Mobile App Experience Fall 2015

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In this assignment, we are building an app to practice using camera and sensors of an Android phone.

The first task is to design an app to take photos and store in a specific dictionary and display the image by pressing a button and starting a new activity. My code is adapted from the github code provided in 4th assignment description, which is named Camera2Basic. It includes three class which respectively builds a fragment displaying the preview of camera, builds the main activity and change the texture view automatically. We can set onClickListener in onViewCreated() method and perform the predefined take picture method in case branch which defines the function for every button in fragment. To display a image, a new activity is created to obtain intent message including the taken image and address information in following task. I use Bitmap.decodeFile to load the image and Bitmap.createScaledBitmap to build the image. In the fragment, designer can add buttons and set onClickListener in onViewCreated(), use getId() to monitor the clicked button and perform corresponding method in case branch. In this task, when the id is showimagebutton, it will perform intent.putExtra() and startActivity(intent).

In the second task, I use address fetching activity in my previous assignment, and store the last location in intent, and receive address from fetchAddressIntentService activity.

The third task is to switch to the front camera. Thus, I modified the code to open front camera and deal with front camera output. Detecting the camera device by getCameraIdList(), and then add control_f_state_inactive condition to monitor whether the device is active. This makes the front camera can focus automatically. Thus, it will make the front camera works normally.

The forth task is to add a sensor manager to detect the accelerometer and gravity of the app. When the accelerometer is greater than certain value, which is set as 9 in this assignment. The threshold must be not so low to start recording video and also not to high for people can hardly start videoing by daily action. I use a sensor manager in this task, which will sensor the acceleration, and calculate the total acceleration by adding the square of dependent axis-acceleration. Perform a packaged method takeVideo() after the condition is true. Thus, it will automatically take video when user suddenly pick up the phone. To stop recording, I use a InfoListener to monitor the duration time, it will stop recording video after 10 seconds since the recording begins. To stop a video, the activity needs to close the camera for video and open the picture camera. And when start videoing, it needs to close the picture camera and open video camera. The acceleration will be set textView in the center top of the screen.

To implement taking a picture after 10 seconds, needs to call takePicture() method after the max duration is reached. Since there will be some system error when the picture is taken too soon after the video is stopped, a counterDownTimer is used to execute taking picture after a predefined interval.

Furthermore, when debugging the app, the smart phone is always out of memory when taking video several times, it needs to kill other progress in the background.

Graduate Report

To output the acceleration curve of phone's daily use, I write data to the text file when sensor on changed, and test the app when I grab the smart phone from different places like dining table, chair, bed and etc. Then, I obtain my acceleration curve like following:

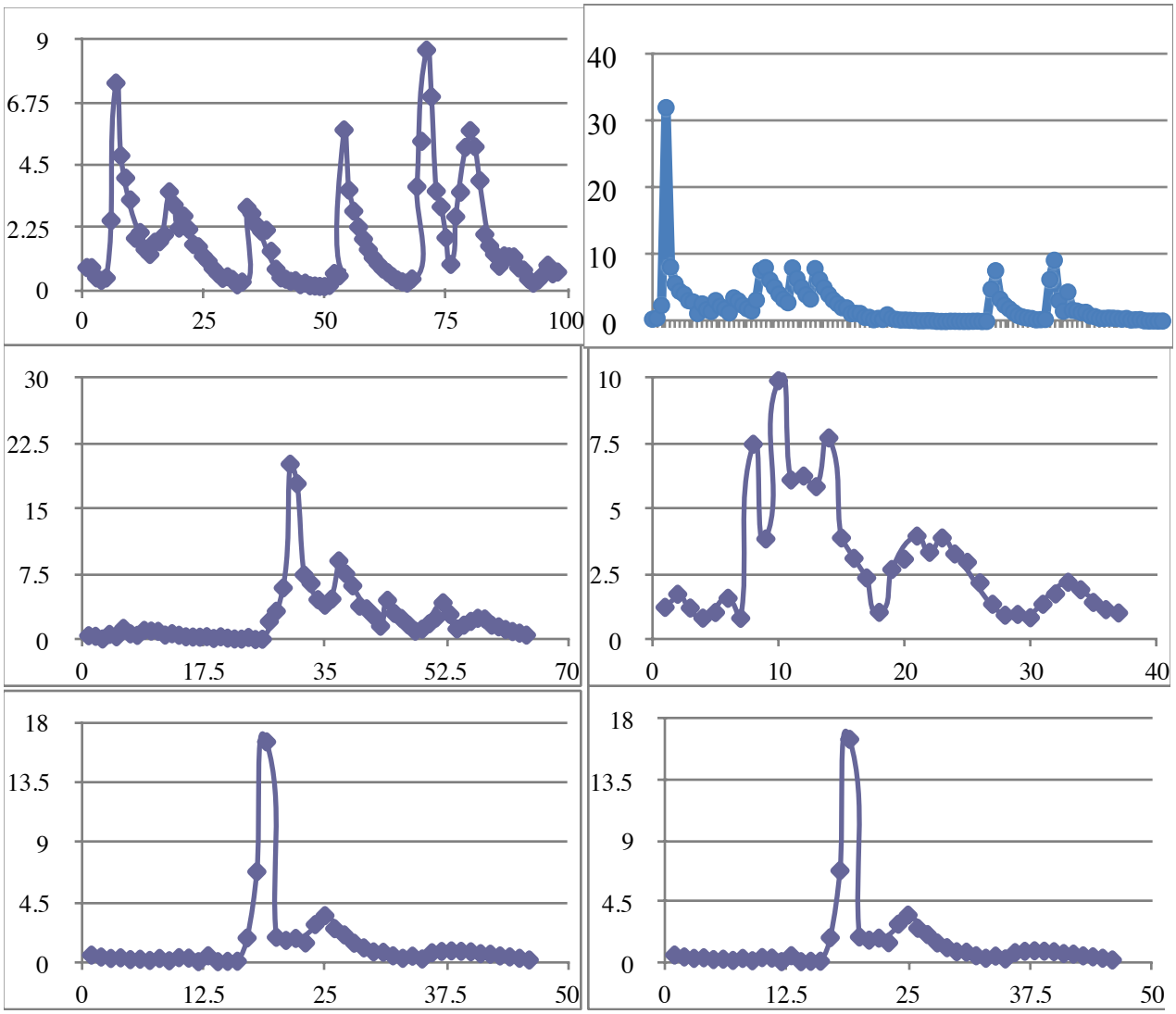

Figure 1. The sudden-pick acceleration curve

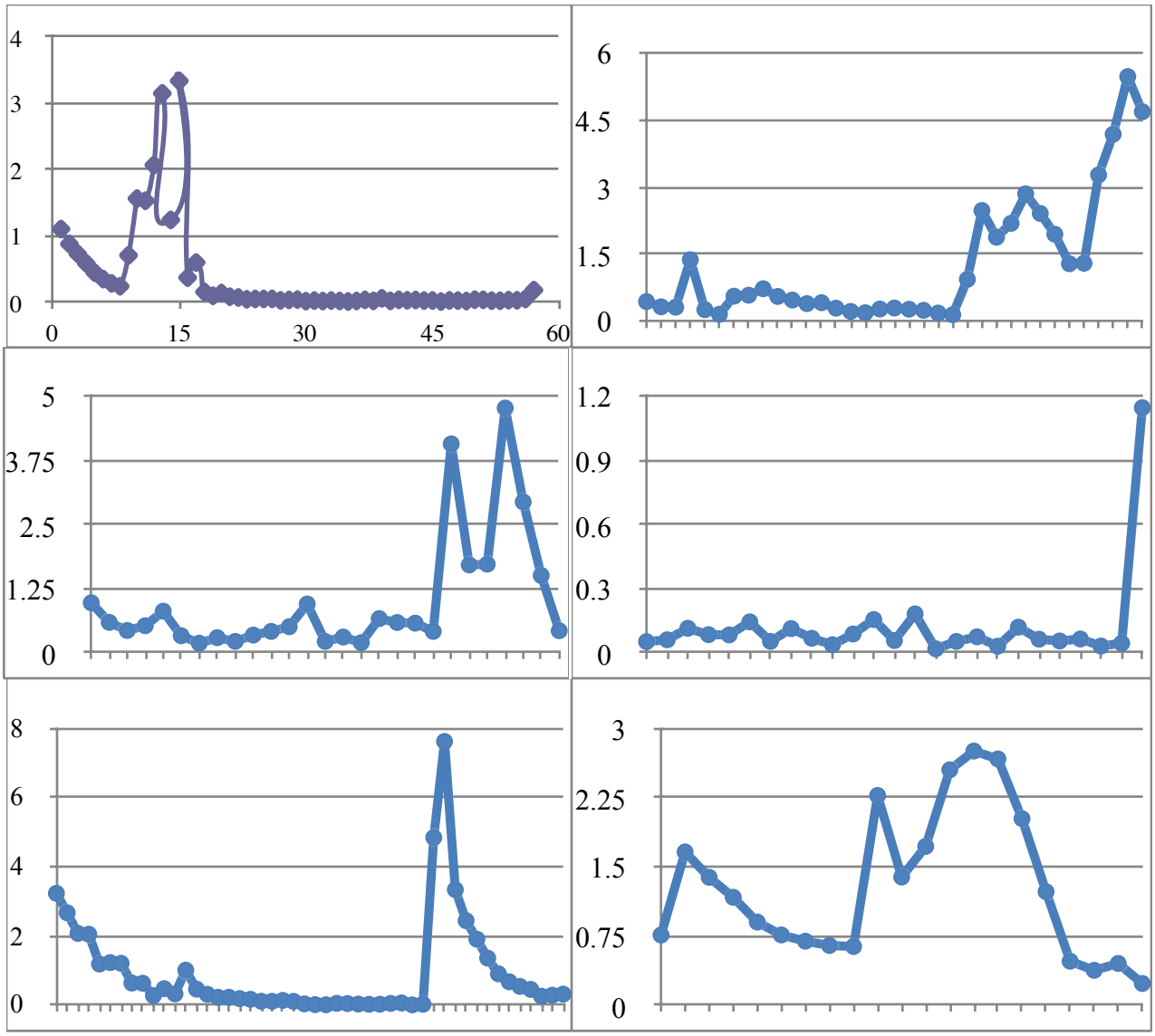

Figure 2. The daily-use acceleration curve

The Figure 1 shows the acceleration curve of sudden pick up. The peak of the curve is ranging from 10 to 40. Besides the peak, the value is relatively low for the other points. The Figure 2 shows the daily-use acceleration curve. The curve is more smooth than the below curves, and the value of points is never exceeding 8. This curve is seems to be distributed more randomly on the x-axis. After numeric testing, the final optimal acceleration threshold is 8.5. The acceleration of raising the phone to read text message is about 5-8. The final threshold value will be reached when somebody grab a phone with certain speed. The video recording will be rarely triggered in daily life.