IMU data collection

This is a fast start guide for collecting IMU data, assuming that you have already set up hardware.

GitHub repository: https://github.com/TLMOS/imu_data_collection

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Connect sensor manager to WiFI

1. Connect Orange Pi Zero to router via Ethernet cable
2. Run `nmap` to find IP address of Orange Pi Zero

```
$ nmap -sP 192.168.1.0/24
```

3. Connect to Orange Pi Zero via SSH. Default password is `1234`

```
$ ssh root@[IP address] -p 22
```

4. Set up WiFi connection using `nmtui`.

```
$ nmtui
```

5. Reboot Orange Pi Zero

```
$ reboot
```

Collect data

Open web browser and go to http://89.208.104.147:8085/.

> Note: this is a temporary address for demo purposes. You can run your own server by following instructions in this repository.

If everything is set up correctly, you should see all available sensors in the list at the bottom of the page.

Configure and calibrate sensors

Sensors are already configured, but you can change settings by going to `Configure sensors` tab in `Sensors` section.

Default settings should be fine for most cases, yet yo may change `accel range` and `gyro range` to a wider range if you need to measure higher accelerations or angular velocities.

Same way you can calibrate sensors by going to `Calibrate sensors` tab in `Sensors` section. Make sure all sensors are placed on a flat surface during calibration.

Sessions

Data is collected in sessions. To start a new session, move to the `New session` tab in `Sessions` section, enter session name and duration then press the Start session button.

Merge, decode and download

Each sensor hub will send its data separately. So session parts need to be merged together.

Also, sensor readings are stored in raw binary format. So they need to be decoded to human readable format.

To do that, move to the `Sessions` section, select `Manage sessionns` tab and select all sessions you want to manage. (All sessions will be selected by default) Then press Merge and Decode buttons.

Same way you can download and delete session data.

Log messages

You can see log messages in the sidebar.

Session finished with overflow

It means that some of the sensor's FIFO buffers overflowed. This can happen if sampling rate is too high.

You can lower the sampling rate by increasing `sample rate divider` or by setting `DLPF mode` to 256 in the `Configure sensors` tab.

This can also happen if you are using too many sensors on one bus/hub.

Manager is busy

Sensor manager is busy with another task. This can happen if you are trying to start a new session while another one is still running.

It can also happen if user client automatically tries to update list of available sensors while manager is busy with another task.