to be revised and find solutions for even better projects. Get the results of the last project plan announcement and continue the work that has been done before,  **ML:**  -data collection  -data cleaning  - try to find best model  **CC:**  - Developing API  - Building a landing page  **MD:**  - Design (Flow and UI Application)  - Implement design to UI application |  |  |  |  |  |  |
| 3 | Consult with mentors and discuss problems encountered  **ML:**  **-** Feature selection  -choose the most probable model  -implement models  - Test the model  - evaluated model  **CC:**  - Deploying API  - Create a simple website for testing  - Giving API to the MD  **MD:**  - Implement design to UI application  - Build Features that doesn’t need API |  |  |  |  |  |  |
| 4 | 31 May report the progress  **ML:**  additional evaluation and fixing what can be improved from the model  **CC:**  -Create a Data Generator  **MD:**  - Build Features that need API  - Build APK |  |  |  |  |  |  |
| 5 | Deploying Website and the App, evaluate together for improvement and fix deficiencies of the project |  |  |  |  |  |  |
| 6 | Make video for Final Deliverables, make project brief, preparation for presentation slides  Monitor and Manage Deployed Apps. |  |  |  |  |  |  |

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

ML Tools:

* TensorFlow
* Github
* Dataset Resource (Kaggle, Google Dataset Search)
* Python Library (Matplotlib, Scikit-Learn, NumPy, Random, OpenCV, Pandas)
* Visual Studio Code

CC Tools:

* Google Cloud
* Flask Web Framework
* Node.js
* Postman
* Visual Studio Code
* GitHub
* Third-Party Public APIs (Open Energy Monitor, Sense, WattTime)
* Laravel Web Framework
* Python Library (Random, Tensorflow, Numpy, Scikit-Learn)

MD Tools:

* Android Studio
* GitHub
* Postman
* Android Library
* Android Emulator
* Figma

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

* Mentors for guiding in making and deploying APIs.
* Guiding in understanding and choosing the best model for the available datasets
* Google Play Console account to publish application to Play Store

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

* The Machine Learning part of our Capstone Project is to create a model using TensorFlow to detect images of home appliances by scanning them and then produce output such as energy consumption, environmental Impact (production, distribution, use, disposal), also alternatives and comparisons with more environmentally friendly products.

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

* The Mobile Developer will have the responsibility of developing an Android application using Kotlin. The development process will use dependencies such as Retrofit2, Dagger Hilt, CameraX, and others. The developer will be using Android Studio. Here is the wireframe that we have created for the project [link](https://www.figma.com/file/j2wr2OdJk7mLKyA7cRilsQ/Application-Design?node-id=0%3A1&t=3WsjYEXHRGY5LtCw-1).

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

* The Cloud/Web/Frontend/Backend of our project would be Developing and Deploying APIs, Deploying the Model / App as well as the landing page. We want to make a landing page too. and for the web part, we would like to monitor how our App handles requests from users.

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

* Unstable APIs (we can use our backup data generator)
* Model Accuracy (while a high accuracy is attainable, we are unsure of whether the accuracy level achieved would be adequate for consumer use)
* Request Handling (Might need to limit the request per minute)
* Unavailable/Incomplete dataset
* Incomplete image dataset for household needs the image dataset is incomplete for household needs, to be able to detect objects and provide energy analysis (the solution might be to slowly scrape image data from Google but it will take a long time)

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

For your consideration, here are our Linkedin and GitHub’s Profile Page:

1. TM Rezha Taufiqurrahman:

* [Linkedin](https://www.linkedin.com/in/rezhataufik/)
* [GitHub](https://github.com/RezhaTaufik)

1. Hajarani Syadzwana:

* [Linkedin](https://www.linkedin.com/in/hajarani-syadzwana-b5ab9b267/)
* [GitHub](https://github.com/hajaraniwana)

1. Muhammad Iqbal Aldeena:

* [Linkedin](https://www.linkedin.com/in/muhammad-iqbal-aldeena-83106491/)
* [GitHub](https://github.com/Iqbal18062002)

1. Putra Cendikia Subekti :

* [Linkedin](https://www.linkedin.com/in/putra-cendikia/)
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* [LinkedIn](https://www.linkedin.com/in/azilla-aurip/)
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1. Afdan Syukron:

* [LinkedIn](https://www.linkedin.com/in/afdan-syukron-959ab91b9/)
* [GitHub](https://github.com/afadalego)

Our Flow Chart Link : [Figma](https://www.figma.com/file/WXZr4PVVRCIcUsqh1mAJ0g/Flow-Chart-Product-Based-Capstone?node-id=0%3A1&t=rb7uQKzoVHmuf7mA-1)