Jaan Tollander de Balsch Aapo Haavisto Antti Karkinen
Misamatti Koistinen Lauri Seppäläinen Juhani Sipilä Markus Tyrkkö

3 + 4 DUDES

Image-based Indoor Localization

PROBLEM

- Global Positioning System (GPS) is the most common technology for locating a user or object in outdoor areas
- In indoor environments GPS usually performs inaccurately and unreliably due to obstructed line of sight to satellites
- Many solutions for indoor localization are either too inaccurate or require an expensive infrastructure to be installed in the environment

OUR SOLUTION

Left: Original photograph, Right: Generated 3D-model

- Purely image-based system for indoor localization, which doesn't require any additional hardware to be installed
- Whole process is based on matching similar details in different pictures and calculating the change in camera positions between two images
- After initial 3D-model is created from at least hundreds of images, new user-sent photos can be compared and added to existing model
- Comparing new images gives not only their location in 3D-space, but also their current facing direction, which makes our solution unique

PROCESS

Gather pictures/videos of a space → Produce a point-cloud from images → Generate 3D-model → Locate new pictures → Update 3D-model → Augment results with AR elements

COMPARISON TO OTHER TECHNOLOGIES

Name	Accuracy	Infrastructure	Maintenance	Power Source	Other
Wi-Fi Triangulation	5 - 30 m	Usually existing	Remapping	Device battery + AC	Relies on existing infrastructure
Bluetooth Beacons	2 - 30 m	Hardware installation, Device management	Remapping	Device battery + AC	–
Magnetic Field Measurement	2 m	API + Initial magnetic mapping	Crowdsourced	Device battery	–
Pedestrian Dead Reckoning	Varies	None	Crowdsourced	Device battery	No additional devices / services needed
Point-Cloud From Images	5 m	API + Initial photoshoot	Crowdsourced	Device battery	Creates 3D model to be used with AR etc.