



**MUGLA SITKI KOÇMAN UNIVERSITY**

**FACULTY OF ENGINEERING**

**DEPARTMENT OF COMPUTER  
ENGINEERING**

**CENG 4012**

**Senior Design Project II**

Mobile based application that helps to find lost cats  
and provides information about the breed of cats.

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## **1 Introduction**

Cats are one of the most common pets in the world. Cats exist in two sexes, male and female, and usually live in homes or apartments. Cats can easily direct their movements, especially thanks to their tails, and are generally very flexible and athletic. Cats can be very affectionate and friendly, but they are also very freedom-loving animals and sometimes may not prefer to be around people. Cats are also very playful and active and love to play with toys or roost inside the house when playing in the house.

But also because cats generally like to be outside, they prefer to have more space and room to move. Cats can also move around more outside due to their hunting nature. Besides, having more plant and animal species outside can satisfy cats' instincts to explore and explore their nature. Cats may run away from home because they have a reproductive urge, and running away may aim to satisfy these urges.

However, there are also disadvantages to cats being outdoors. Outside, cats may be more at risk and more likely to encounter wildlife. Cats can also suffer more harm and health problems. Therefore, it is important to create a safe environment for cats to want to be outside.

The purpose of this project is to facilitate the finding of cats running away from home and to obtain information about the breeds of cats that are wanted to be adopted from the street.

## **2 Motivation**

The biggest factor in thinking about this project idea is to address a problem that we ourselves experience in real life. As cat owners, one of our biggest fears is losing our cat. Since it was an event that had happened to us before, and it was desired to find a solution for the inadequacy of places to be made and applied to find the cat. There are also many stray cats on the street. A person who wants to adopt a cat from the street can easily get what he is wondering about the breed of the cat he wants to adopt from this application.

### **3 Similar Existing Applications**

By using this mobile application, it allows you to match your cats running away from home with the cat found ads and get your cat easily. At the same time, the user can obtain information about the breed of a scanned cat and this breed.

There are other mobile applications with similar features to the application to be developed in the project. First of all, the application called MissingPets has similar and different features with the application we will develop. Secondly, there is the application called Cat Scanner: Breed Recognition. Finally, there is the application called Cat Breed Identifier: Kitten. Working mechanism of MissingPets application when a dog or cat is lost or found, everyone nearby will be notified that the pet has been lost, encouraging them to help look for the pet or reach out if they see it. When we compare the application we will develop and the application called MissingPets, there is a system in which missing cat advertisements can be added as a similar feature. As a difference, the application called MissingPets does not have the feature of scanning the cat. The application called Cat Scanner: Breed Recognition provides information about the breed of the cat by scanning the photo of the cat. In the same way, our application provides information about the breed of cats by scanning cat photos. As a difference, our application is for finding lost cats, and found and lost cats can be matched. Finally, the application named Cat Breed Identifier: Kitten has similar features as Cat Scanner: Breed Recognition. In addition to these applications, our application receives lost cat and found cat ads and matches them with these ads.

### **4 Method**

It was decided to use Android Studio to develop mobile applications. The model of the user interface of our mobile application was made using Balsamiq. Since we have mobile application knowledge, we first need to learn image processing in our project. For this reason, it started to be learned by purchasing an image processing course on Udemy. The purpose of libraries such as OpenCV and TensorFlow that will contribute to our project was learned. Google Collabs was used for the machine learning part of our application. We developed our application with Java language on Android Studio. We also used the keras library to use the CNN deep learning algorithm.

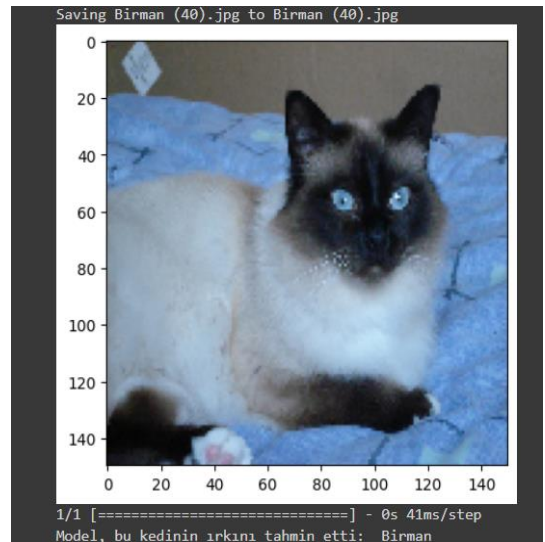
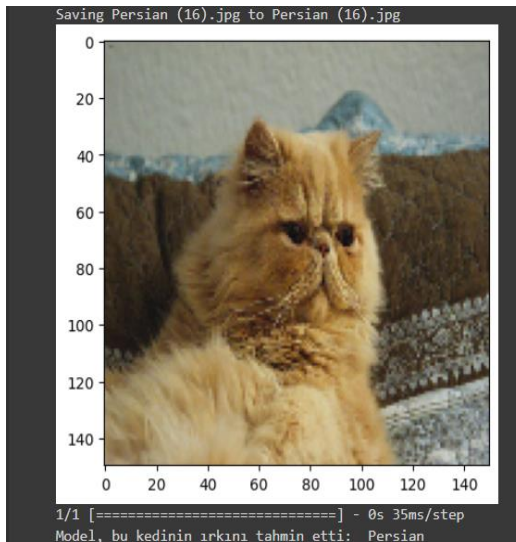
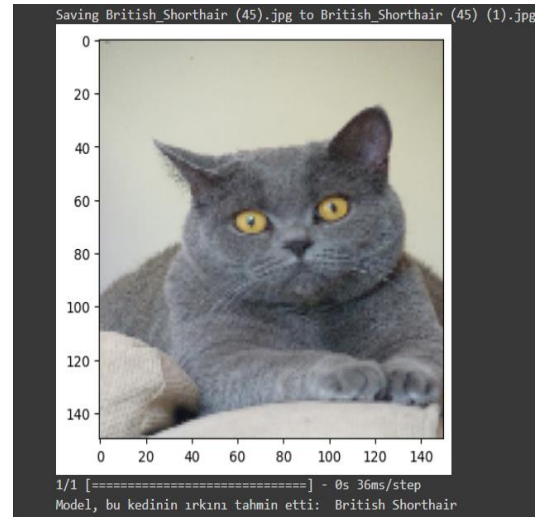
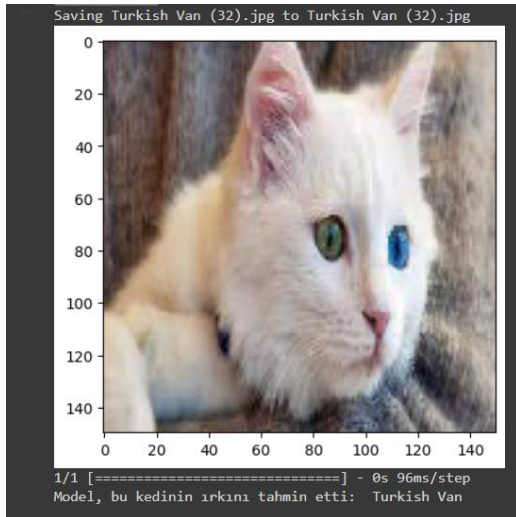
Datasets intended to be used for the application:

- <https://www.kaggle.com/datasets/ma7555/cat-breeds-dataset?select=images>
- <https://www.kaggle.com/datasets/crawford/cat-dataset>

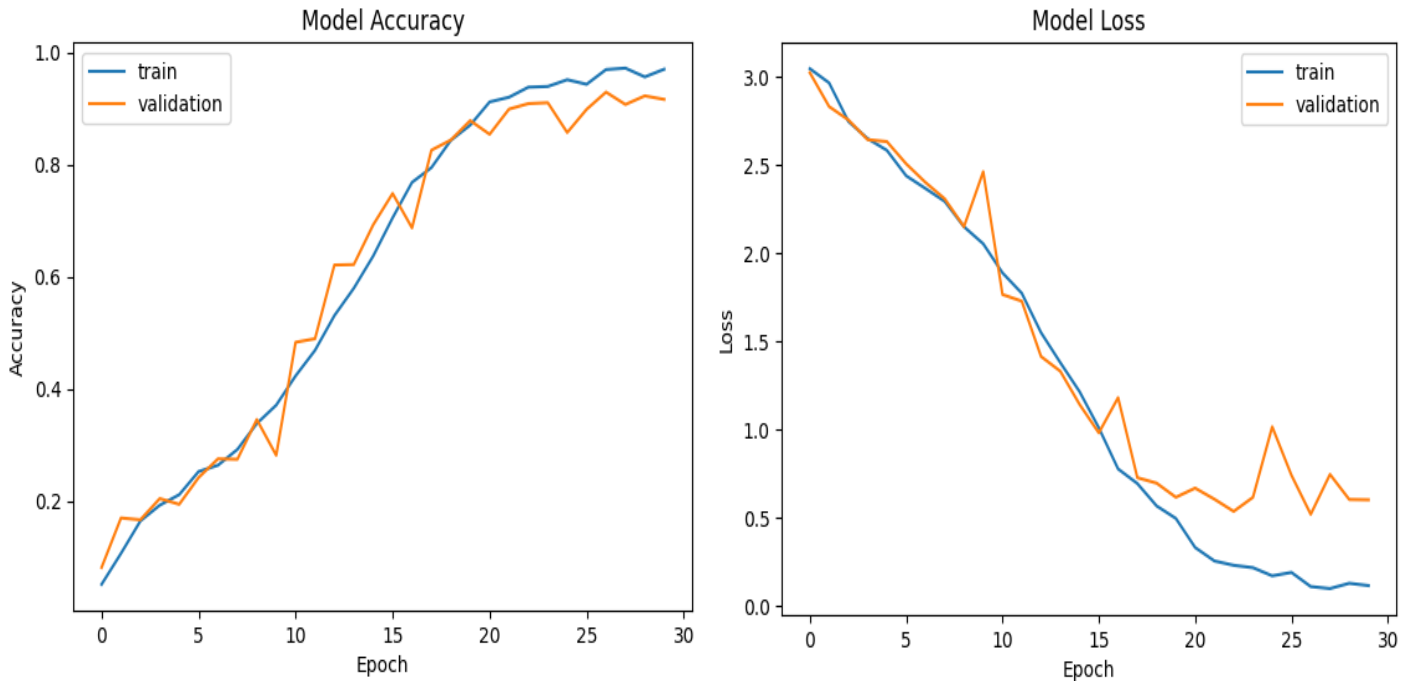
## 5 Results of Model

We chose to use the CNN deep learning algorithm while training our model. Because other deep learning algorithms did not give the results we wanted. We got the best results in our model that we trained with the CNN algorithm.

When we send a photo to the model we trained below, the predictions of cat breeds can be seen.



When we evaluate the model, the accuracy rate and loss rates are as in the graph in the figure.



While the loss was 0.59 in our model, our accuracy rate was 0.91. Our model that we trained with the CNN algorithm has the highest accuracy rate. If we want to reduce the loss rate and increase the accuracy rate even more, then we can balance these rates by adding more data on cat breeds.

## 6 Proposed System

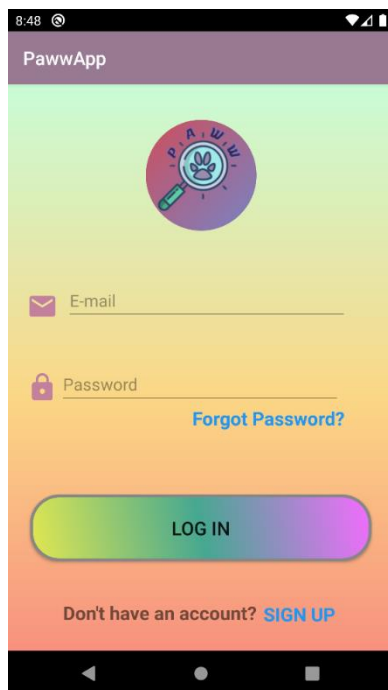
### 6.1 Overview

We have developed both the front and back of the user-controlled pages of our mobile application. Our application has an interface of 8 pages. On these pages, the user can log in, post a lost cat, and access information on the breeds of cats he is curious about. In addition, we converted our model, which we trained in Google Collabs, into a tflite file and integrated it into our mobile application. In this way, we were able to classify the breeds of cats.

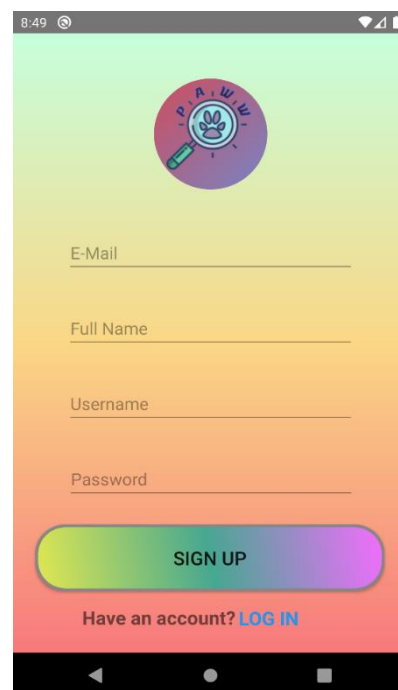
## 6.2 Description of App

### 6.2.1 Login and SignUp Page

When the application is opened, the Login Page comes first. If the user is not registered, he/she enters the SignUp Page and registers by entering his/her email address, full name, user name and password. Then, the user can log in to the application from the Login Page with his email address and password.



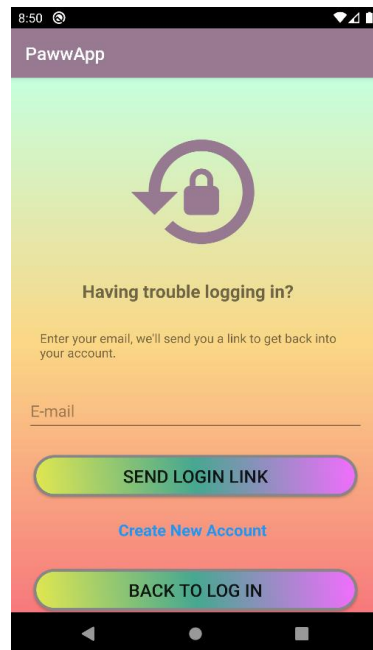
*Figure 1 Login Page*



*Figure 2 SignUp Page*

### 6.2.2 Forgot Password Page

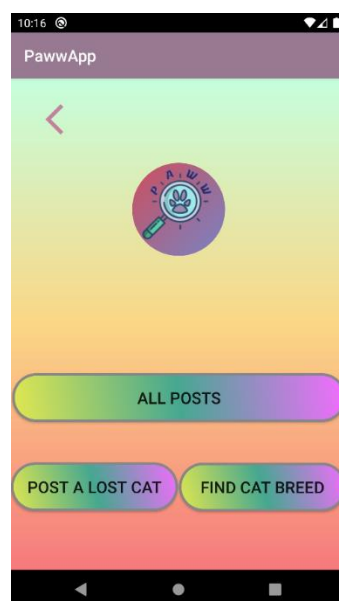
If the user forgot his password, he will be directed to this page by clicking the forgot password section on the Login Page. On this page, he can renew his password by entering his email address.



*Figure 3 Forgot Password Page*

### 6.2.3 Home Page

The page that opens after the user logs in is the HomePage page. From this page, the user can go to the page where he can view all the posts, go to the page where he can create a post, or go to the page where he can get information about the cat breed.



*Figure 4 Home Page*



#### 6.2.4 All Post Page

This is the page where all posts are seen. This page contains information about the names, colors, reeds and other characteristics of cats. You can also create a new ad with the plus button in the upper right corner of the page.



Figure 5 All Posts Page

#### 6.2.5 Details Page

The user clicks on his post on the all posts page to view the detail page of his post. If his cat is found, he can delete this post.



Figure 6 Details Page

### 6.2.6 Cat Report Page

On this page, users can create a lost cat posting. The user uploads the photo of the cat and saves the information about the cat by entering the necessary places.

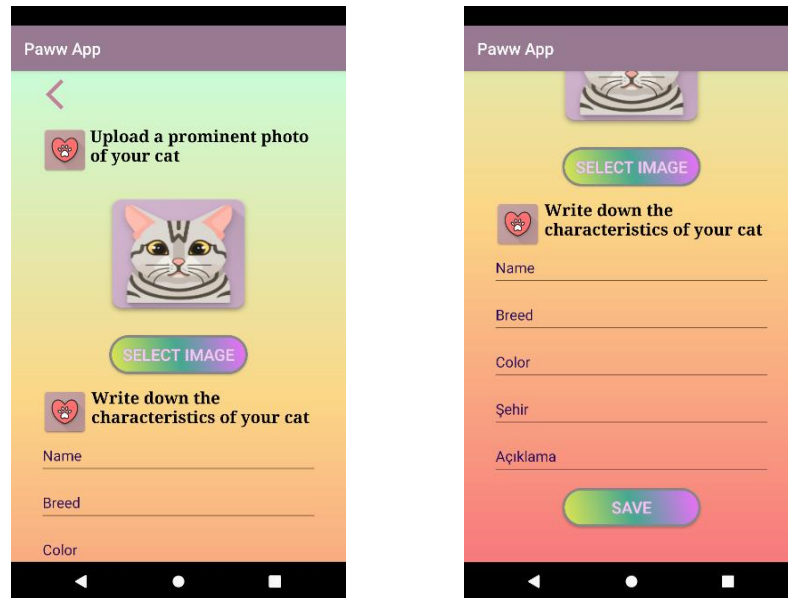


Figure 7 Cat Report Page

### 6.2.7 Find Cat Breed Page

On this page, the user uploads a photo of a cat by uploading a photo from the gallery or accessing the phone's camera. The application guesses the breed of the cat in the photo uploaded by the user. After the guess is made, the user is directed to the Wikipedia page to get information about the cat breed by clicking on the result.

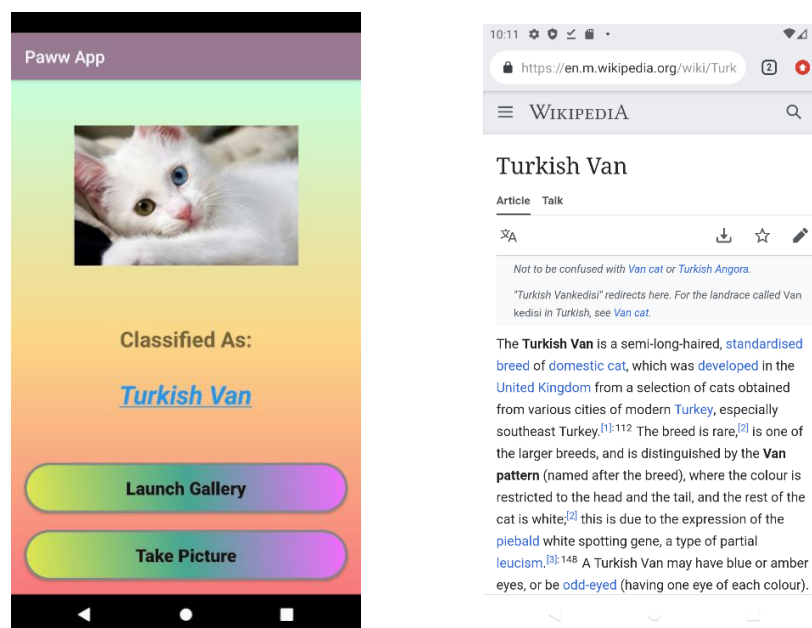


Figure 8 Find Cat Breed Page

## 7 Future Work

In the continuation of the project, it is aimed for users to communicate with each other through the application. For example, when a user finds a lost cat, the user can send a message or warning to the owner of the post from within the application. User share the exact location of the place he saw the cat with the owner of the ad. At the same time, the user can select the exact location of the cat's disappearance from the map and add it to the announcement page while placing an announcement. Users can have their own profile pages. They can edit their information from this page. More information about cats can be displayed in-app, not just from the Wikipedia page, but from several other trusted sites. Announcement on the Home Page can be filtered by city, cat color or breed.

## 8 References

- [1] <https://missingpets-app.com/>
- [2] <https://www.tensorflow.org/lite/android>
- [3] <https://firebase.google.com/docs/android/setup>
- [4] [https://en.wikipedia.org/wiki/List\\_of\\_cat\\_breeds](https://en.wikipedia.org/wiki/List_of_cat_breeds)
- [5] <https://www.catbreedslist.com/>