Initial Analysis

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Section 1 - Introduction:

The purpose of this report is to present the proposed working of the computer vision based product recommender, with the intention of implementing an efficient application that provides accurate results. Throughout the project the analysis, development, implementation and testing phases will be conducted using the industry standard waterfall model with backflow. This specifies that changes can be made if required and whenever it is appropriate.

Most online-shopping search engines still largely depend on the knowledge base and use keyword matching as their search strategy to find the most likely product that consumers want to buy. This is inefficient in the sense that the description of products can vary a lot from the seller's side to the buyer's side. Therefore, there is room for improvement in this search process and for making the customer experience smoother.

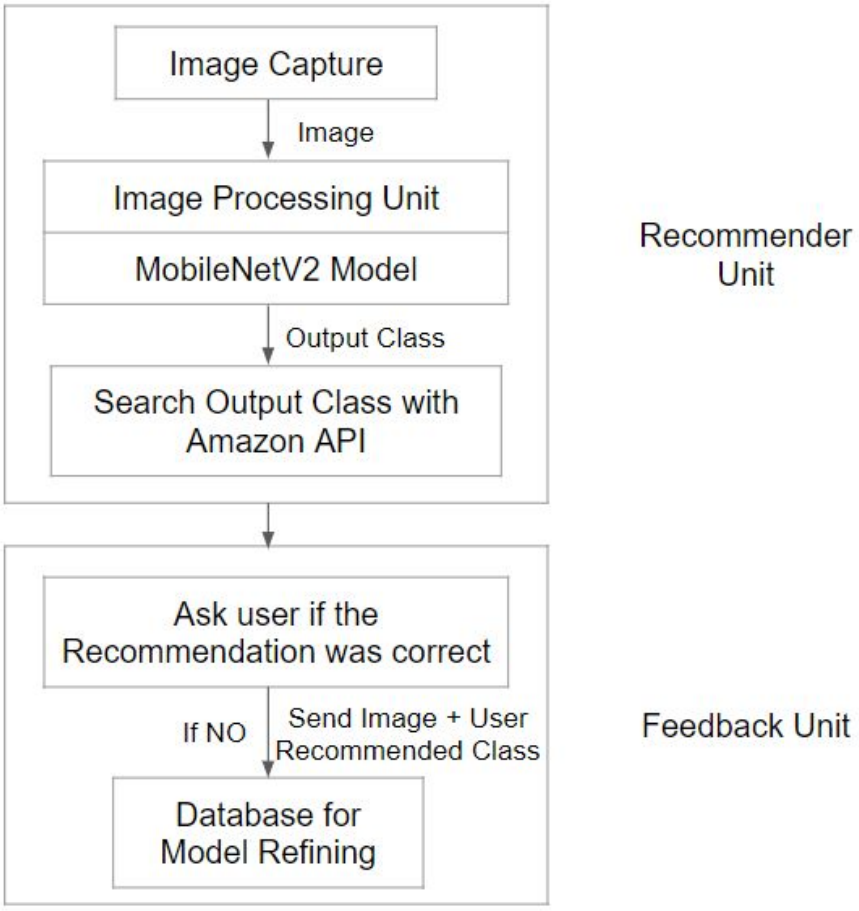
Section 2 - Project Overview:

The image based product recommender seeks to identify products based on the captured image and then search for it on amazon. This adds a new layer to the search engine by using the visual similarities between objects as the search criteria. This improves the shopping experience by reducing the search process to taking a simple picture. The implementation proposed is to build a mobile application for the image based product recommender.

The working of the application can be divided into the following stages:

- Image Capture: It captures the image and feeds it to the image processing unit for further computation.
- Image Processing Unit: The image processing unit uses a machine learning model to classify the image and outputs this classification.
- Recommendation and Feedback: The recommendation is used to search for the object in Amazon and the feedback is then collected to refine the model.

A flowchart showcasing the major components of the image based product recommendation system is shown below :



Section 3 - Scope of the Work:

The project will involve the design of a mobile application that recommends products based on the image captured by the user. The application from the image data determines what product is to be searched for. Upon successful completion of the image processing, the app is redirected to a list of recommended products using Amazon APIs. If the recommendation was wrong or only partially correct, then, a mechanism is available to collect the feedback which is then used to refine the machine learning model in the backend.

The application UI will be developed using flutter as it is a free and open source platform independent framework. The underlying image classification unit will use MobileNetV2 for processing the image and producing the recommendation. For some images, it is not enough to just classify it. For example, properly searching for a book requires identifying the title of the book also. In these cases, an OCR text recognition algorithm can also be applied to improve our app. This functionality is not currently included in the app as of now. After the specified requirements have been met, this functionality may be included if possible.

Section 4 - Deliverables:

The main deliverable of this project would be a mobile app that would perform the following tasks:

- ❏ Captures the image and feeds it to the image processing unit.
- ❏ The image classifier processes the image and outputs the classification of the captured image.
- ❏ Feedback mechanism which collects the feedback which is then used to refine the model.

Section 5 - Timeline:

	Week 1 September 13-19	Week 2 September 20-26	Week 3 September 27-October 03	Week 4 October 04-10	Week 5 October 11-17	Week 6 October 18-24	Week 7 October 25-31	Week 8 Novemeber 01-07	Week 9 November 08-14	Week 10 November 15-21	Week 11 November 22-30
1	Analyze existing applications related to image based processing.										
2	Prepare software requirements document and detailed timeline of the project.										
3			Basic UI development and procurement of data set for training the image processing unit.								
4				Implementation of a working prototype using the image captured and external amazon APIs to produce the recommendation system.							
5						Prepare version 2 report with several screenshots and use cases.					
6								Implement the feedback mechanism and perform several improvements in the UI and the model.			
7										Preperation of final report for the image based product recommender and possibly, deployment of the app.	