Bangkit 2021 Capstone Project Plan

Corak: Identify Batik Motives with Your Phone

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Team ID: B21-CAP0283

Active Member ID and Name:

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4. C3312955 - Armia Riyan
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Inactive Member ID and Name:

1.
2.
3.

Selected Theme: National Identity & Character Building

Title of the Project: Corak: Identify Batik Motives with Your Phone

Executive Summary:

One of the national character developments is the preservation of culture as a national identity. Preserving can be started from knowing and understanding. Batik, is Indonesian culture which in this modern era is less recognized by children. What makes children less familiar with batik? How well technology supported batik information in Indonesia's learning system? We choose to take this problem, a combination of cultural introduction with technology. With "Corak" knowing the motive, type, area of origin, and other information is as easy as turning on the camera, pointing it, and let the "Corak" tell you the details.

Project Scope & Deliverables:

Project Scope

- Develop an App called "Corak" to classify 20 various Indonesian Batik motives.
- The main target for this app is educating Indonesian children with age ranging from 5 up to 14 years old (TK/Kindergarten to SMP/Junior High School).
- The "Corak" app will display related information about the predicted motive such as its name, area of origin, the story behind the motive, etc.
- The app will consist of 3 different technology stacks which are Machine Learning, Cloud Computing, and Mobile Development. Each technology stack consists of 2 people according to their Bangkit learning path.
- Machine learning team will create a machine learning model to classify the Batik motives using the Tensorflow library for building the Neural Network design (Deep Learning) and using a dataset from Kaggle.com.
- Cloud Computing team will set up a cloud service using GCP to train the ML model (if needed), text-to-speech API for narrating the information about the Batik motive, and create an image storage to store new sets of labeled images from the app. So the model can get more training dataset.
- Mobile Development team will develop the UI design and Android app using Kotlin to integrate all the tech stacks for the users.
- The team will work in 4 weeks as described below (weekly):

Week	Task	Tech Stack / Team	Expected output
1 & 2	Create an ML model to classify 20 various Batik motives.	Machine Learning	Working ML model with good performance parameters.

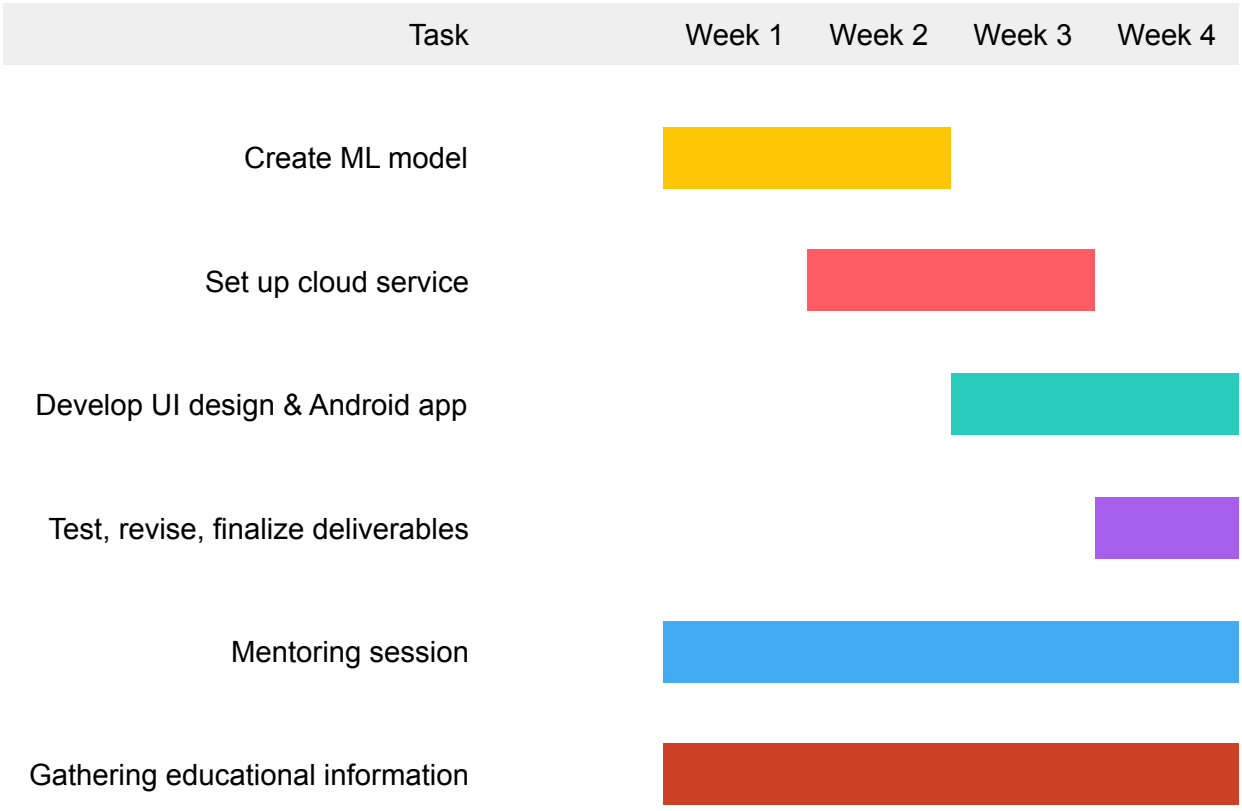
2 & 3	Set up a cloud service to train the ML model (if needed), text-to-speech feature, and image storage to gather a new set of images.	Cloud Computing	Working backend system to store a new set of images from users, text-to-speech feature, and do further ML model training to get better results.
3 & 4	Develop UI design and Android app to integrate all the tech stacks.	Mobile Development	Attractive and easy-to-use app for the targeted users.
4	Testing the app, revise (if needed), and prepare required final deliverables.	All	Fully working app with integration to all the 3 technologies and complete all the required final deliverables.
1 - 4	Do minimum of one mentoring session with the assigned mentor	All	Get a clear direction about what and how to tackle each task in order to complete the project well.
1 - 4	Gathering educational information about all the 20 Batik motives	All	Gathered all important information about the Batik motives to educate the users through the app.

Deliverables

- First progress exploration report - [Done]
- Project plan/design document - [Done]
- Progress report document
- “Corak” app file in .apk
- GitHub repository & documentation
- Project brief
- Presentation slides & video (10 minutes)
- Business/go-to-market proposal

Project Schedule:

Gantt Chart



Project start: May 5th, 2021
Project deadline: June 4th, 2021 - 23.59 Western Indonesian Time
Working time: 4 weeks

Project Resources:

Budget

No.	Expanses	Est. Amount (in USD)
1.	Cloud Storage (Standard and Archive)	0.104 per month
2.	Cloud Instance (VM)	60 per month
3.	Additional	139
Total		**200**

Roles

- Ahmad Alfan & Adinda Fatkhah Gifary (Machine Learning)

- Puspa Ayu Savira & Armia Riyan (Cloud Computing)
- Nabil & Dhosi Irawan (Android Development)

Dataset

- Indonesian Batik Motifs - Discover 20 Designs of Indonesia's Signature Craft
  https://www.kaggle.com/dionisiusdh/indonesian-batik-motifs

Paper/Journal/Article

- Batik Classification using Deep Convolutional Network Transfer Learning
  https://www.researchgate.net/publication/326154308_Batik_Classification_using_Deep_Convolutional_Network_Transfer_Learning

Other resources

- yohanesgultom/deep-learning-batik-classification
  https://github.com/yohanesgultom/deep-learning-batik-classification

Risk and Issue Management Plan:

Problem

1. The prediction from the Batik motive photo (inference) can be incorrect due to lack of data (possibly low accuracy).
2. The predicted label in the inference photo that will be fed into the database might be mislabeled which leads to affect the future training result.
3. Prediction bias to classify combined Batik motives.
4. Prediction bias to classify various colors from different Batik motives.
5. Lack of experience to integrate ML model to the Android app using TensorflowLite to be able to use real-time camera inference.

Solution

1. Do image augmentation to get more dataset by applying different position, rotation, skewing, and other augmentation to each image using ImageDataGenerator in TF.
2. Increase the number of dataset and tuning the hyper-parameters to get more accuracy. The higher accuracy lessens the chance for mislabeled predictions.
3. Add more image data with labeled combined Batik motives distribution and retrain the model.
4. Convert the images into grayscale and retrain the model to analyze the improvements.
5. Learn more from examples and the mentor to gain more experience and knowledge.