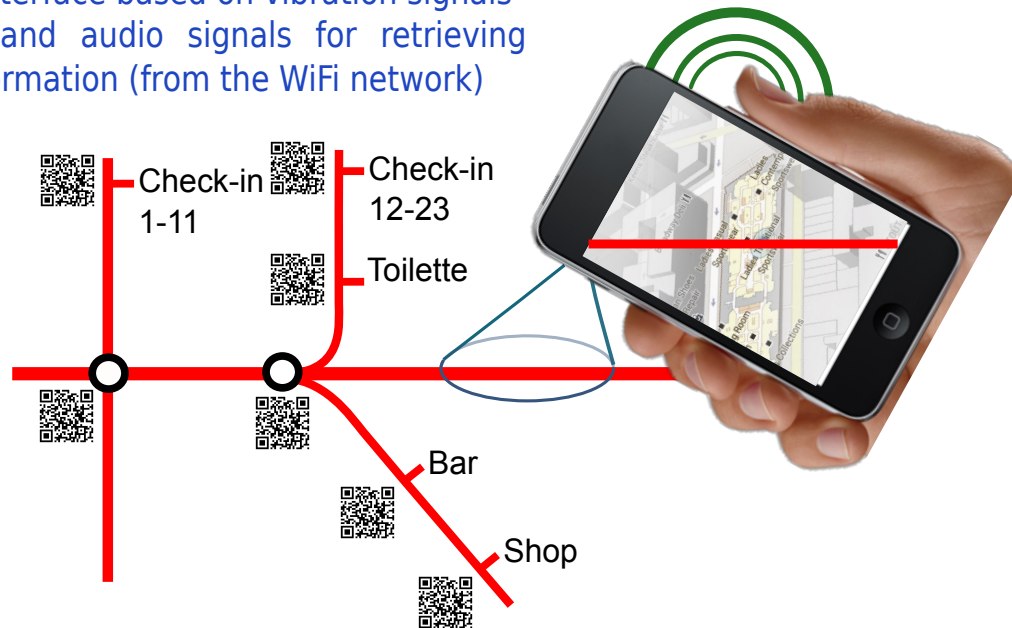## The haptic user interface

- Tactile interface based on vibration signals
- On demand audio signals for retrieving path information (from the WiFi network)

Check-in 1-11

Check-in 12-23

Toilette

Bar

Shop

UNIVERSITÀ DEGLI STUDI DI PALERMO

LINEE*

Following the line with your smartphone

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Low impact on hearing

Visually impaired people use hearing to catch information on the near environment. Most assistive navigation tools exploit vocal instructions to inform the traveler about his position and the near environment in a simple form or using virtual acoustic displays, and verbal commands issued by a synthetic speech display. Audio instructions from a piloting device can be perceived as an extra load on an already overloaded sense.

LINEE in brief

System characteristics:
- real-time navigation
- obstacle and hazards avoidance
- haptic human-machine interface
- low weight and pocket-size portability
- low-cost solution

Requirements:
- no dedicated infrastructure
- minimal (or zero) training
- off-the-shelf touch-screen phones

What's next:
- invisible (infra-red) lines!

*LINEE stands for *Line Identification and Navigation for Environment Exploration*. *Linee* is the Italian translation of "lines".

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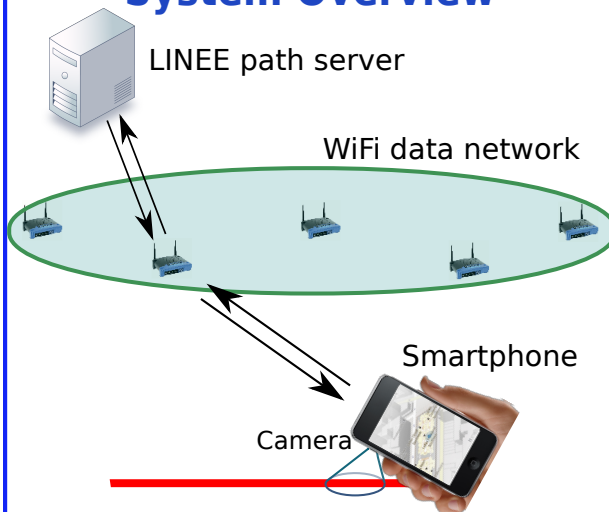
Email: pierluigi.gallo@unipa.it

Scenario

Points of Interest

Line junction
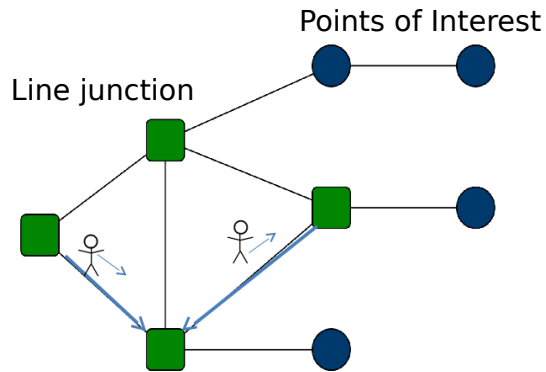
- Navigation is possible along pre-established paths
- The paths are build connecting diramation nodes & points of interest

System Overview

LINEE path server

WiFi data network

Smartphone

Camera

- Path reader integrated into the phone
- WiFi network for disseminating path information
- Smartphone for user interface

Path Recognition

- Camera recognizes the path
- Filters are used to distinguish colors, lines, shapes, etc.
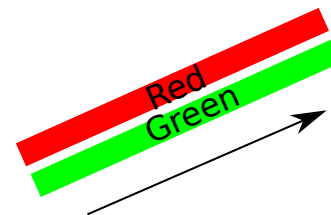
Path coding

The path can be identified with:
- Different colors
- Specific signs along the path
- QR codes on line junctions and points of interest

Path information can be easily modified on the LINEE path server. The updates are sent to the user dynamically through the WiFi network.

Example 1: color codes

Red
Green

R G   Direct path

G R   Reverse path

Example 2: bar codes

The bar code may contain information on the path, the location (positioning), the direction, etc.