Implementation of Math Model

On previous weeks was implemented additional functional of Gyroscope method of Fall Detection. As it was mentioned on the last report, the logic of work is:

First, application should store data from sensors for Gyroscope like for the accelerometer part in parallel mode. Secondly, main mathematical part (accelerometer) should detect a fall. If it happens, the main part should trigger method of Gyroscope class and gives time stamps of the beginning and ending of the fall. Then, Gyroscope part is going to the previous measurements, when falling is started and accelerometer has approximately **-1 g** on OZ axis. Between these two timestamps, application started to measure angle of the fall on two axis. If composition angle of two axis is equal to:

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then it is mean that patient is laying and Gyroscope class proofs the fall.

First problem was to state the timeframe when the fall was. In that point, algorithm looking for the last measurements of **-1 g** on OZ axis and states it as beginning of fall. Then the end of fall is stated by time when the impact was proceed. By this, we can state the timeframe of the fall for the Gyroscope algorithm. However, if the measurement of OZ axis is 0 g it means that the user was laying before the fall.

One of the main problem during the implementation was that the program could not change array of measurements during the computations. That is why there was implemented footprint of the measurements. It brings some disadvantages, as the program should store a lot of information for computations. Nevertheless, it is one solution, which can be done in case to do not lose important measurements from SensorTag.

Finally, the architecture of the Maths logic now contains three classes:

* Mathematics – contains main thread of computations, creating stamp of Gyro and Accelerometer objects inside the thread, and contains main static variables like impact power, laying acceleration;
* Gyro – contains measurements from sensor, functions off adding new measurements, thread of Gyro computations;
* Accelerometer - contains measurements from sensor, functions off adding new measurements, can trigger Gyro method to start its thread.