Indoor Map Screening and Route Finding on a Smartphone

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What it is all about?
Indoor navigation solutions relay today on two things:
1) Approximating current user’s location using local WiFi accelerometer data.
2) Predefined location maps available in the system.
The focus of this project: Generating indoor navigation maps, allowing quick and efficient route finding using those maps

Product Objective
To design and develop prototype mobile system that allows its users the following:
• Indoor navigation in form of route planning, between current location and any given point of interest.
• Display the map of current indoor location.
• Import new location maps by scanning a blueprint or a map of a building.

System Overview

Input
• Binary color conversion
• Noise reduction

Bounding contours
• Tessellation

Mesh Generator
• Input: Map’s image
• Binary color conversion
• Noise reduction
• Calculate bounding contours
• Tessellation (Delaunay triangulation)
• Remove obstacle polygons
• Output: Polygon mesh

Pathfinding Algorithm
• Input: Polygon mesh
• Generate poly-path (Weighted A*)
• Generate point-path (Funnel algorithm)
• Output: Point list

Logic (How it works?)

What about blueprints?
It works exactly the same for blueprints …

What is it good for?
• Using existing data to generate navigation maps.
• Fast mapping of entire cities from already available blueprints.
• Integration with existing navigation solutions.
• Solving Sunday’s paper mazes …