

# A Map Matching Component and a Survey on Present Methods on Indoor Navigation

- Master Thesis -

In last decade, sensors and smartphones have opened up a number of interesting applications. One such application is indoor navigation. The thesis is based on the development of an Map Matching Component for indoor localization applying map matching techniques using a map database. Regarding the map database, it was created in AutoCAD from 2D plans of the building applying a link-node model.

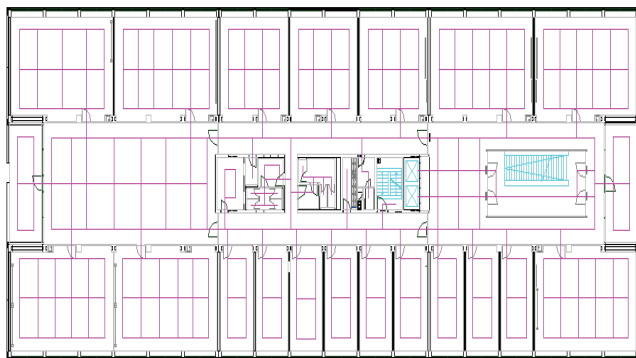


Figure 1: Link-node model and plan 2nd floor B-building

The Map Matching Component for Indoor Navigation was created using MATLAB and it is based on two sub-algorithms: the link localization and the continuous localization.

Link localization is the process of finding the link where the user is located and the user's orientation in this link. The aim of the link localization is to match the original trajectory of the user to the links of the database, this process is known as map matching.

In the continuous localization, the location of the user is presented as a point and this point is considered as part of a link. Consider the location point  $P_{t-1}$  at moment  $t-1$  is known. At moment  $t$ , the next point in the trajectory is received which define the user's position as  $P_t$ . The task of the continuous localization algorithm is to determine

the location point  $P_t$  at moment  $t$ , by matching  $P_t$  to an element of the map database.

This thesis has been focused on make an overview about the different techniques used in Indoor Navigation and the development of several algorithms for Indoor Navigation using a map database that represents an essential source of information for the process of localization.

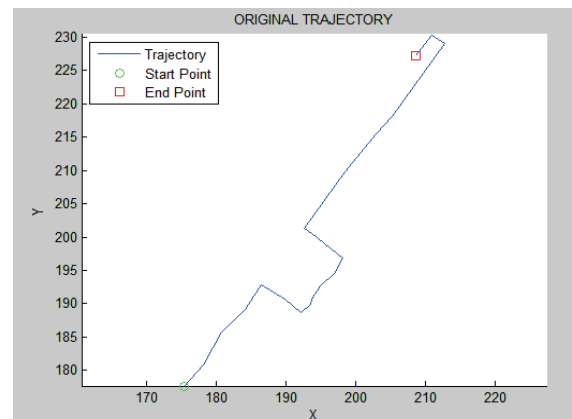


Figure 2: Original Trajectory

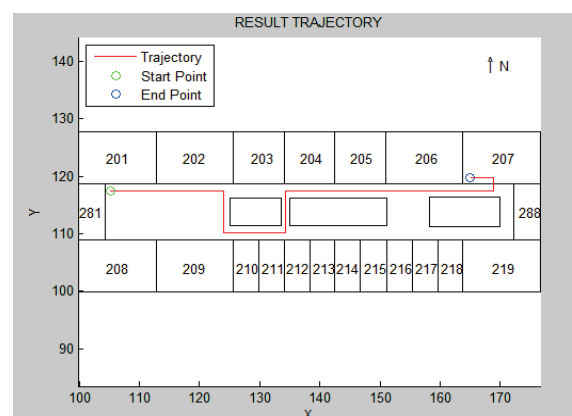


Figure 3: Result Trajectory