SLEEP TRACKER ANDROID APPLICATION

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DESCRIPTION

A Sleep Tracker Android App is a sophisticated mobile tool designed to help users monitor and improve their sleep patterns. By leveraging the power of advanced sensors and algorithms, the app can provide detailed insights into sleep cycles, including light, deep, and REM sleep stages.

Key features often include automatic sleep detection, sleep schedule tracking, and the ability to monitor elapsed sleep time to help users adhere to their desired sleep routines. The app may also include smart alarms that wake users during their lightest sleep phase for minimal grogginess and personalized sleep advice based on collected data.

The primary goal of a Sleep Tracker App is not just to inform but to empower users to cultivate healthier sleep habits through data-driven insights and actionable recommendations.

SOURCE CODE

Main Activity.java:

```
package com.app.joe.mwsleeptracker;

import android.app.ProgressDialog;

import android.content.*;

//import android.database.sqlite.SQLiteDatabase;

import android.os.Bundle;

import android.os.IBinder;

//import android.support.design.widget.Snackbar;

import android.support.v4.app.Fragment;

import android.support.v7.app.AlertDialog;

import android.util.Log; import android.view.View;

import android.support.design.widget.NavigationView;

import android.support.v4.view.GravityCompat;

import android.support.v4.widget.DrawerLayout;

import android.support.v7.app.ActionBarDrawerToggle;

import android.support.v7.app.AppCompatActivity;

import android.support.v7.widget.Toolbar;
import android.view.Menu;
import android.view.MenuItem;
import android.support.v4.app.FragmentManager;
import android.support.v4.app.FragmentTransaction;
import android.bluetooth.BluetoothDevice;
import android.bluetooth.BluetoothManager;
import android.view.ViewGroup;
import android.widget.Button;
import android.widget.CompoundButton;
import android.widget.LinearLayout;
import android.widget.Switch;
import android.widget.TextView;
//import android.widget.Toast;
//import android.widget.ToggleButton;
import com.mbientlab.metawear.AsyncOperation;
import com.mbientlab.metawear.Message;
import com.mbientlab.metawear.MetaWearBleService;
import com.mbientlab.metawear.MetaWearBoard;
import com.mbientlab.metawear.RouteManager;
import com.mbientlab.metawear.UnsupportedModuleException;
import com.mbientlab.metawear.data.CartesianFloat;
//import com.mbientlab.metawear.module.Accelerometer;
//import com.mbientlab.metawear.module.Bma255Accelerometer;
import com.mbientlab.metawear.module.Bmi160Accelerometer;
public class MainActivity extends AppCompatActivity implements ServiceConnection,
NavigationView.OnNavigationItemSelectedListener {


 private MetaWearBleService.LocalBinder serviceBinder;
 private String deviceMACAddress = "";
 private MetaWearBoard mwBoard;
 private ProgressDialog connectDialog;
@Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
 Toolbar toolbar = (Toolbar) findViewById(R.id.toolbar);
        setSupportActionBar(toolbar);
        //Setup navigation drawer
        DrawerLayout drawer = (DrawerLayout) findViewById(R.id.drawer_layout);
        ActionBarDrawerToggle toggle = new ActionBarDrawerToggle(
                this, drawer, toolbar, R.string.navigation_drawer_open, R.string.navigation_drawer_close);
        drawer.setDrawerListener(toggle);
        toggle.syncState();
        NavigationView navigationView = (NavigationView) findViewById(R.id.nav_view);
        if (navigationView != null) {
            navigationView.setNavigationItemSelectedListener(this);
        }
//Read the selected MW board MAC
 PrefManager.Init(this);
 deviceMACAddress = PrefManager.readMACAddress();
 //If one has not been selected, Hide the connection switch and show that no
 //device has been selected
```

```
if (deviceMACAddress == null || deviceMACAddress == ""){
 Switch switchConnection = (Switch) findViewById(R.id.switchConnection);
 switchConnection.setVisibility(View.GONE);

 TextView tvSelectedDevice = (TextView) findViewById(R.id.tvSelectedDevice);
 tvSelectedDevice.setText(R.string.no_device_selected);

 TextView tvBoardStatus = (TextView) findViewById(R.id.tvBoardStatus);
 tvBoardStatus.setText("");
 }
 else{
 //Otherwise, display the switch and create a listner that will detect when the
 //switch has changed states
 Switch switchConnection = (Switch) findViewById(R.id.switchConnection);
 switchConnection.setVisibility(View.VISIBLE);
if (switchConnection != null) {
 switchConnection.setOnCheckedChangeListener(new CompoundButton.OnCheckedChangeListener() {
@Override
public void onCheckedChanged(CompoundButton buttonView, boolean isChecked) {
 if (isChecked) {
 //If the switch is on, then connect the MW board
 connectMWBoard();
 } else {
 //If the switch is off, disconnect the MW board
 disconnectMWBoard();
 }
 }
 });
 }
 //Bind the MW bluetooth serveice and update that status fragment.
 getApplicationContext().bindService(new Intent(this, MetaWearBleService.class), this, BIND_AUTO_CREATE);
 updateStatusFragment();
 }
 //Hide the info fragment until the MW board has been connected.
 hideInfoFragment(); }
```

```
private void updateStatusFragment(){
//Calls method in status fragment to update the status
FragmentManager fm = getSupportFragmentManager();
MWStatusFragment fragment = (MWStatusFragment) fm.findFragmentById(R.id.status_fragment);
fragment.updateStatusInfo(mwBoard, deviceMACAddress);
}
private void updateInfoFragment(float X, float Y, float Z){
//Calls method in info fragment to update the display of accel info
FragmentManager fm = getSupportFragmentManager();
MWInfoFragment fragment = (MWInfoFragment) fm.findFragmentById(R.id.info_fragment);
fragment.updateDeviceInfo(X, Y, Z);
}
@Override
public void onBackPressed() {
DrawerLayout drawer = (DrawerLayout) findViewById(R.id.drawer_layout);
if(drawer != null){
if (drawer.isDrawerOpen(GravityCompat.START)) {
```

```
drawer.closeDrawer(GravityCompat.START);
 } else {
 super.onBackPressed();
 }
 }
 }

 @SuppressWarnings("StatementWithEmptyBody")
 @Override
 public boolean onNavigationItemSelected(MenuItem item) {
 // Handle navigation view item clicks here.
 Intent intent;
 int id = item.getItemId();

 if (id == R.id.nav_view_history) {
 intent = new Intent(MainActivity.this, SleepLogActivity.class);
 startActivity(intent);
} else if (id == R.id.nav_settings) {
```

```
intent = new Intent(MainActivity.this, AppSettingsActivity.class);
 startActivity(intent);
 } else if (id == R.id.nav_about) {
 intent = new Intent(MainActivity.this, AboutActivity.class);
 startActivity(intent);
 }

 DrawerLayout drawer = (DrawerLayout) findViewById(R.id.drawer_layout);
 if (drawer != null) {
 drawer.closeDrawer(GravityCompat.START);
 }
@Override
 public void onDestroy() {
 super.onDestroy();

 if (serviceBinder != null)
 // Unbind the service when the activity is destroyed
 getApplicationContext().unbindService(this);
```

```
}
@Override
public void onServiceConnected(ComponentName name, IBinder service) {
// Typecast the binder to the service's LocalBinder class
serviceBinder = (MetaWearBleService.LocalBinder) service;

//Retrieve the board information
retrieveBoard();
mwBoard.setConnectionStateHandler(new MetaWearBoard.ConnectionStateHandler() {
@Override
public void connected() {
//Close the connect dialog
connectDialog.dismiss();

runOnUiThread(new Runnable(){
@Override
public void run(){
setConnectionSwitch(true);
}
});
showInfoFragment();
updateStatusFragment();
Log.i("MainActivity", "Connected");
try {
startAccelerometer();
} catch (UnsupportedModuleException e) {
unsupportedModule();
}
}
@Override
public void disconnected() {
if (connectDialog.isShowing()) {
connectDialog.dismiss();
}

hideInfoFragment();
```

```
runOnUiThread(new Runnable(){
 @Override
 public void run(){
 setConnectionSwitch(false);
 }
 });
 updateStatusFragment();
 }
 @Override
 public void failure(int status, Throwable error) {
 if (connectDialog.isShowing()) {
 connectDialog.dismiss();
 }
});
 hideInfoFragment();
 updateStatusFragment();
 mwBoard.connect();
```

```
}
 });
 }

 private void hideInfoFragment(){
 //Hide the info fragment shown on this activity
 FragmentManager fm = getSupportFragmentManager();
 MWInfoFragment fragment = (MWInfoFragment) fm.findFragmentById(R.id.info_fragment);
 FragmentTransaction ft = fm.beginTransaction();
 ft.hide(fragment);
 ft.commit();
 }
private void showInfoFragment(){
 //Show the info fragment shown on this activity
 FragmentManager fm = getSupportFragmentManager();
 MWInfoFragment fragment = (MWInfoFragment)
fm.findFragmentById(R.id.info_fragment);
```

```
FragmentTransaction ft = fm.beginTransaction();
 ft.show(fragment);
 ft.commit();
 }
private void setConnectionSwitch(boolean isChecked){
 //Change the switch state based on the input parameter
 Switch switchConnection = (Switch) findViewById(R.id.switchConnection);
 if(switchConnection != null) {
 switchConnection.setChecked(isChecked);
 }
 }
private void unsupportedModule() {
 //Display an alert of the module is not supported by the MW board
 AlertDialog.Builder alertDialogBuilder = new AlertDialog.Builder(this);
alertDialogBuilder.setTitle(R.string.title_error);
 alertDialogBuilder
 .setMessage("Unsupported Module")
```

```
.setCancelable(false)
 .create()
 .show();
 }

 ///< Taken from: http://stackoverflow.com/a/20742032/4872841
 protected void enableDisableViewGroup(ViewGroup viewGroup, boolean enabled) {
 int childCount = viewGroup.getChildCount();
 for (int i = 0; i < childCount; i++)
}
 }

 private void connectMWBoard(){
 //Open the connection dialog
 connectDialog = new ProgressDialog(MainActivity.this);
 connectDialog.setTitle(getString(R.string.title_connecting));
 connectDialog.setMessage(getString(R.string.message_wait));
connectDialog.setCancelable(false);
connectDialog.setCanceledOnTouchOutside(false);
connectDialog.setIndeterminate(true);
connectDialog.setButton(DialogInterface.BUTTON_NEGATIVE, getString(R.string.label_cancel), new
DialogInterface.OnClickListener() {
 @Override
 public void onClick(DialogInterface dialogInterface, int i) {
 mwBoard.disconnect();
 }
 });
 connectDialog.show();
 //Connect to the MetaWear board
 mwBoard.connect();
 }
 private void disconnectMWBoard(){
 mwBoard.disconnect();
 hideInfoFragment();
 }
```

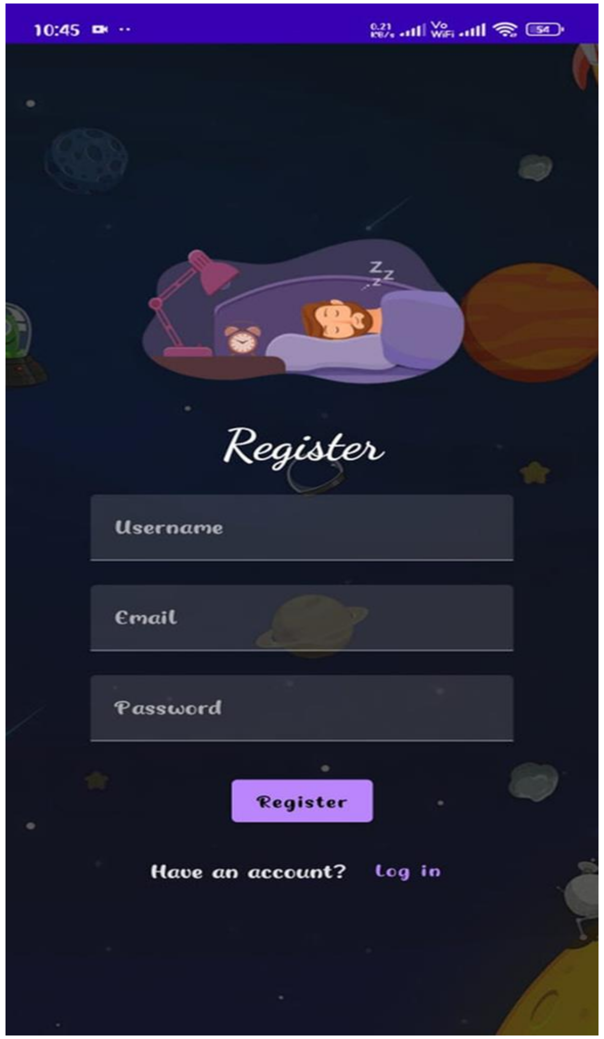
```
@Override
public void onServiceDisconnected(ComponentName componentName) {
}
private void disconnectMWBoard(){
mwBoard.disconnect();
hideInfoFragment();
}

@Override
public void onServiceDisconnected(ComponentName componentName) {
}
public void retrieveBoard() {
final BluetoothManager btManager=
(BluetoothManager) getSystemService(Context.BLUETOOTH_SERVICE);
final BluetoothDevice remoteDevice=
btManager.getAdapter().getRemoteDevice(deviceMACAddress);
// Create a MetaWear board object for the Bluetooth Device
```

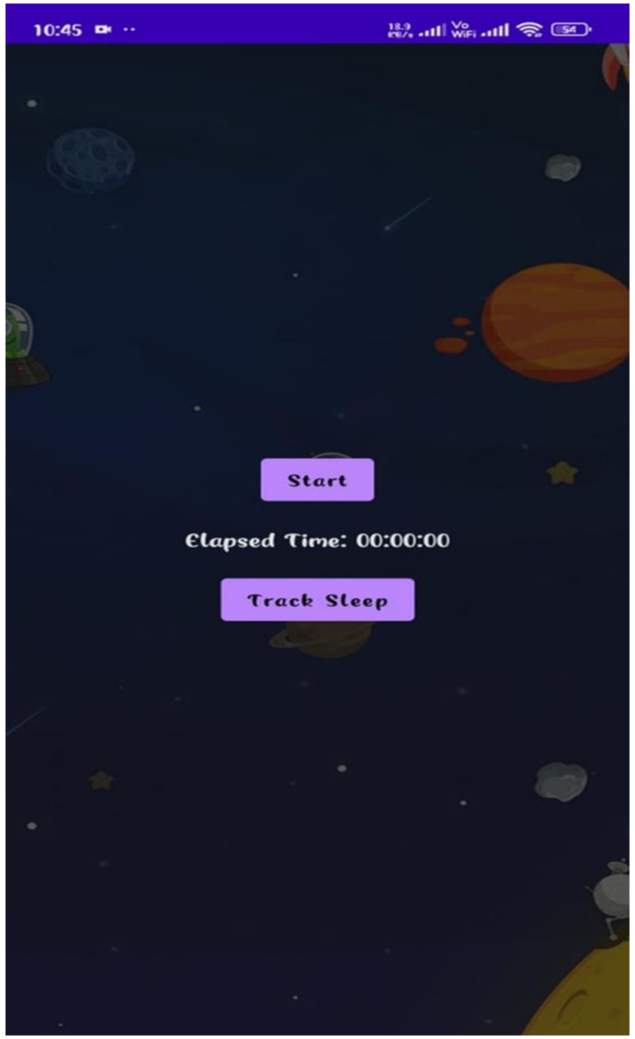
```
serviceBinder.getMetaWearBoard(remoteDevice);
 }
 private void startAccelerometer() throws UnsupportedModuleException {
 Bmi160Accelerometer bmi160AccModule= mwBoard.getModule(Bmi160Accelerometer.class);
 bmi160AccModule.setOutputDataRate(2.f);
 bmi160AccModule.setAxisSamplingRange(3.0f);
 bmi160AccModule.enableAxisSampling();
 // Switch the accelerometer to active mode
 bmi160AccModule.start();
 }
}
// Route data from the chip's motion detector
 bmi160AccModule.routeData().fromAxes().stream("motion").commit()
 .onComplete(new AsyncOperation.CompletionHandler<RouteManager>() {
 @Override
 public void success(RouteManager result) {
 result.subscribe("motion", new RouteManager.MessageHandler() {
```

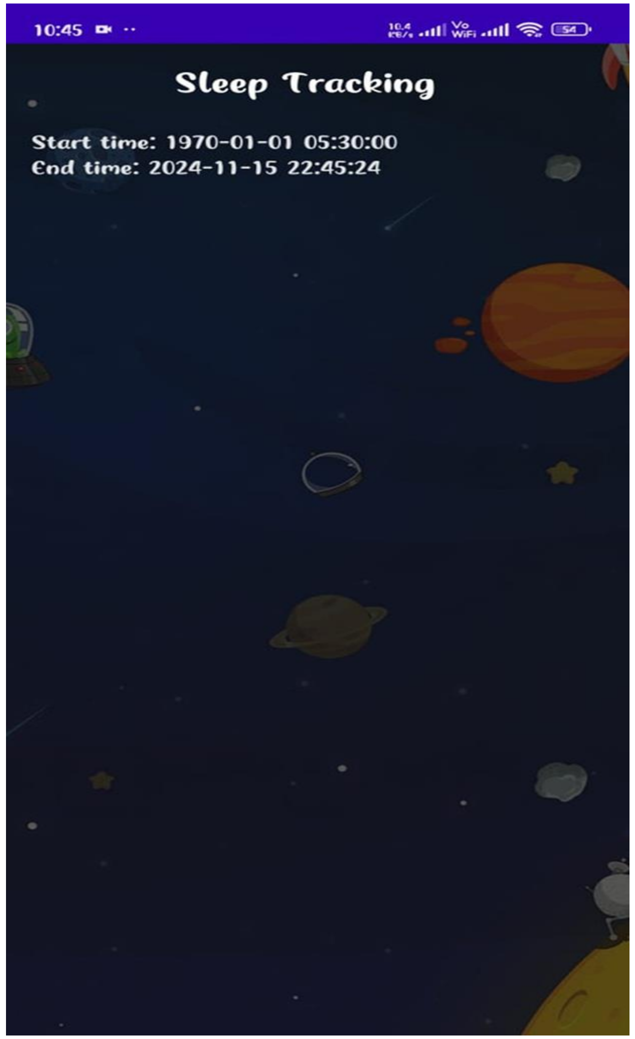
```
serviceBinder.getMetaWearBoard(remoteDevice);
 }
 private void startAccelerometer() throws UnsupportedModuleException {
 Bmi160Accelerometer bmi160AccModule= mwBoard.getModule(Bmi160Accelerometer.class);
 bmi160AccModule.setOutputDataRate(2.f);
 bmi160AccModule.setAxisSamplingRange(3.0f);
 bmi160AccModule.enableAxisSampling();
 // Switch the accelerometer to active mode
 bmi160AccModule.start();
 }
}
// Route data from the chip's motion detector
 bmi160AccModule.routeData().fromAxes().stream("motion").commit()
 .onComplete(new AsyncOperation.CompletionHandler<RouteManager>() {
 @Override
 public void success(RouteManager result) {
 result.subscribe("motion", new RouteManager.MessageHandler() {
```

```
@Override
public void process(Message msg) {

updateInfoFragment(msg.getData(CartesianFloat.class).x(),
msg.getData(CartesianFloat.class).y(),
msg.getData(CartesianFloat.class).z());

//CALL TO PHYSICS ENGINE WOULD BE HERE

Log.i("MainActivity", msg.getData(CartesianFloat.class).toString());
}
});
}
});
```

OUTPUT







Sleep Tracking

Start time: 1970-01-01 05:30:00
End time: 2024-11-15 22:45:24

THANK YOU