

## Goal

- The goal of our project is to develop a product with application achieving the function that wake up the user in appropriate time. The appropriate time is the time when you get up most refreshing. Also, a line chart is produced based on movement data collected during sleep.

## Motivations and Objectives

### □ Motivations

- Most of us have the experience that we have enough sleep but still feel dizzy after we get up. Sometimes when we have less sleep but still feel refreshing getting up. We want to find the right time to wake people up.

### □ Objectives

- Track the movement of users during their sleep
- predict the optimal time to wake them up based on the alarm clock they set

## Research Challenges

- How to make right prediction when is the exact time waking people up
- How to make hardware part work and transmit data to mobile phone
- How to make the algorithm associate with UI
- How to call alarm function of Android device

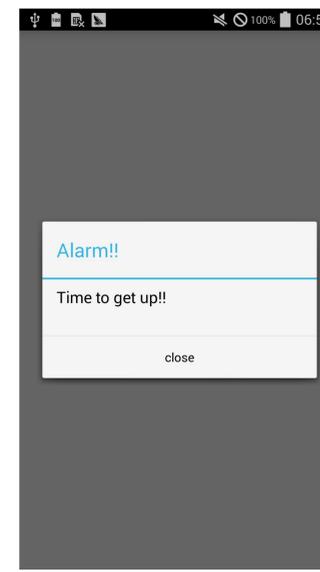
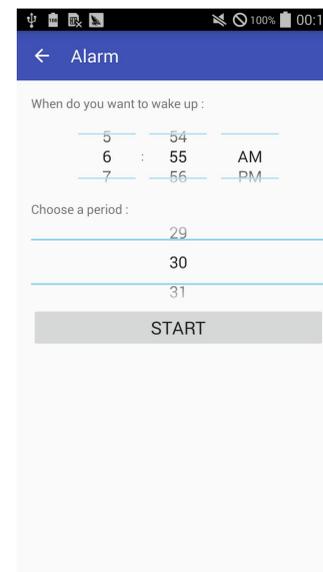
## Acknowledgement

We would like to thank Dr. Mehdi Javanmard, our advisor, offering help and instructions to our project.

## Methodology

- collect movement data from gyroscope/accelerator
- derive the resultant angular speed from raw data
- filter the background noise in the movement data
- evaluate sleeping status by moving average formula
- determine the wake up strategy using support vector classifier
- draw the sleep status trend chart with Achartengine
- use trigonometric function to train the support vector classifier model
- classify the sleeping score series from 90 minutes before window to the front edge of window
- determine the wake up time by the result of classify

## Results



### User Guidance

- Set up your latest acceptable wake up time
- Click start button and lie the phone by your pillow
- Alarm will wake you up in the window before the latest alarm time
- You will wake up refreshingly and have no difficulty to get out of bed
- Go to Trend interface to check your sleeping status trend

## References

- [1] G. Jean-Louis, D. Kripke, W. Mason, J. Elliott and S. Youngstedt. Sleep estimation from wrist movement quantified by different actigraphic modalities. *Journal of Neuroscience Methods* 105, 2001.
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- [3] [http://developer.android.com/intl/zh-cn/guide/topics/sensors/sensors\\_motion.html](http://developer.android.com/intl/zh-cn/guide/topics/sensors/sensors_motion.html)