

## Abstract

The indoor trajectory is a path of moving an object through corridor, stairs or other inside the building. There is various type of technology that can be used to reconstruct the path of moving an object and positioning detection. In an outdoor environment, Google Positioning System (GPS) has been used for reconstruction. While in an indoor environment, the utilize of embedded sensors on the mobile device is used. Accelerometer sensor and Magnetometer sensor has been used to detect the human movement and reconstruct the trajectory in the single floor. In an indoor environment, there are many activities that will create the trajectory same with an outdoor environment, such as passing along the corridor, visiting one room to another room and the other activities. The result of the trajectory can be utilized for research or others thing that produces many benefits. The latest study has been reconstructing the trajectory in the single floor, while in the real case indoor environment is consist of a multi-floor and multi-building. The purpose of this paper is trying to reconstruct the trajectory in indoor environment consist of the multi-floor. The focus of trajectory reconstruction is in the Kultubai Selatan (F) building of Computer Science at Telkom University. The result of our experiment shows that the height of the building can be detected using a barometer sensor in atmospheric pressure value and then will be transformed by setting the range value into the number of the floor. So, those sensors detect the activity related to the multi-floor building. The result of the accelerometer sensor shows that it can detect the human step accurately by adding the best threshold parameter (0.3) and the best position of device is  $0^\circ$ . The result of the magnetometer sensor can be used to reconstruct the trajectory similar to the real path based on the direction and degree direction. The level accuracy of the system when recognizing step in multi-floor is about 84%, while in single floor its about 88.75%. The level average accuracy when recognize walking activity or stopping activity is about 90% in a single floor and 87% in mult.

**Keywords:** reconstruction, trajectory, multi-floor, accelerometer, barometer, magnetometer