CO227 Computer Engineering Project

Development of Dog counting and locating App for Dog population control

A.M.H.I Adikari [E/14/009]

I.D.H.I Dilshan [E/14/410]

Department of Computer Engineering

Faculty of engineering

University of Peradeniya

Introduction and background

The project is to develop an application that can be used in mobile devices that have features to report and record information of dogs and their closes location with GPS coordinate information.

The project consist of two parts. Those are mobile app and front end web app for administrators.

Using the mobile app users can upload images of dogs they see with an image and it's details. Those are sent to a centralized database and Administrators can view the summarized information like number of dogs in total, stray dogs, pets separately using the web app.

The idea of the project is to get an approximated dog population in Sri Lanka. That is because we don't have a good estimate of the dog population in Sri Lanka. Having accurate count of dog in Streets is mandatory for population control strategies. Furthermore stray dogs in Sri Lanka comprise of dogs owned dogs, community dogs and without owners. Estimating these groups are also required for dog population control work.

Problem definition and proposed solution

Problem

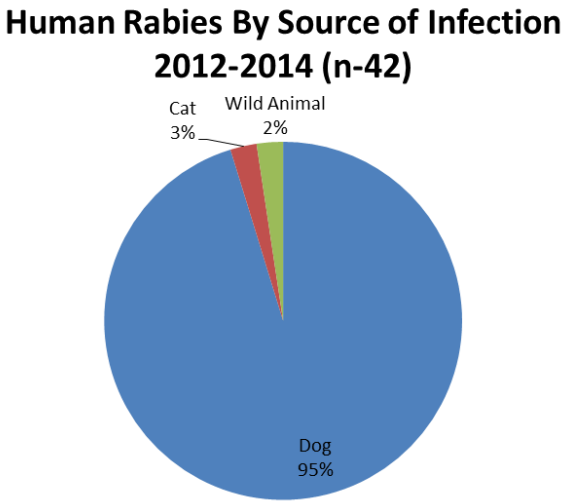
Sri Lanka is a tropical Asian country with a many roaming dogs and is endemic with rabies, with 51 confirmed human cases in 2008 (rate of 0.27 per 100,000 pop).

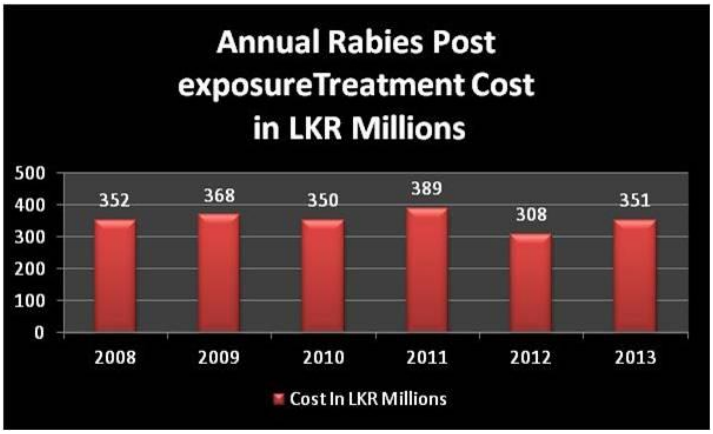
Rabies is 100% fatal and also 100% preventable both in human and animal populations. In Sri Lanka **20** to **30** people succumb to rabies annually. Children are often at greatest risk of getting rabies.

Most human deaths followed bite from rabies infected dogs. Wound washing and flushing with soap and water and rabies post exposure therapy as soon as possible can prevent onset of rabies 100%.

Most cost effective way for preventing rabies in people by eliminating rabies in dogs through effective mass rabies immunization campaign targeting over 70% coverage among dog population. Following are few statistics that shows how worse the problem.

Source: http://www.rabies.gov.lk





According to the statistics above, dog population control is needed. For those future projects knowing the dog population in Sri Lanka is much important.

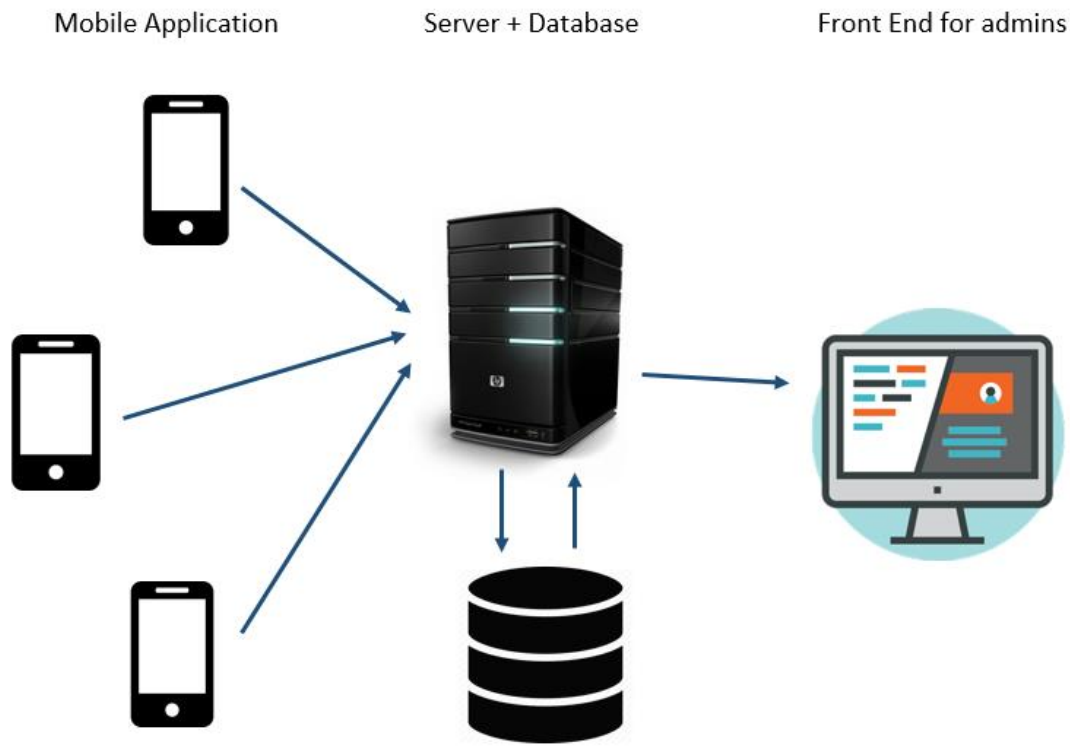
Solution

Developing an Application to be used for dog counting where both dogs living in house and in streets can be reported. It must be a mobile application where any mobile user can add data. Also a front end for administrators or researchers to view those data.

Design and Implementation of the solution

There were no related android application developed so far and available in internet.

So we designed the total system considering mobile app and web app.



We developed the mobile application for only android platform. We used android studio to develop and java and xml was the languages we used. As according to statistics, majority of mobile phone users of Sri Lanka use android phones other than other platforms. So the platform we choose was android. Also easiness in developing in android was also a reason.

The flow of the operation when a user add a dog was made and the software was developed accordingly.

1. User starts the app.
2. Click to get location
    - GPS location is received.
3. Click to take a photo using camera or gallery.
4. Choose colors of the dog from list
5. Choose whether the dog is stray or not.
6. Choose whether the dog is a puppy or not

7. Click to submit

-photo uploading finishes

8. User get suggestions of close dogs around the location submitted with their images and three options to choose saying that the dog is same dog, may be and not same.

(The suggestions are the dogs in database with location inside 1km x 1km square with current location at center)

9. User responds to suggestions.

10. Dog adding process finishes and a thanking screen is shown.

Also our design had a plan to give points to users based on their contributions and display their points to them in the app.

Implementation

Location is needed with a good accuracy for a dog to be inserted. So we had to use only GPS provider to get location. But it take few much time for first GPS location fix to arrive. Network provider provide location based on towers quickly than GPS, but not accurate. As we need accuracy much we used GPS for the location provider.

But when the GPS listener is on, there is a high battery drain. To avoid that we start the listener, listen for a fixed number of location fixes, get the most accurate out of those and close the listener.

GPS locations are followed by an accuracy in meters. It is radial type one. That says that a circle around the location with radius equal to accuracy in meters will have the real position inside the circle and the probability of having it there is 68%.

Also it was implemented to sign up to the service using the app for any user. He must provide user name, email and enter a password submit. Then the server will send an email to the user with a verification code, The app will ask for it and once you provide it you are registered and suitable to contribute.

User can log in once and the user details are kept in shared preferences and unless he logout he needs not log in again when opening the app. That means logged-in feature is available in the app.

User can add a photo using either camera or gallery. User must choose color of dog out of colors white, brown, black and gray. Also few other details. (Stray/not, puppy/not)

Another important feature is suggestions. It reduces the risk of having duplicate dogs added to system. (only reduce, not prevent)

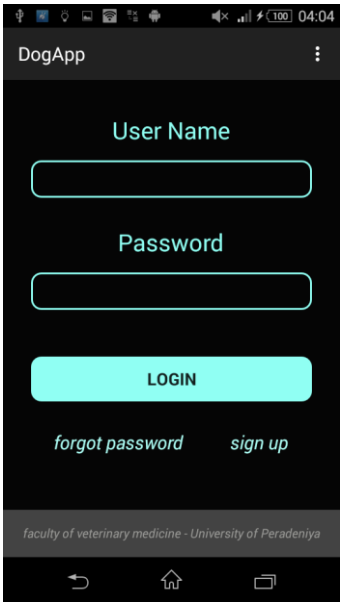
The mobile app has been made to be a user friendly one. Nice colors and shapes.

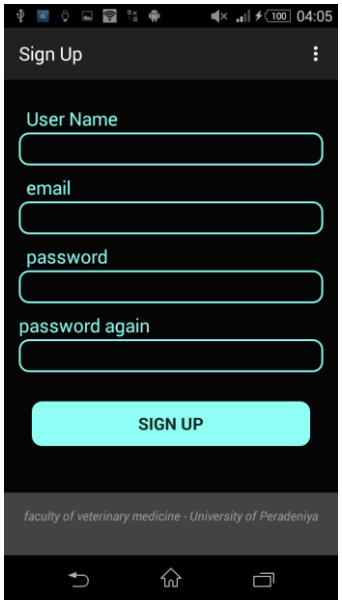
Front end web app is to be used by administrators to view results. It shows dog counts in different,111.11 categories and also total dogs can be viewed in a map.

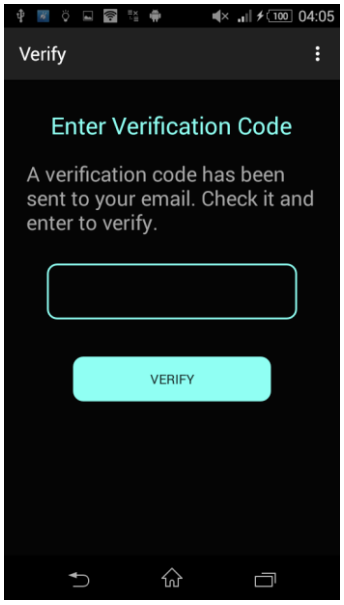
The assumption related to GPS coordinates and distances is 111,111.11 m is equal to 1 degree latitude, and 111,111.111 cos (latitude) is equal to 1 degree longitude. This was needed when getting suggestions because the suggestions are chosen from a square of 1km side, around the location of added dog. Also it check whether the color code matches and details of dog matches.

Results

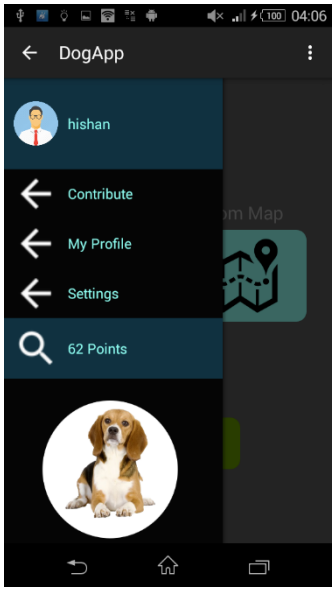
Following is the logging screen of the app, signup screen and verify screen.

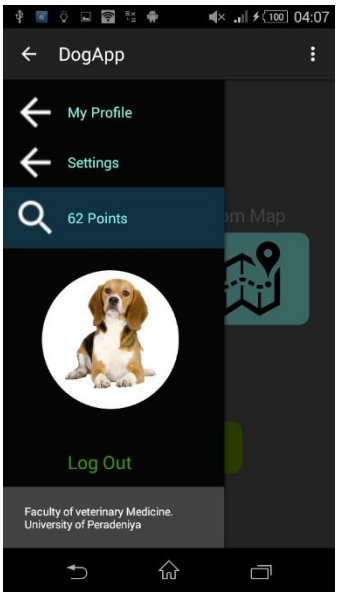


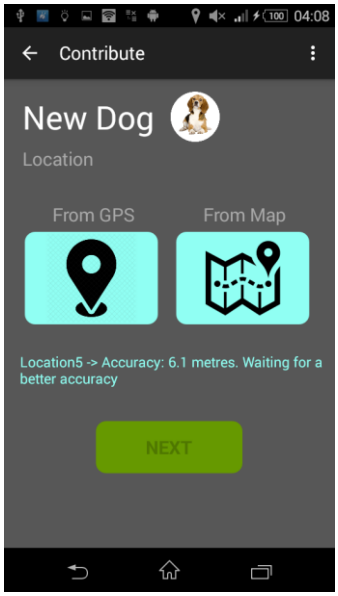




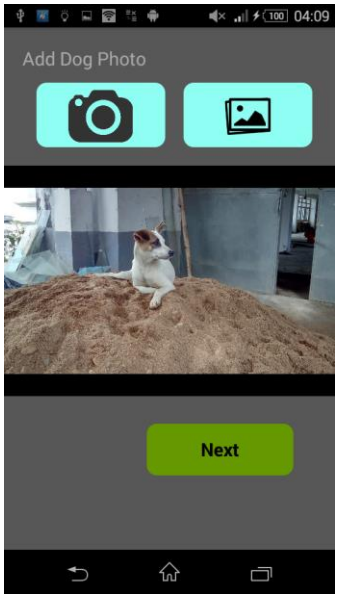
Following is the navigation bar and contribute main screen

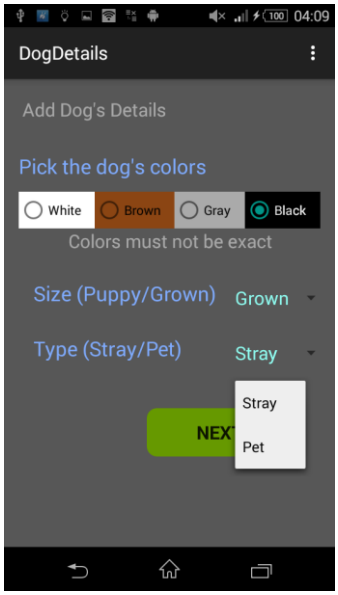


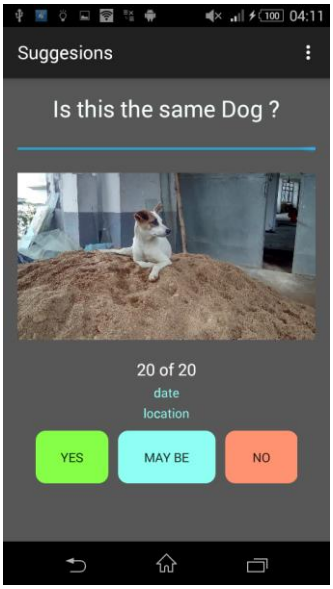




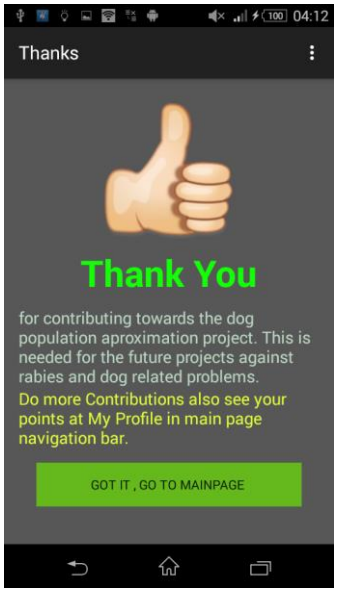
Following is adding image, details and suggestion screen

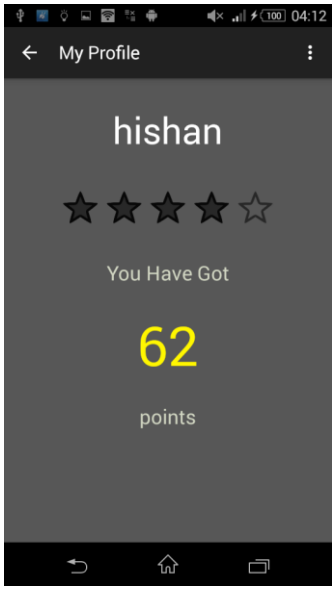






Following is Thanks activity and user profile





The accuracy of the GPS location was between 7.5 m and 3.9 m as checked from Sony Experia E4g.

conclusions and future works

Finally the mobile app was made successful and it is working finely. The dogs can be recorded in this way. The app wad mobile friendly and nice finishing. That is to make users motivated to contribute. Adding a point system is also targets motivation.

Some areas of Sri Lanka where use of smart mobile phones is not so populated may have a problem.

Also without people's full contribution, the target of the project will be a mess.

Future works include, encrypting data such as passwords sent via network, and developing security procedures to the data, and improving user friendliness.