Jetson TX2 기반 YOLO 응용 과정

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2018. 12

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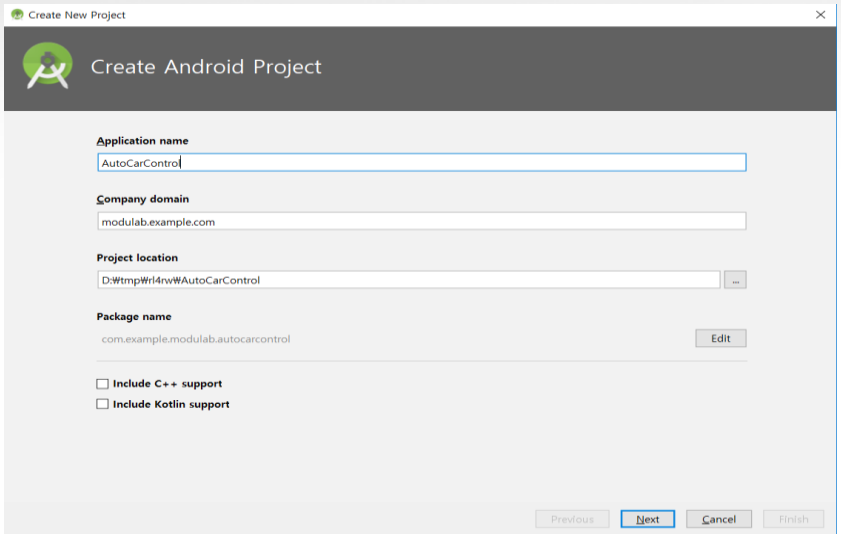
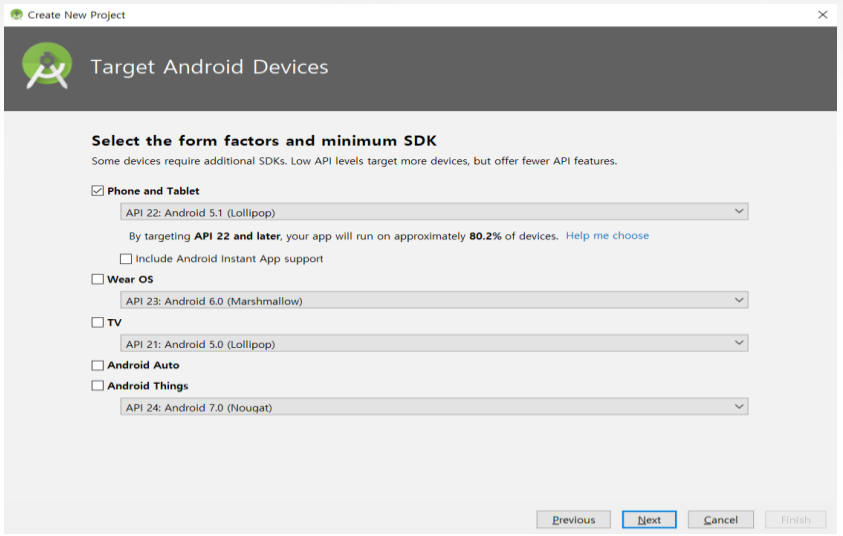
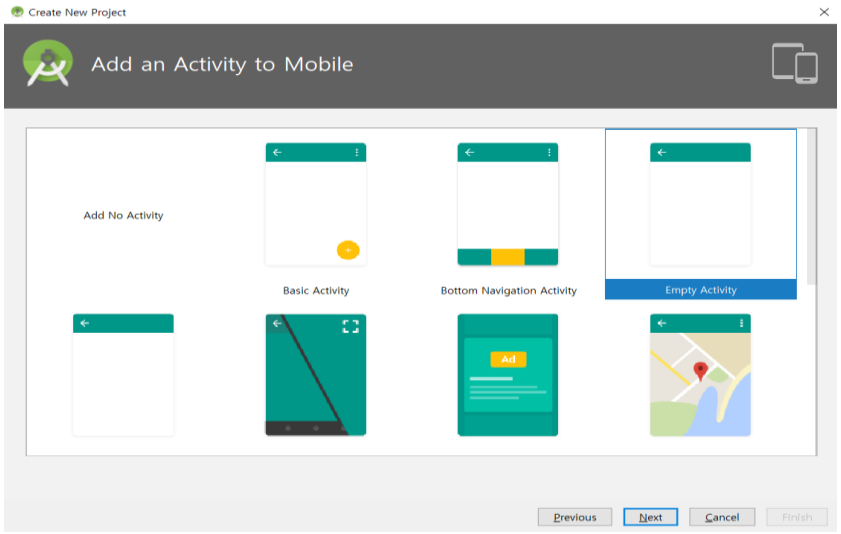
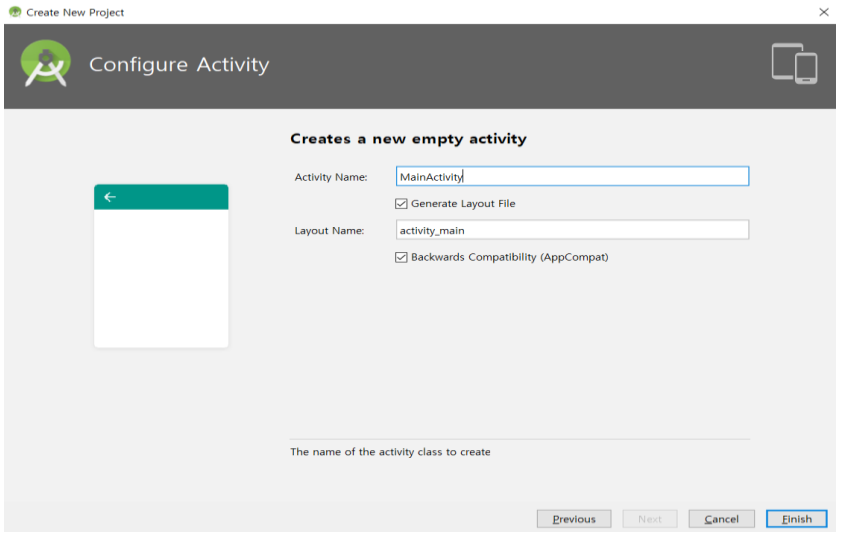
목 차

AutoCarControll 앱 생성

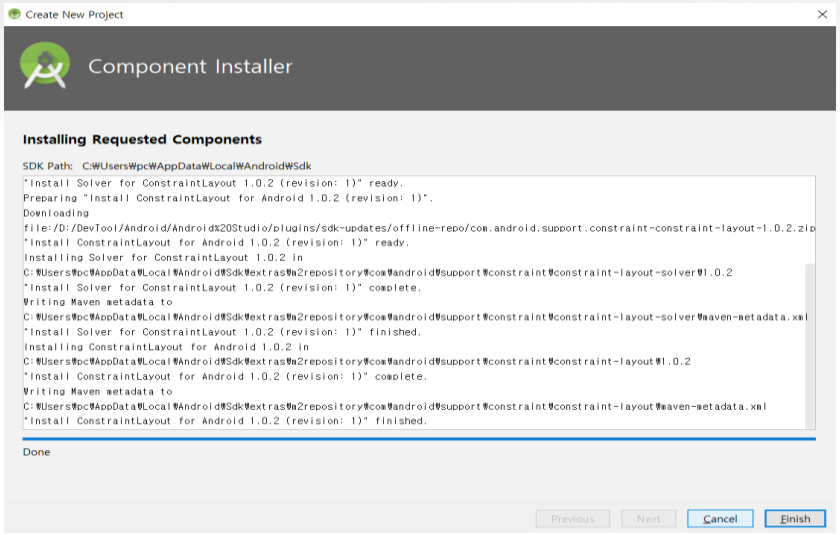


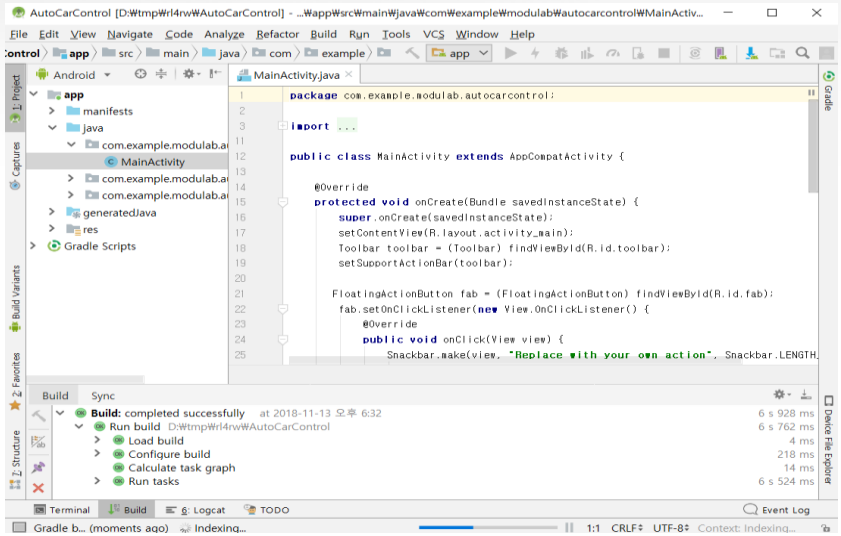




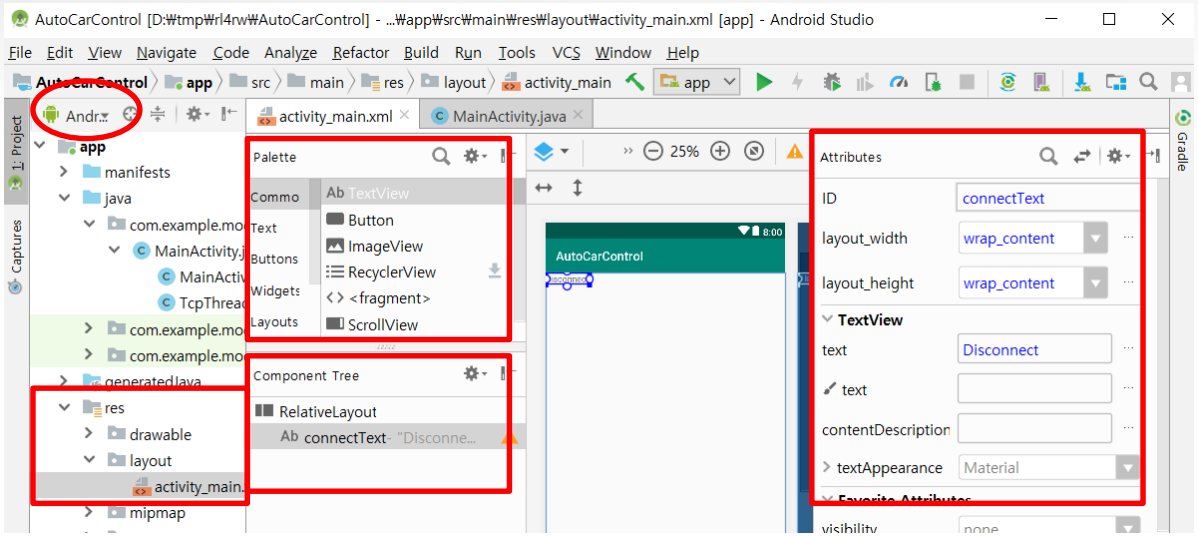


AutoCarControll 앱 생성

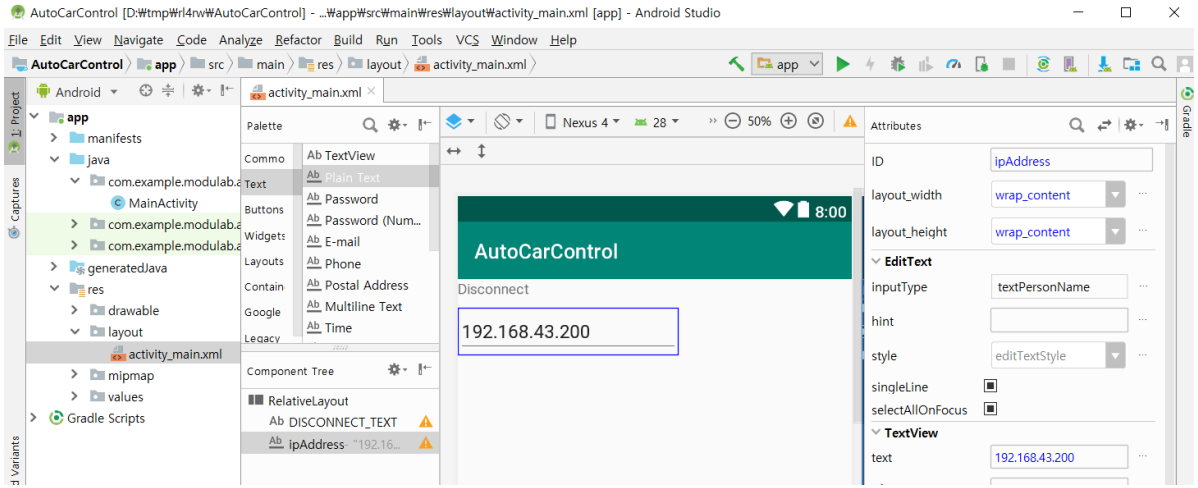




WiFi GUI 구성

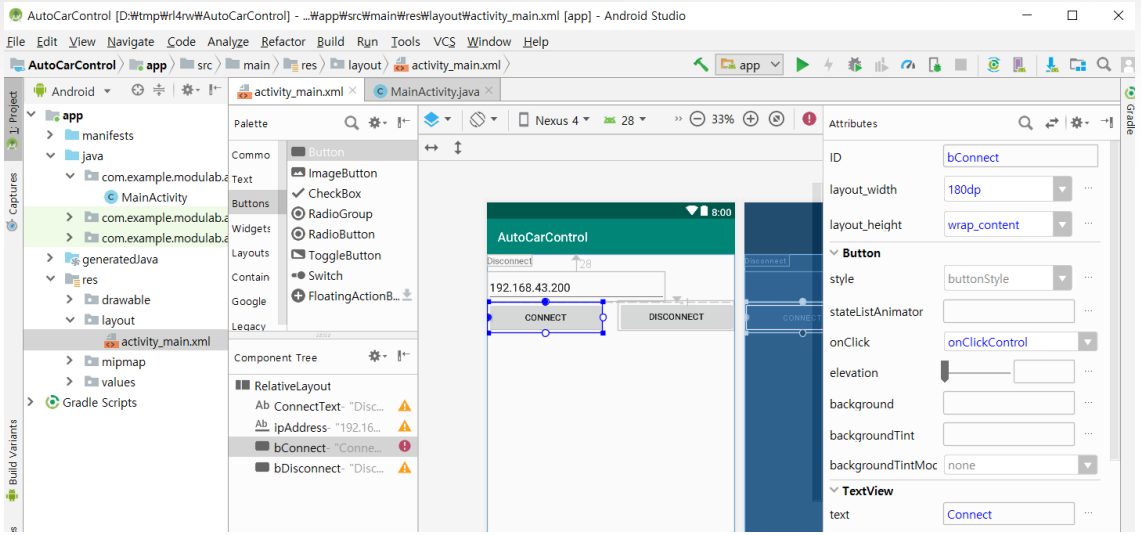


TextView 추가하기
ID: “connectText”
Text: “Disconnect”

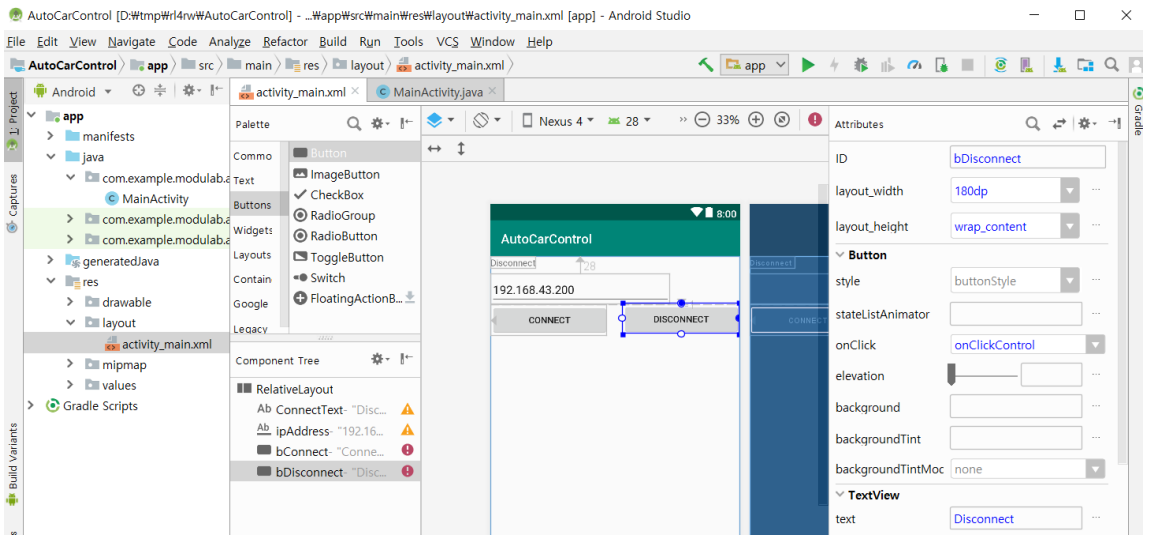


EditText 추가하기
ID: “ipAddress”
Text: “192.168.200”

WiFi GUI 구성



버튼 추가하기
ID: “bConnect”
onClick: “onClickControl”
Text: “Connect”



버튼 추가하기
ID: “bDisconnect”
onClick: “onClickControl”
Text: “Disconnect”

WiFi 소스– onClickControl 추가

MainActivity 클래스에서 아래와 같이 변수 및 Thread, 버튼 동작 함수를 추가한다.

```
public class MainActivity extends AppCompatActivity {
    //code is added -->
    private int task_state = 0;

    TextView mMainText;
    EditText mNumEdit1;
    TcpThread mThread;
    //code is added <--

    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);

        //code is added -->
        mMainText = (TextView)findViewById(R.id.connectText);
        mNumEdit1 = (EditText)findViewById(R.id.ipAddress);

        mThread = new TcpThread(mHandler);
        mThread.setDaemon(true);
        mThread.start();
        //code is added <--
    }
```

```
//code is added -->
    public void onClickControl(View v) {
        Message msg;
        switch (v.getId()) {
            case R.id.bConnect:
                if(task_state == 1)  break;
                String addr = mNumEdit1.getText().toString();

                msg = new Message();
                msg.what = 0;
                msg.obj = (String)addr;
                mThread.mBackHandler.sendMessage(msg);
                break;

            case R.id.bDisconnect:
                if(task_state == 0)  break;
                msg = new Message();
                msg.what = 7;
                msg.obj = (String)mNumEdit1.getText().toString();
                mThread.mBackHandler.sendMessage(msg);
                break;
        }
    }
    //code is added <--
```

WiFi 소스– 핸들러 추가

MainActivity 클래스에서 아래와 같이 핸들러 함수를 추가한다.

```
public class MainActivity extends AppCompatActivity {

    //code is added -->
      Handler mHandler = new Handler() {
        public void handleMessage(Message msg) {
          switch (msg.what) {
            case 0:
              if(msg.arg1 == 0) {
                mMainText.setText("connection successful : " + msg.obj);
                task_state = 1;
              }else if(msg.arg1 == 1)
              {
                mMainText.setText("connection fail : " + msg.obj);
                task_state = 0;
              }
              break;

            case 7:
              mMainText.setText("disconnect : ");
              task_state = 0;
              break;

            default:
              break;
          }
        }
      };
      //code is added <--
```

WiFi 소스 - TcpThread 추가

MainActivity.java 파일에 TcpThread 클래스를 추가한다.

```
class TcpThread extends Thread {
  Handler mMainHandler;
  Handler mBackHandler;
  private Socket sock;
  private OutputStream outs;
  private int start = 0;

  TcpThread(Handler handler) {
    mMainHandler = handler;
  }

  public void run() {
    Looper.prepare(); // 작업스레드를 위한 looper 준비
    mBackHandler = new Handler() {
      public void handleMessage(Message msg) {
        Message retmsg = new Message();

        switch (msg.what) {
          case 0:    // connect

            break;

          case 7:    // disconnect

            break;

          default:
            break;
        }
        mMainHandler.sendMessage(retmsg); //
      }
    };
    Looper.loop(); // }
}
```

connect 인 경우 코드

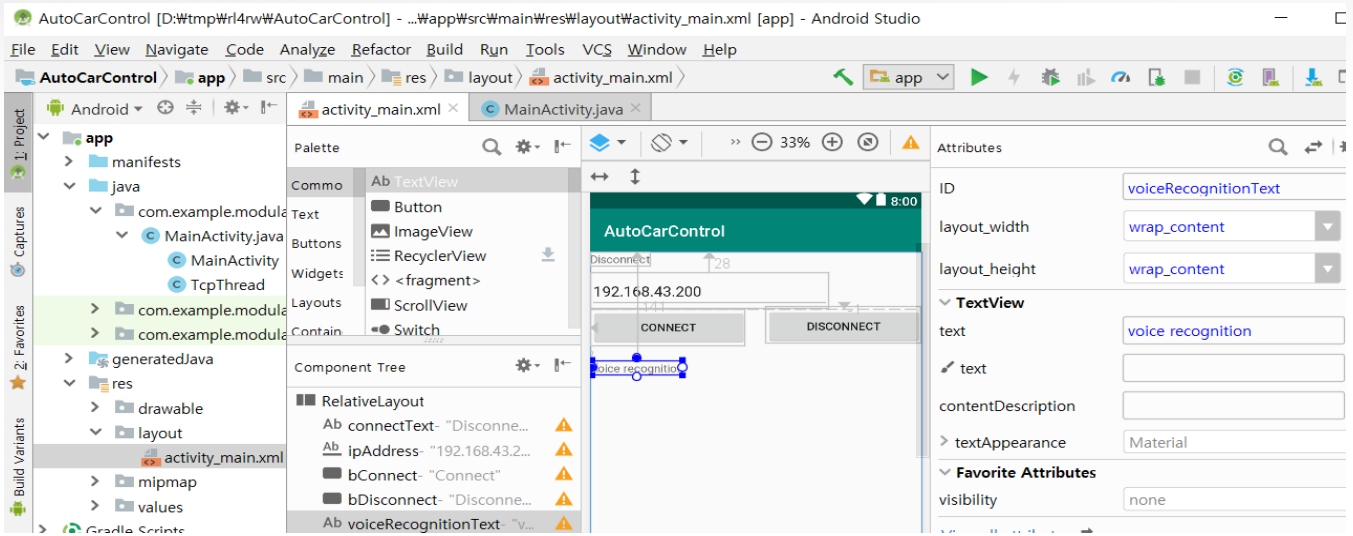
```
try {
   Thread.sleep(200);
} catch (InterruptedException e) {
   ;
}
if (start == 0) {
   try {
      sock = new Socket((String) msg.obj, 1234);
      outs = sock.getOutputStream();
      start = 1;

      retmsg.what = 0;
      retmsg.arg1 = 0;          // success
      retmsg.obj = (String) msg.obj;
    } catch (Exception ex) {
      ex.printStackTrace();

      start = 0;
      retmsg.what = 0;
      retmsg.arg1 = 1;          // fail
      retmsg.obj = (String) msg.obj;
   }
}
```

disconnect 인 경우 코드

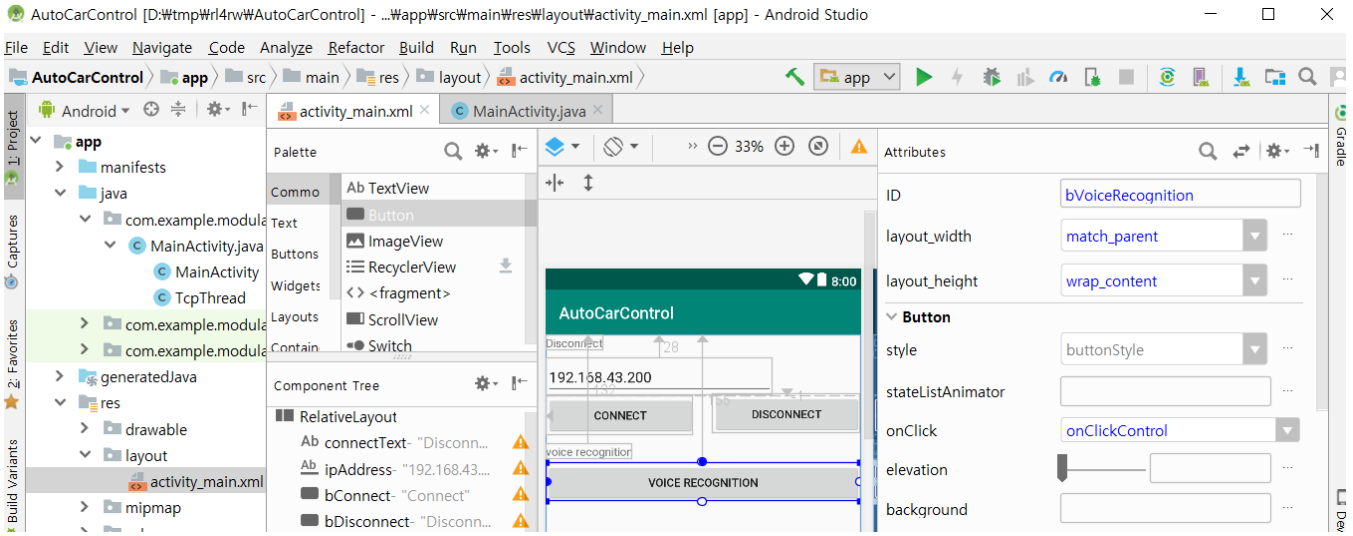
```
try {
   Thread.sleep(200);
} catch (InterruptedException e) {
   ;
}
if (start == 1) {
   try {
   } catch (Exception ex) {
      ex.printStackTrace();
   }

   try {
      sock.close();
      sock = null;
   } catch (IOException e) {
      e.printStackTrace();
   }
   start = 0;
    retmsg.what = 7;
 }
```

음성인식 GUI 구성

음성인식 GUI 를 추가한다.

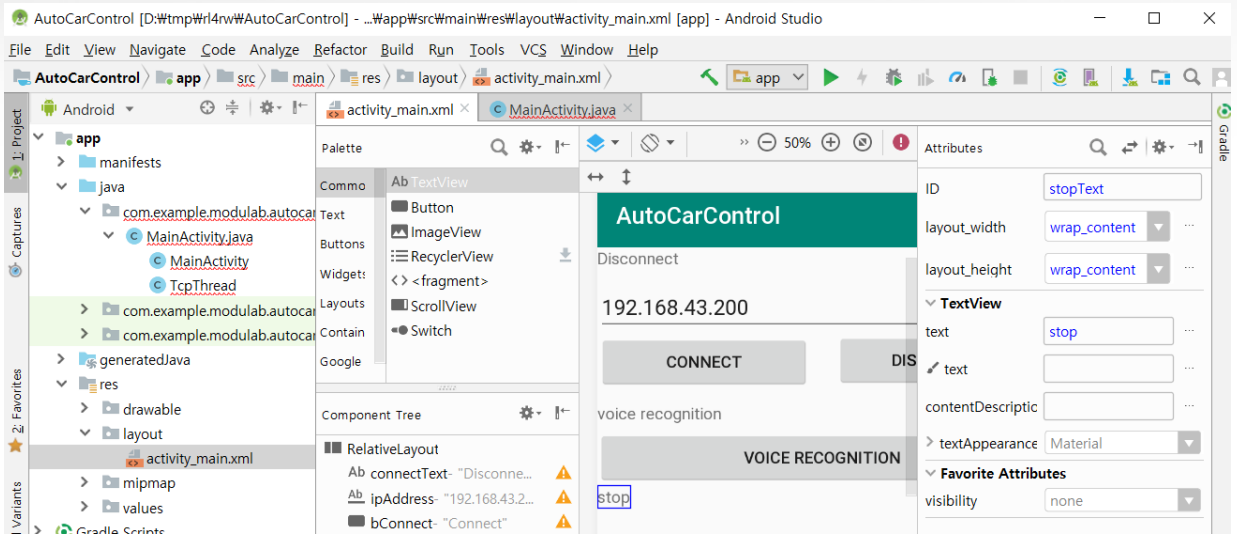


TextView 추가하기
- ID: “voiceRcognitionText”
- Text: “voice recognition”



버튼 추가하기
- ID: “bVoiceRecognition”
- onClick: “onClickControl”
- Text: “Voice Recognition”

음성인식 GUI 구성



음성인식 -onClickControl 수정

```
import android.app.Activity;
import android.content.Intent;
import android.os.Handler;
import android.os.Looper;
import android.os.Message;
import android.speech.RecognizerIntent;
import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;
import android.util.Log;
import android.view.View;
import android.widget.EditText;
import android.widget.TextView;
import android.widget.Toast;

import java.io.IOException;
import java.io.ObjectOutputStream;
import java.io.OutputStream;
import java.net.Socket;
import java.util.ArrayList;
```

음성인식 -onClickControl 수정

```
public class MainActivity extends AppCompatActivity {
    //code is added -->
      private int task_state = 0;
      TextView mMainText;
      EditText mNumEdit1;
      TcpThread mThread;
      //code is added <--

    //2 code is added -->
      private static final int RECOGNIZER = 1001;
      TextView mVoiceText;
      TextView mBackText;
      //2 code is added <--


    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);

       //2 code is added -->
        mVoiceText = (TextView)findViewById(R.id.voiceRecognitionText);
        //2 code is added <--
    }
```

```
public void onClickControl(View v) {
    Message msg;
    switch (v.getId()) {

      //2 code is added -->
      case R.id.bVoiceRecognition:
        if(task_state == 0)  break;

        VoiceSpeech();
        break;
      //2 code is added <--
    }
  }
```

음성인식 -핸들러수정

MainActivity 클래스에서 아래와 같이 핸들러 함수를 수정한다.

```
public class MainActivity extends AppCompatActivity {

    //code is added -->
      Handler mHandler = new Handler() {
        public void handleMessage(Message msg) {
          switch (msg.what) {

            //2 code is added -->
            case 5:
              mVoiceText.setText("Voice activation: ");
              break;
             //2 code is added <--

            default:
              break;
          }
        }
      };
      //code is added <--
```

음성인식-음성인식함수 추가

MainActivity 클래스에서 아래와 같이 음성인식 처리 함수를 추가한다.

```
public class MainActivity extends AppCompatActivity {


 //2 code is added -->
   public void VoiceSpeech() {
      try {
         Intent intent = new Intent(RecognizerIntent.ACTION_RECOGNIZE_SPEECH);
         intent.putExtra(RecognizerIntent.EXTRA_LANGUAGE_MODEL,
               RecognizerIntent.LANGUAGE_MODEL_WEB_SEARCH );
         intent.putExtra(RecognizerIntent.EXTRA_MAX_RESULTS,100);
         startActivityForResult(intent, RECOGNIZER);
      } catch (Exception e) {
         Toast.makeText(getApplicationContext(), "No Speech support",
               Toast.LENGTH_LONG).show();
      }
   }
 //2 code is added <--
```

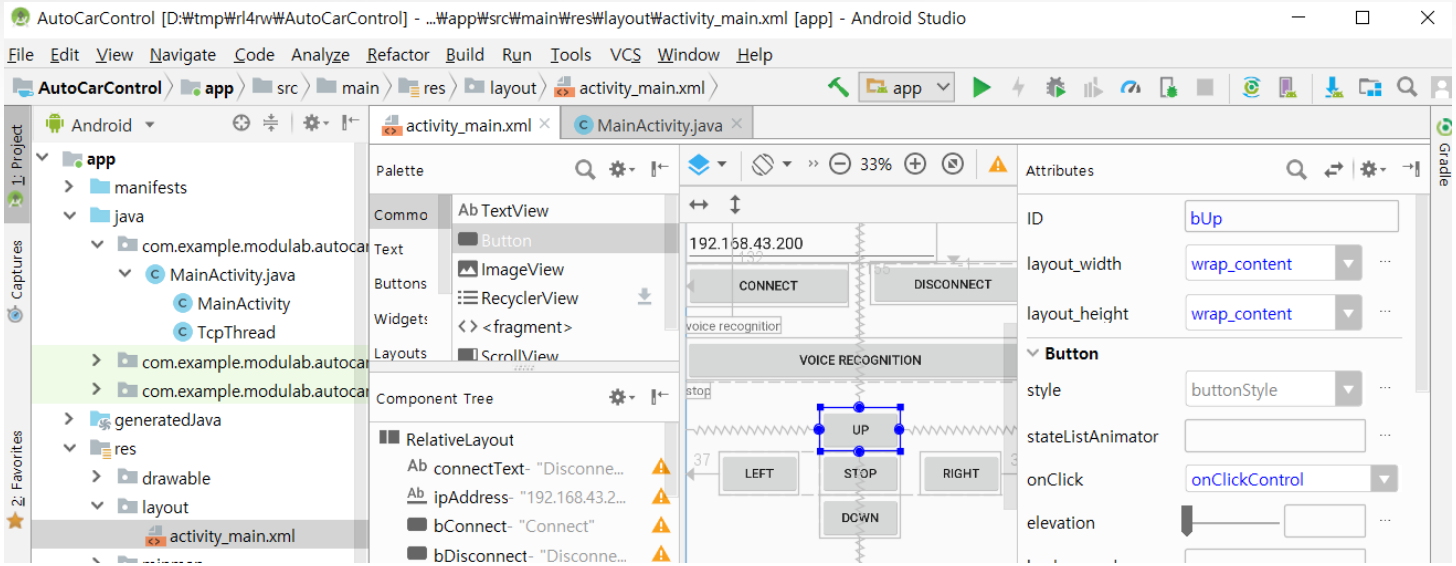
```
public void onActivityResult(int requestCode, int resultCode, Intent data)
  {
     Message msg;
     if (requestCode == RECOGNIZER && resultCode == Activity.RESULT_OK) {
        // returned data is a list of matches to the speech input
        ArrayList<String> result = data
              .getStringArrayListExtra(RecognizerIntent.EXTRA_RESULTS);
        Log.d("SPEECH", "size:" + result.size());
        String datos ;
        for (int i = result.size()-1; i >= 0 ; i--) {
           Log.d("SPEECH", "str:"+i+ ":" + result.get(i));
           datos= result.get(i);
           System.out.println(datos);

           mVoiceText = (TextView)findViewById(R.id.voiceRecognitionText);
           mVoiceText.setText((i+1)+"/"+result.size()+ ":" + result.get(i));
            if (datos.equals("izquierda") || datos.equals("left")
                || datos.equals("gauche")
                || datos.equals("왼쪽")
                || datos.equals("????")) {
              Toast.makeText(getApplicationContext(), "left", Toast.LENGTH_LONG).show();
              msg = new Message();
              msg.what = 9;
              //msg.arg1 = Integer.parseInt(mNumEdit2.getText().toString());
              mThread.mBackHandler.sendMessage(msg);
              break;
           }

           }
        }
     }
  }
```

음성인식- TcpThread 수정

MainActivity.java 파일에 TcpThread 클래스를 수정한다.

```
class TcpThread extends Thread {

  public void run() {
    Looper.prepare();
    mBackHandler = new Handler() {
      public void handleMessage(Message msg) {
        Message retmsg = new Message();

        switch (msg.what) {
         //2 code is added -->
          case 5:
            if(start == 0) break;
            retmsg.what = 5;
            break;
          case 9:
            if(start == 0) break;

            retmsg.what = 9;
            retmsg.obj = msg.obj;
            retmsg.arg1 = msg.arg1;
            retmsg.arg2 = msg.arg2;
            sndOpkey = (String)msg.obj;
            try {
              outs.write(sndOpkey.getBytes("UTF-8"));
              outs.flush();
            } catch (Exception ex) {
              ex.printStackTrace();
            }
            break;
          //2 code is added <--

          default:
            break;
        }
        mMainHandler.sendMessage(retmsg); //
      }
    };
    Looper.loop(); //
  }
}
```

네비게이션 GUI 구성



버튼 추가하기

ID: “bUp”, “bLeft”, “bStop”, “bRight”, “bDown”

onClick: “onClickControl” ➔ 빈칸에서 입력한다.

Text: “Up”, “Left”, “Stop”, “Right”, “Down”

네비게이션 -onClickControl 수정

public class MainActivity extends AppCompatActivity {

```
public void onClickControl(View v) {
    Message msg;
    switch (v.getId()) {

      //3 code is added -->
      case R.id.bLeft:
        if(task_state == 0)  break;
        msg = new Message();
        msg.what = 1;
        msg.obj = (String)"192.168.43.200";

        mThread.mBackHandler.sendMessage(msg);
        try { Thread.sleep(200); } catch (InterruptedException e) {;}
        break;

      case R.id.bRight:
        if(task_state == 0)  break;
        msg = new Message();
        msg.what = 2;

        mThread.mBackHandler.sendMessage(msg);
       try { Thread.sleep(200); } catch (InterruptedException e) {;}
        break;

      case R.id.bUp:
        if(task_state == 0)  break;
        msg = new Message();
        msg.what = 3;

        mThread.mBackHandler.sendMessage(msg);
        try { Thread.sleep(200); } catch (InterruptedException e) {;}
        break;

      case R.id.bDown:
        if(task_state == 0)  break;
        msg = new Message();
        msg.what = 4;

        mThread.mBackHandler.sendMessage(msg);
        try { Thread.sleep(200); } catch (InterruptedException e) {;}
        break;

      case R.id.bStop:
        if(task_state == 0)  break;
        msg = new Message();
        msg.what = 6;
        //msg.arg1 = Integer.parseInt(mNumEdit2.getText().toString());
        mThread.mBackHandler.sendMessage(msg);
        try { Thread.sleep(200); } catch (InterruptedException e) {;}
        break;
      //3 code is added <--
    }
}
```

네비게이션-핸들러수정

MainActivity 클래스에서 아래와 같이 핸들러 함수를 수정한다.

```
public class MainActivity extends AppCompatActivity {

    //code is added -->
    Handler mHandler = new Handler() {
        public void handleMessage(Message msg) {
            switch (msg.what) {

                //3 code is added -->
                case 1:
                    mBackText.setText("Left : ");
                    break;
                case 2:
                    mBackText.setText("Right : ");
                    break;
                case 3:
                    mBackText.setText("Up : ");
                    break;
                case 4:
                    mBackText.setText("Down : ");
                    break;
                case 6:
                    mBackText.setText("Stop : ");
                    break;
                //3 code is added <--

                default:
                    break;
            }
        }
```

네비게이션- TcpThread 수정

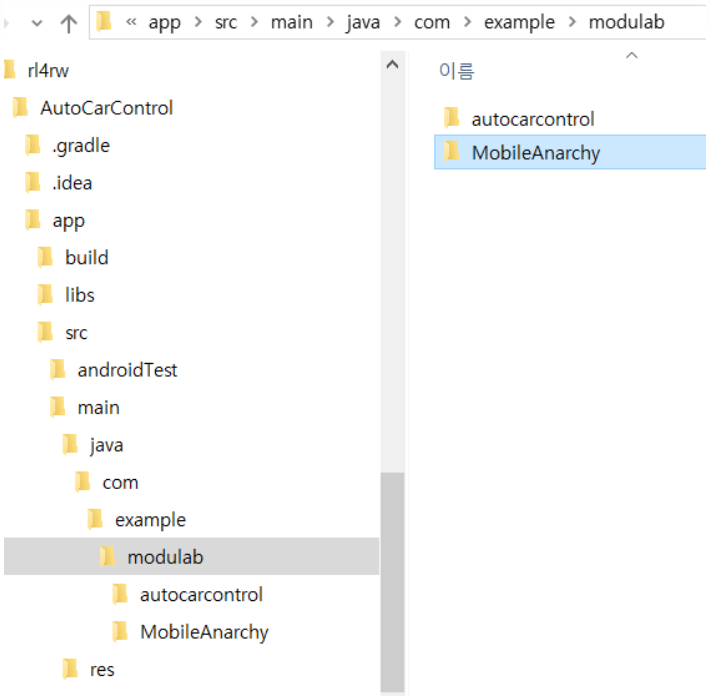
MainActivity.java 파일에 TcpThread 클래스를 수정한다.

class TcpThread extends Thread {

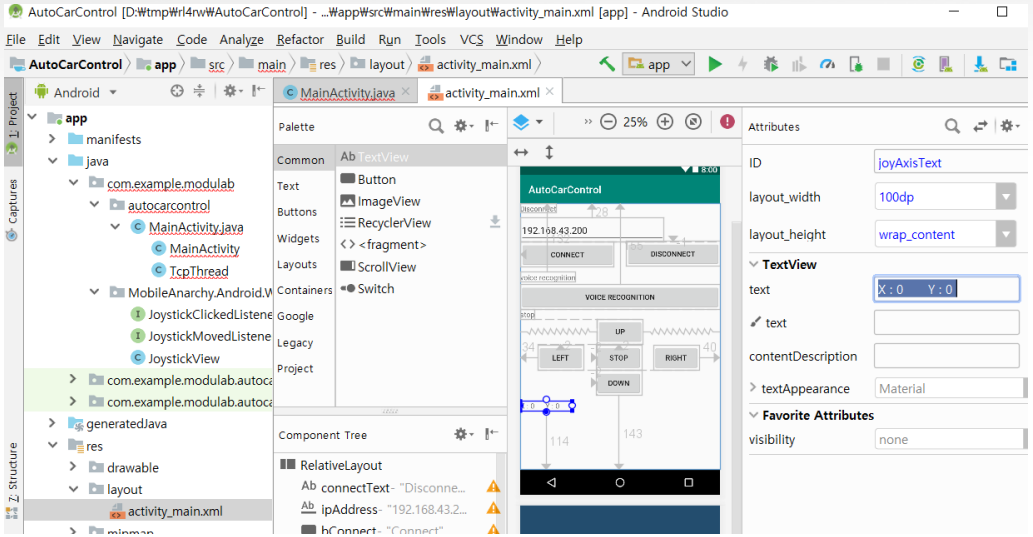
```
public void run() {
   Looper.prepare();
   mBackHandler = new Handler() {
      public void handleMessage(Message msg) {
         Message retmsg = new Message();

         switch (msg.what) {

          //3 code is added -->
          case 1:    // left
             retmsg.what = 1;
             retmsg.obj = msg.obj;
             if(start == 0) break;
             try {
                sndOpkey = "left\n";      //"a\n"
                outs.write(sndOpkey.getBytes("UTF-8"));
                outs.flush();
             } catch (Exception ex) {
                ex.printStackTrace();
             }
             break;

          case 2:    // right
             retmsg.what = 2;
             if(start == 0) break;
             try {
                sndOpkey = "right";     //"b\n"
                outs.write(sndOpkey.getBytes("UTF-8"));
                outs.flush();
             } catch (Exception ex) {
                ex.printStackTrace();
             }
             break;

          case 3:    // up
             retmsg.what = 3;
             if(start == 0) break;
             try {
                sndOpkey = "up\n";     //"c\n"
                outs.write(sndOpkey.getBytes("UTF-8"));
                outs.flush();
             } catch (Exception ex) {
                ex.printStackTrace();
             }
             break;

          case 4:    // down
             retmsg.what = 4;
             if(start == 0) break;
             try {
                sndOpkey = "down\n";     //"c\n"
                outs.write(sndOpkey.getBytes("UTF-8"));
                outs.flush();
             } catch (Exception ex) {
                ex.printStackTrace();
             }
             break;

          case 6:    // joystick stop
             retmsg.what = 6;
             if(start == 0) break;
             try {
                sndOpkey = "stop\n";     // joystick stop
                outs.write(sndOpkey.getBytes("UTF-8"));
                outs.flush();
             } catch (Exception ex) {
                ex.printStackTrace();
             }
             break;
           //3 code is added <--
           default:
             break;
      }
      mMainHandler.sendMessage(retmsg); //
```

조이스틱

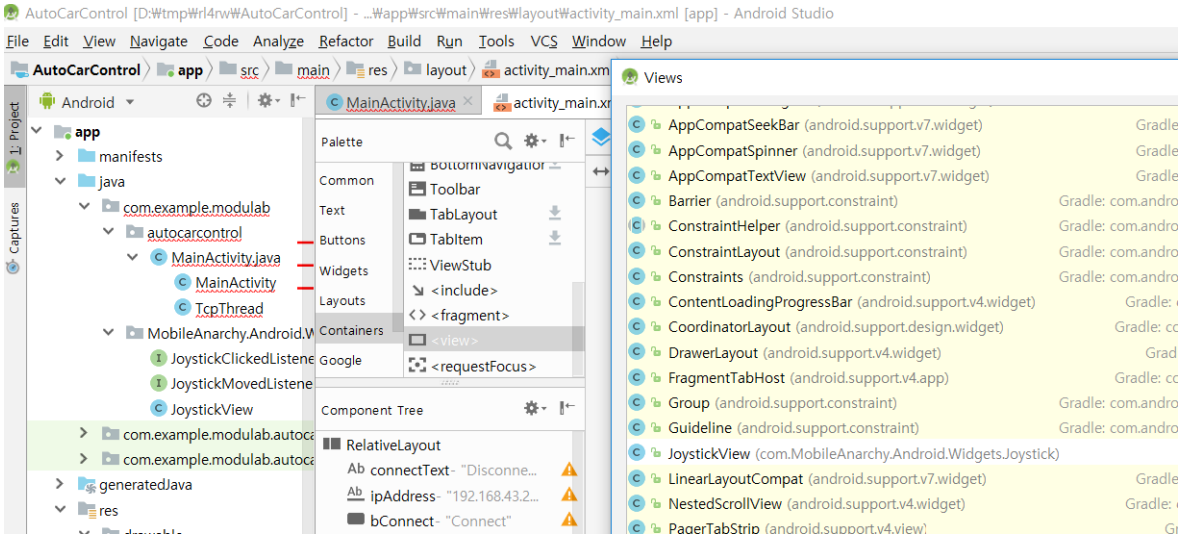
AutoCarControl\app\src\main\java\com\example\modulab
폴더에 MobileAnrchy를 카피한다.



조이스틱 GUI 구성



TextView 추가하기
ID: “joyAxisText”
Text: “X : 0 Y : 0”



Containers->view 추가하기
class : JoystickView 선택한다.
ID : “joyStickMove”
layout_width : 150dp
layout_height : 150dp

조이스틱 핸들러 수정

```
public class MainActivity extends AppCompatActivity {

  //4 code is added -->
   TextView mJoyText;
   private int joy_state = 0;
   private com.MobileAnarchy.Android.Widgets.Joystick.JoystickView joystick;
   //4 code is added <--

 protected void onCreate(Bundle savedInstanceState) {
      //4 code is added -->
      mJoyText = (TextView)findViewById(R.id.joyAxisText);
      joystick = (com.MobileAnarchy.Android.Widgets.Joystick.JoystickView)findViewById(R.id.joyStickMove);
      joystick.setOnJostickMovedListener(_listener);
      //4 code is added <--
                                  Handler mHandler = new Handler() {
                                        public void handleMessage(Message msg) {
                                          switch (msg.what) {
                                        //4 code is added -->
                                        case 8:
                                          //mJoyText.setText("Voice : " + ((Double)msg.obj).doubleValue());
                                          //mJoyText.setText("Joystick : ");
                                          mJoyText.setText("X : " + Integer.toString(msg.arg1) + "       Y : " + Integer.toString(msg.arg2) +"    " + msg.obj);
                                          joy_state = 0;
                                          break;
                                        //4 code is added <--

                                       default:
                                          break;
                                     }
                                   }
                                };
```

조이스틱 Listener 추가

```
public class MainActivity extends AppCompatActivity {

//4 code is added -->
  private com.MobileAnarchy.Android.Widgets.Joystick.JoystickMovedListener _listener =
   new com.MobileAnarchy.Android.Widgets.Joystick.JoystickMovedListener() {
    //Date lastSent = new Date();
    Message msg;
    public void OnMoved(int pan, int tilt) {
      mJoyText.setText("X : " + Integer.toString(pan) + "       Y : " + Integer.toString(tilt));
      //mJoyText.setText(Integer.toString(tilt));

      if(task_state == 0 || joy_state == 1)  return;
      joy_state = 1;
      msg = new Message();
      msg.what = 8;
      msg.obj = (String)" ";
      msg.arg1 = Integer.parseInt(Integer.toString(pan));
      msg.arg2 = Integer.parseInt(Integer.toString(tilt));
      mThread.mBackHandler.sendMessage(msg);
    }

    public void OnReleased() {
      if(task_state == 0 || joy_state == 1)  return;
      joy_state = 1;
      msg = new Message();
      msg.what = 8;
      msg.obj = (String)"released";
      msg.arg1 = 0;
      msg.arg2 = 0;
      mThread.mBackHandler.sendMessage(msg);
      //try { Thread.sleep(200); } catch (InterruptedException e) {;}
    }

    public void OnReturnedToCenter() {
      if(task_state == 0 || joy_state == 1)  return;
      joy_state = 1;
      msg = new Message();
      msg.what = 8;
      msg.obj = (String)"stopped";
      msg.arg1 = 0;
      msg.arg2 = 0;
      mThread.mBackHandler.sendMessage(msg);
   };
};
//4 code is added <--
```

조이스틱- TcpThread 수정

```
class TcpThread extends Thread {

    //4 code is added -->
     case 8:
       if(start == 0) break;
       try { Thread.sleep(20); } catch (InterruptedException e) {;}
       retmsg.what = 8;
       retmsg.obj = msg.obj;
       retmsg.arg1 = msg.arg1;
       retmsg.arg2 = msg.arg2;
       //Toast.makeText(run(), "0", Toast.LENGTH_LONG).show();
       if(msg.arg1 > 8){
          sndOpkey = "left\n";  //left "b\n"
       }
       else if(msg.arg1 < -8){
          sndOpkey = "right\n";  //right "a\n"
       }
       else if(msg.arg2 > 8) {
          sndOpkey = "down\n";  //down  "d\n"
       }
       else if(msg.arg2 < -8) {
          sndOpkey = "up\n";  //up    "c\n"
       }
       else {
          //sndOpkey = "0\n";  //up
          break;
       }
                                          try {
                                             outs.write(sndOpkey.getBytes("UTF-8"));
                                             outs.flush();
                                          } catch (Exception ex) {
                                             ex.printStackTrace();
                                          }
                                          break;
                                          //4 code is added <--
```

명령어 전달 과정