

Figure 4: Flow chart of android application

C. Dashboard Activity Creation: It creates a dashboard screen layout via application screen such as webpage where the user can interact with the screen. This screen has to be enabled and this is done by using handle touch.

D.Camera Motion Activity Creation: The Android framework includes support for various cameras and camera features available on devices, allowing you to capture pictures and videos in your applications.

Detecting Camera Hardware

If your application does not specifically require a camera using a manifest declaration, you should check to see if a camera is available at runtime. To perform this check, use the PackageManager.hasSystemFeature() method, as shown in the example code below:

```

/** Check if this device has a camera */
private Boolean checkCameraHardware(Context context)
if
(context.getPackageManager().hasSystemFeature(PackageM
anager.FEATURE_CAMERA)){
// this device has a camera
return true;
} else {
// no camera on this device
return false;}}
    
```

E.IMAGE PIXELIZATION: Pixelization is caused by displaying a bitmap or a section of a bitmap at such a large size that individual pixels, small single-colored square display elements that comprise the bitmap, are visible. Such an image is said to be pixelated. It is been classified as:

Test images: images that are been captured lively by android camera and stored in SD card.

Train images: images that are been stored already in SD card via preprogrammed.

Steps Involved In Image Pixelization

1. Set train image in SD card: In this step the objects are been preprogrammed and it is stored in SD card.

2. Get process file (test images): In this step the objects which are been captured lively are been stored in SD card.
3. Get image bitmap: get bitmap of the test image.Convert to grey image
4. Convert the images into grey level images by the process of normalization
5. Compare bitmap: compare bit map of the both test and train images.

F. Image Recognition Match: In this process the two objects such as train and test objects are been compared. Test objects are those that are been stored in SD card during camera processing i.e. when camera is active. Train objects are those that are been preprogrammed and stored in SD card.

G. Calculation Of Minimum Distance: Calculation of distance is the process of getting the distance of the object. This is been done because at times there will be two objects which are of same size and color. At the time the robot doesn't know of to which object it has to be picked hence distance calculation is been done for the robot to pick the object which is nearer to it. This will reduce the timing and hence increase the performance.

Step1: First we have to get the object array list. This consists of list of objects that are been captured by android camera.all these objects are been stored in Iterator.

Step2: In this step the iterator will display all the elements.

Step3: distance calculation: train value - test distance. This formula will give the distance of the object.

6.Results and Discussion

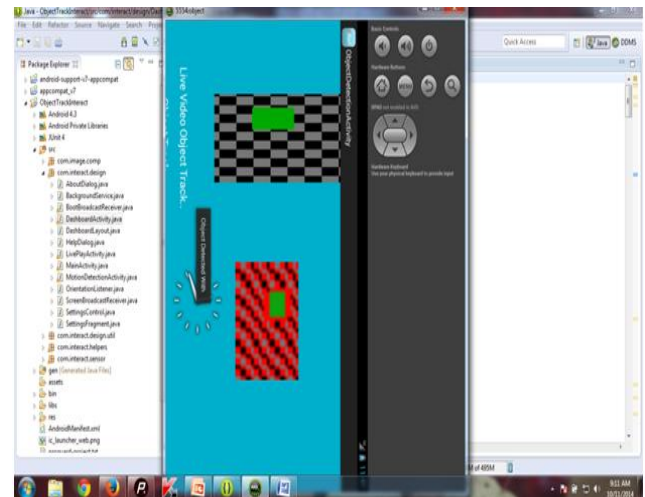


Figure 5: Output of emulator

The figure 5 shows the Output from emulator shows the conversion of YUV image (black and white images) into RGB images. This is because the android camera which is been developed usually possess only two types of format namely: yuv and NV21. Thus a conversion is required.



Figure 6: Motion detected with matched object

The figure 6 shows the output of the created android application which shows that motion is been detected and object matching between test and train objects. This application also allows us to get the distance calculation of the object.

7. Conclusion

Thus implementation of pick and place robot is been done by using android application via object detection application which is used to work in all environments and it overcomes the drawbacks of sensors which is used to detect object. Wireless charging of robot is also implemented which states that whenever onboard battery of robot goes below threshold level then robot will move to recharging station to charge itself.

8. Future Work

In future the pick and place robot must be designed in such a way that it is not restricted to particular objects and android application must be designed in such a way that it is capable to capture more articulated objects and complex background.

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