

Project Plan for Bangkit 2023 Product-based Capstone

Problem Statement:

The difference in the quality of education in several educational institutions has resulted in many educational disparities between ibtidaiyah madrasah and sanawiyah madrasah. Where Arabic language students are still often repeated when entering higher education. However, on the other hand, several educational institutions continue the syllabus that was passed on from the syllabus of the previous educational institution.

Research Question:

1. whether conventional learning media is qualified?
2. with this application can it be useful for students?

Team ID : C23-PS278

Team Member :

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2. (ML) M166DKX4049 – Yahya Bernanda Fahrurrozi – Universitas Diponegoro – Active
3. (CC) C172DSX2227 – Alif Taqiyyuddin Akmal – Universitas Gunadarma – Active
4. (CC) C172DSY2684 – Sinta Puspito Rini – Universitas Gunadarma – Active
5. (MD) A122DKX4590 – Iqbal Putra Ramadhan – UIN Sunan Gunung Djati – Active
6. (MD) A199DKX4586 – Fawzan Ibnu Fajar – UIN Sunan Gunung Djati – Active

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Final Selected Themes:

Education, Learning, and Personal Development.

Title of the Project:

ArabKu: An Object Recognition App for Students Learning Arabic.

Excecutive Summary/Abstract:

As a means of communication, language plays an important role in human life. this also applies to students who are learning about Arabic. Meanwhile, the media participates in communication. In other words, the media plays an active role in enhancing learning and achieving student goals, which greatly determines the success and efficiency of education delivery. The presence of the media is a very important aspect in supporting the success of the learning process. In learning a language, vocabulary is very important. One thing that must be understood is that teaching vocabulary has the aim of expanding the learner's vocabulary.

This project aims to develop an object recognition mobile application to support students learning Arabic. The application is designed to help students improve their Arabic vocabulary by providing them with a fun and interactive way to learn new words. The application will use machine learning technology to recognize objects and translate their names into Arabic. By using this application, students will be able to easily and quickly expand their Arabic vocabulary. The success of this project will greatly enhance the efficiency of Arabic language education and improve students learning outcomes.

How did your team come up with this project?

My team came up with the idea in difference in the quality of education in several educational institutions has resulted in many educational disparities between ibtdaiyah madrasah and sanawiyah madrasah. Where Arabic language students are still often repeated when entering higher education. However, on the other hand, several educational institutions continue the syllabus that was passed on from the syllabus of the previous educational institution.

Project Scope & Deliverables:

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Project Scope		
No	Task	Person Responsible
1	Perform requirement engineering	ML, MD and CC
2	Set Up Project on Github	ML, MD and CC
3	Designing UX on Figma	MD
4	Implementing UX on Android	MD
5	Implementing Machine Learning with Cloud Connection	MD

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6	Testing application and Debugging	MD
7	Analyze Cloud Architecture	CC
8	Preparing Cloud Service for Team Member	CC
9	Prepare Data Storage for Application Data	CC
10	Deploying the Application and Conducting Testing	CC
11	Collecting Dataset	ML
12	Process Dataset	ML
13	Build The Model	ML
14	Train and Test the Model	ML
15	Implementing and Passing the Model to Cloud Computing	ML
16	Evaluating the Model	ML

Deliverables		
No	Name	Role
1	UI/UX design	MD
2	API documentations	CC
3	ML models	ML
4	Android application	MD

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Project Schedule:

Task	May			June		
	Pre-phase	W1	W2	W3	W4	W5
# All Member						
1 Make Project Plan						
2 Submitting Project Plan						
3 Revision (if any)						
4 Perform Requirement Engineering						
5 Set up Project on Github						
6 Final Deliverable						
# Machine Learning						
1 Collecting Dataset						
2 Process Dataset						
3 Build the Model						
4 Train and Test the Model						
5 Implementing and Passing the Model to Cloud Computing						
6 Evaluating the Model						
# Mobile Development						
1 Designing UX on Figma						
2 Implementing UX on Android						
3 Implementing Machine Learning with Cloud Connection						
4 Testing the App and debugging.						
# Cloud Computing						
1 Analyzing the cloud architecture						
2 Provide and preparing cloud services for team member						
3 Prepare data storage for application data						
4 Deploying the application and conducting testing						

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

Machine Learning	Mobile Development	Cloud Computing
Datasets	Android Studio	Cloud Storage
Python	Retrofit	Cloud BigTable
Keras	Room	Cloud SQL
Tensorflow	ML Kit	Compute Engine

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TFLite	Paging 3	Cloud Function
	CameraX	VPC Networks
	Glide	Swagger API
		Load Balancer

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

- Google Cloud Platform credit
- We need Experienced mentor on Android development, Datasets, Knowledge of usable APIs and cloud.

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

We plan to make AI with tensorflow to identify object, especially object that we can found around the classroom. We use TensorFlow to create model. We use dataset from Kaggle. The trained model then converted using TFLite for further deployment into android.

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

We'll use Retrofit to fetch data from the network and Room for local databases to implement offline-first which some will be processed by Paging 3 remote mediator and paging source. We will also using ML Kit to using the model in python, CameraX for camera and Hilt for dependency injection.

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

We'll use Cloud SQL and Cloud Bigtable as a database. We also use Cloud Storage as storage for the image. We utilize Compute Engine/Cloud Function and load balancer to serve backend API and we will use Swagger framework to write our API documentation.

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

If there will be any issues due to the project, we think It will be at the development phase from the CC and ML team. This issue is more of a confusion of using an API classifier that will be called by the API developed by the CC team which will end up being called by the application or we use Cloud Function so that the ML team will provide the trained model to the CC team. Or from MD team to stabilize the gradle so apps can using ML kit.

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

We want to make it easier for someone to recognize pictures of objects in the syllabus, especially for students who are learning Arabic. So that can improve the learning method in Indonesia. The implementation of image recognition feature to recognize classroom object is a simple yet very helpful feature for users to quickly know what the Arabic object.