



Marble Classification Using Deep Learning



Faculty of Engineering

Department of Computer Engineering

CMPE/ISE/SE 494 Senior Project

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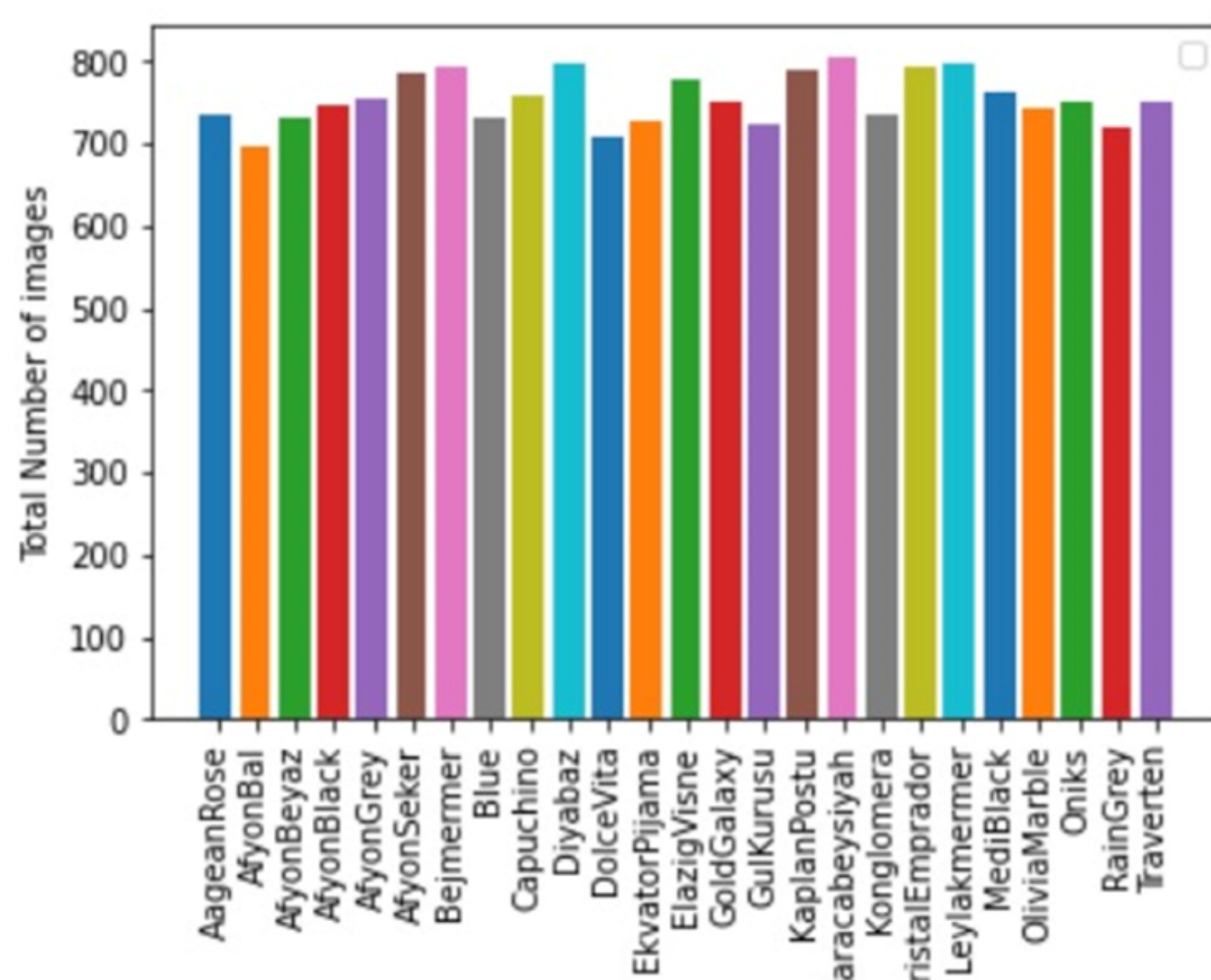
St. Bengisu DOĞANAY

Objective

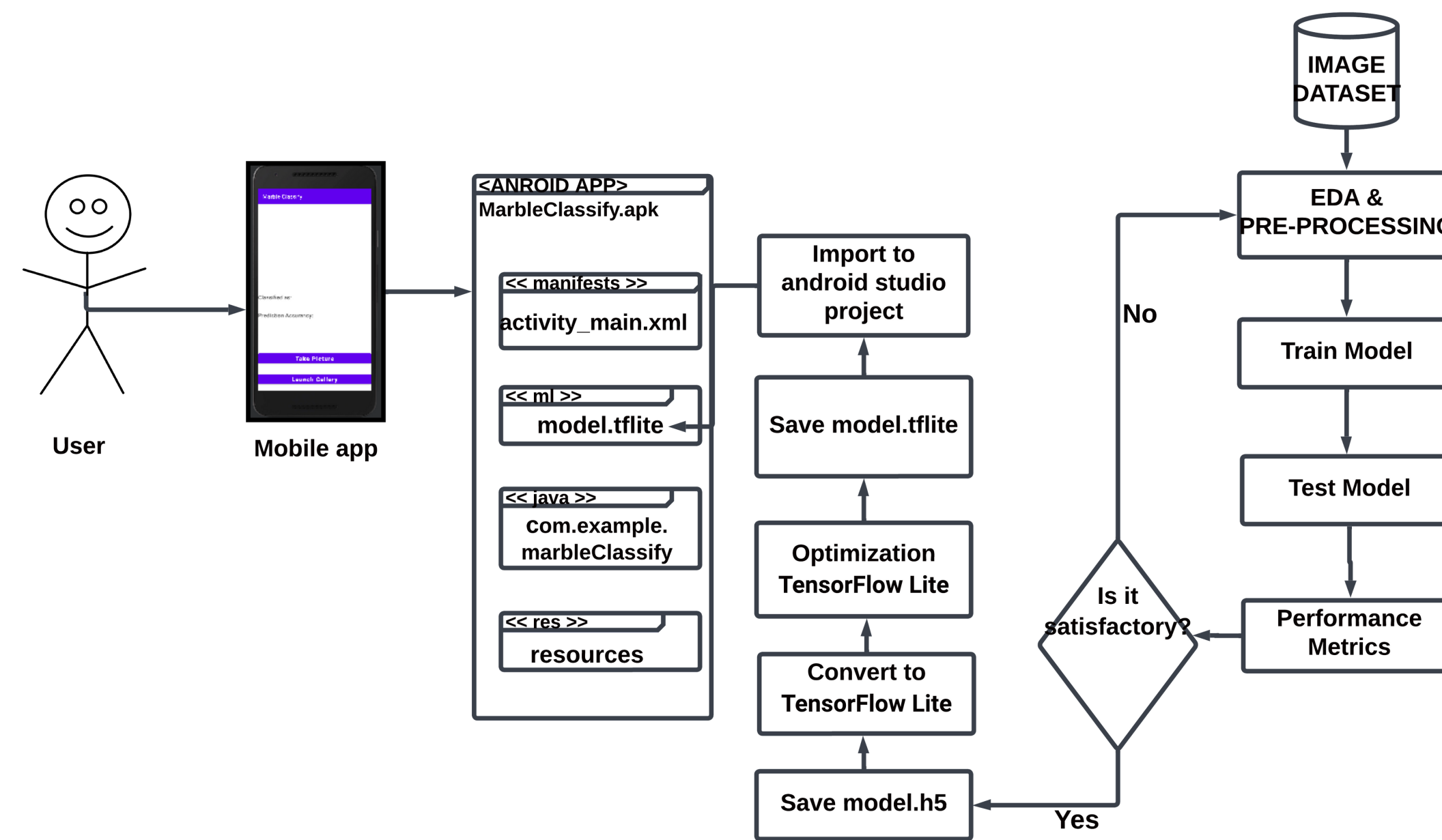
In nature, there is a large number of different marble types. Thus, in the construction industry, the type of the purchased marble cannot be distinguished easily in some cases. In this project, we aim to develop a mobile application to detect the type of a given marble accurately and reliably. In this project, we first design and train a Deep Learning model applying Transfer Learning approach. Then we integrate the model into an Android mobile application. The mobile application can take a picture of the marble and returns its type to the user.

Introduction

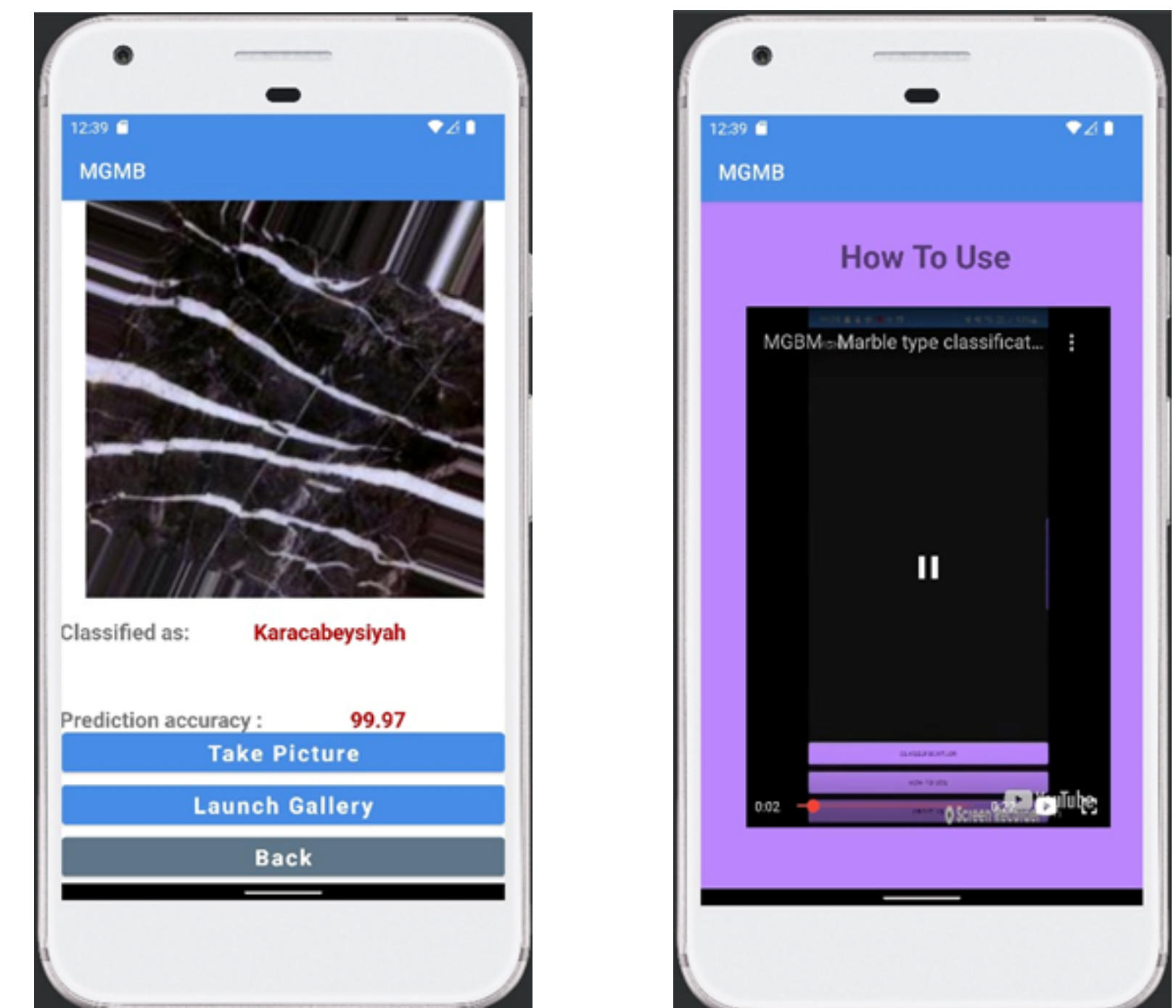
Marbles have many application areas in construction. It can be produced in different ways by many companies according to the intended usage. Since they look like very similar, it is very difficult to distinguish their types for a non-expert. Consumers may want to learn about the types of marble which they see or like on the somewhere. In this project, by using the pictures of different marble types, a Deep Learning model is trained. In addition, a mobile application is developed so that the user can take a photo of any marble and learn its type. Thus, we implement an image recognition technology based on Convolutional Neural Network (CNN) in this project. In order to train the model, we build a data set of 18869 pictures of 25 different marble types from an advertisement agency and several marble production factories.



Software Architecture

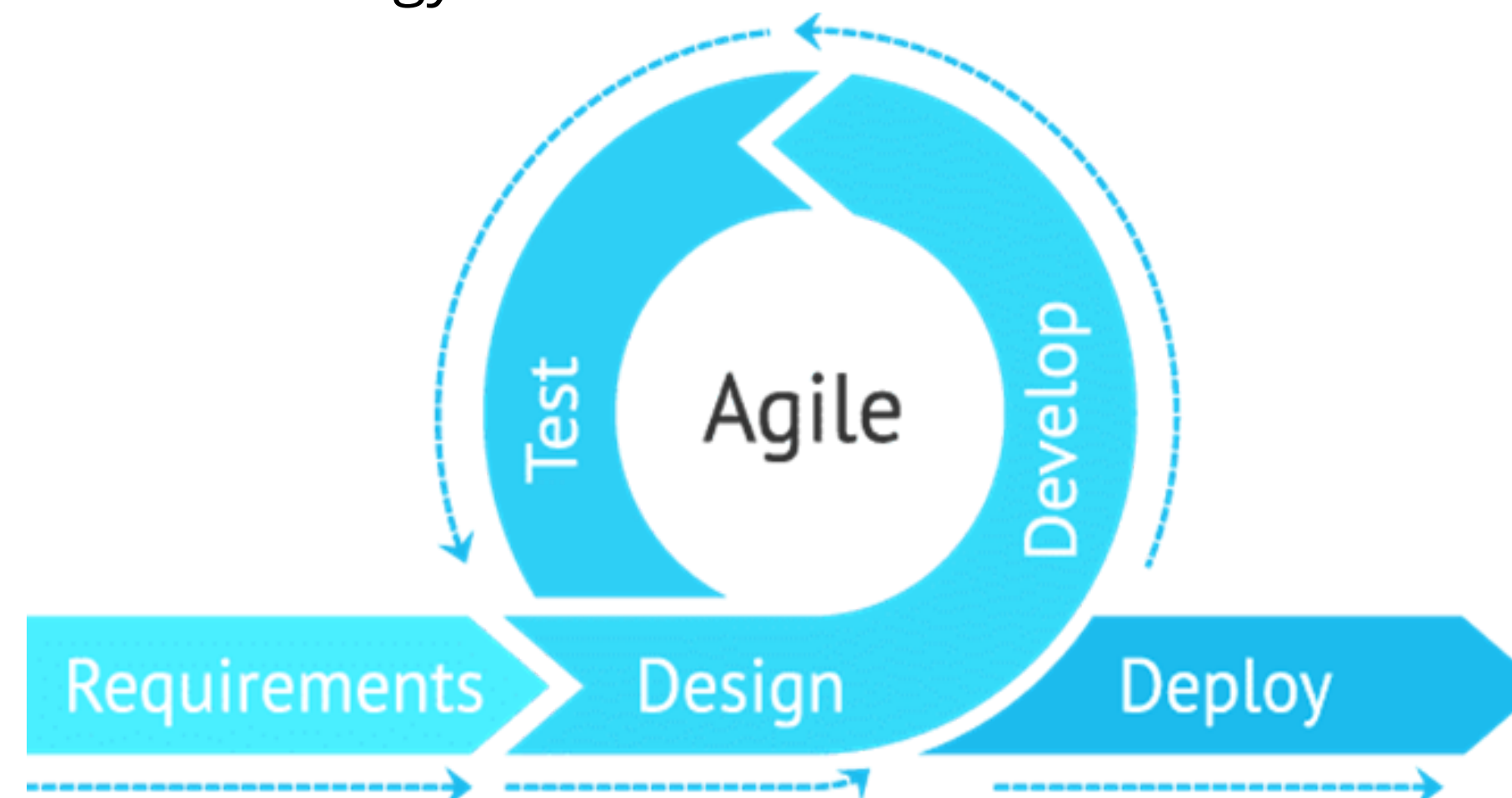


User Interface

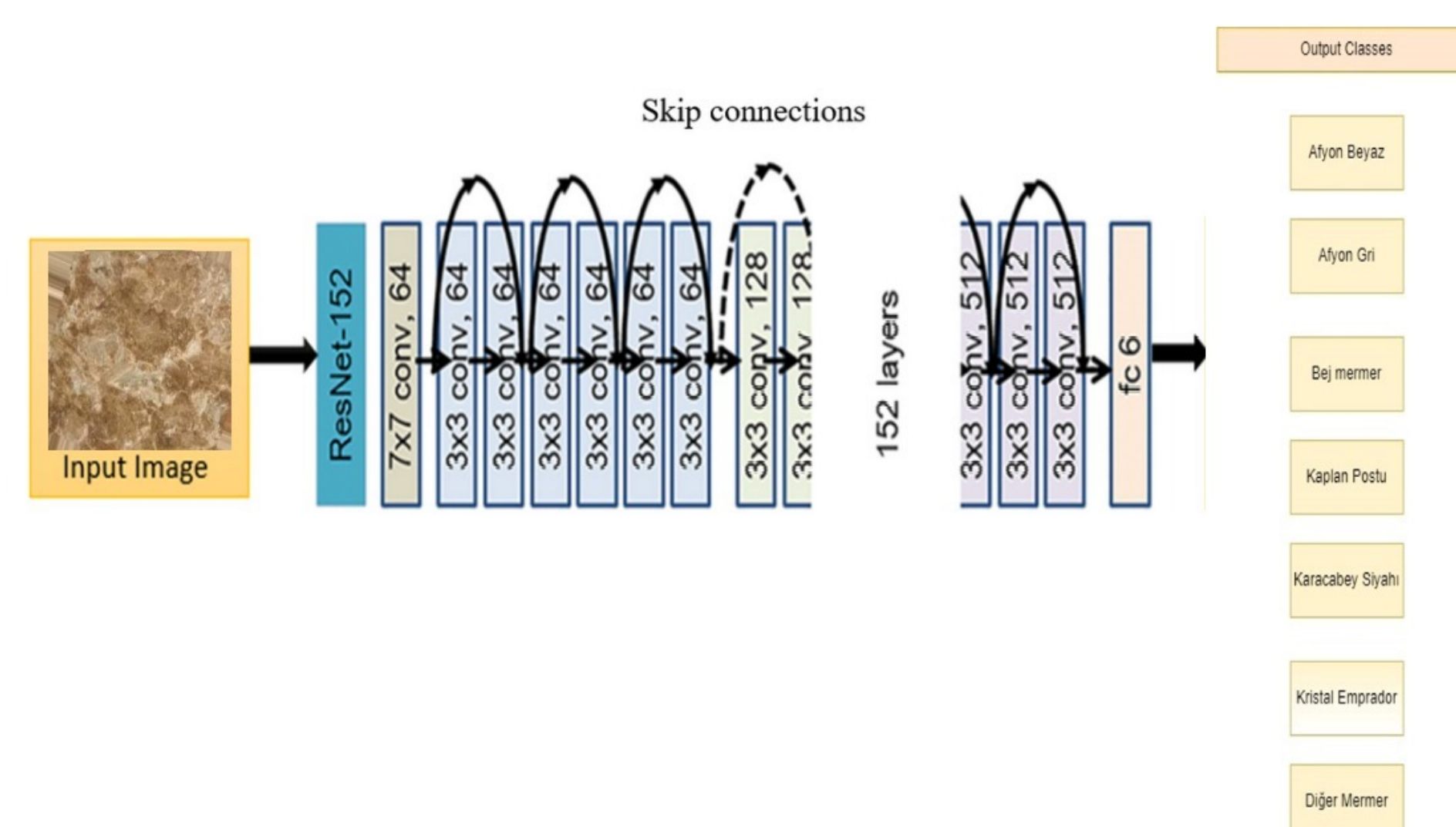


Methods

In this project, we apply the Agile development methodology.

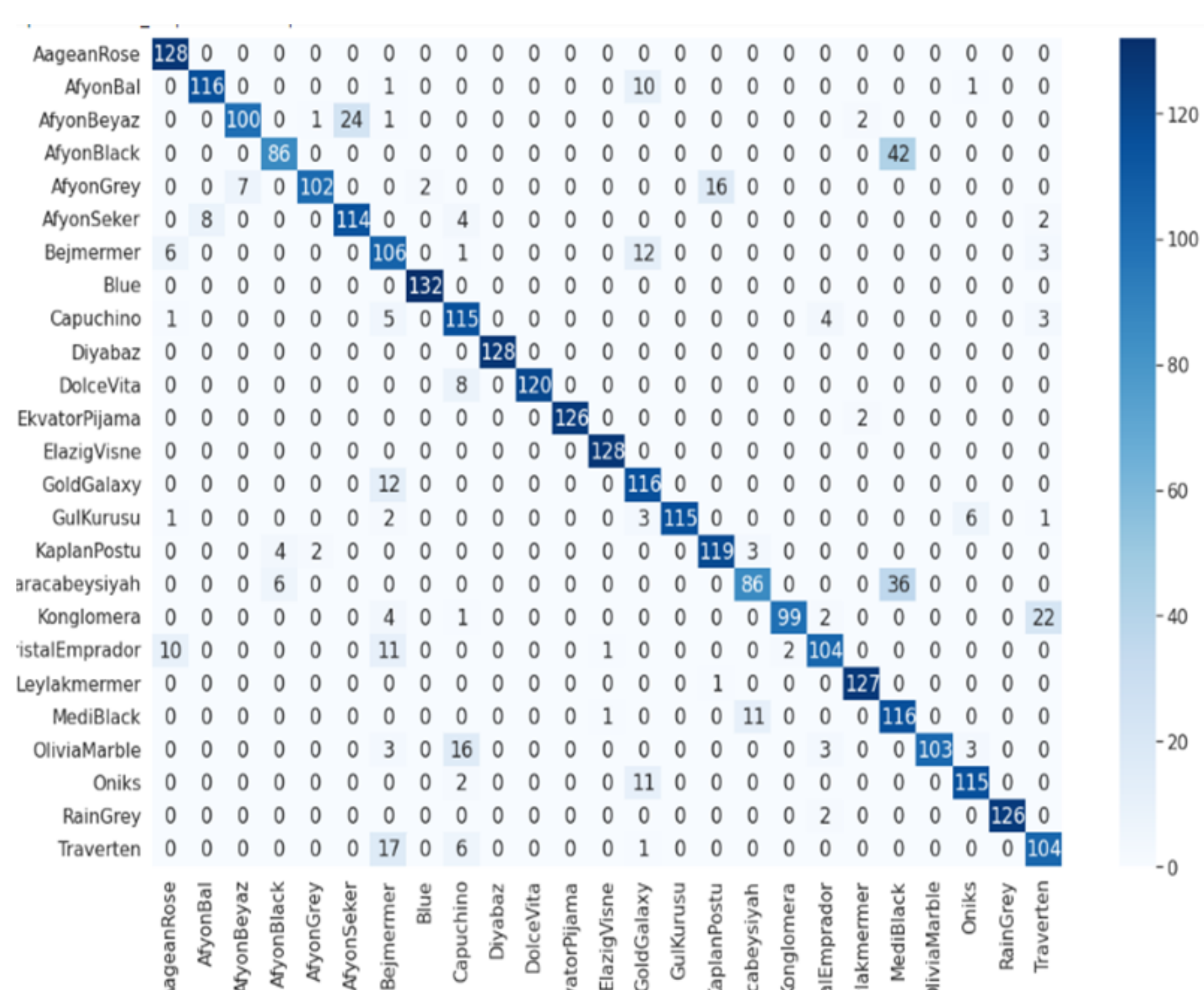


ResNet152V2 is used as the base model in the transfer learning approach.



Conclusion

Integrating Deep Learning with a Mobile Application, we enable the users to identify the marble type with ease. Any user can shop the intended marble type safely. The manufacturer will be able to make the deliveries correctly.



The Keras and TensorFlow libraries are used for model building and training.



The TensorFlow Lite library is used to integrate the trained model into the mobile application. In addition, the mobile application is developed with the Android Studio IDE.



Application Areas

The application area of this project is the construction industry and anyone who wants to know about marble. It can be easily used in all areas of the industry. It can be used on any Android device.

Acknowledgement

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