A multidimensional model for personalised landmarks
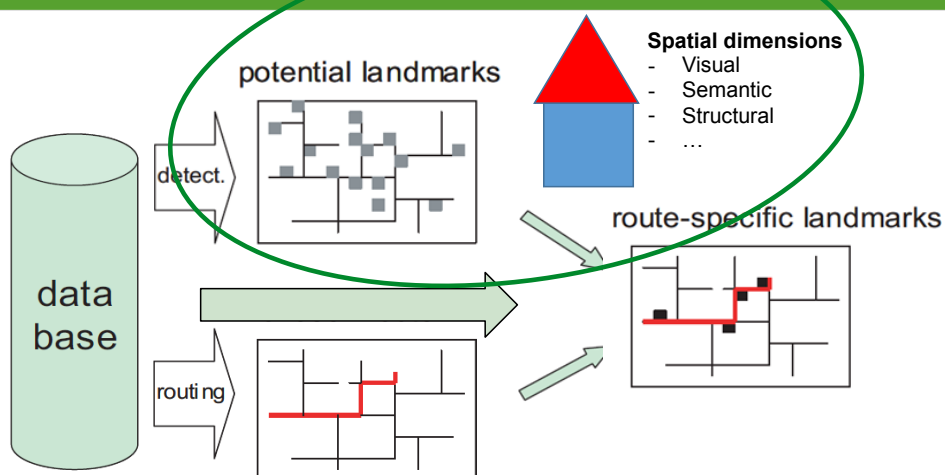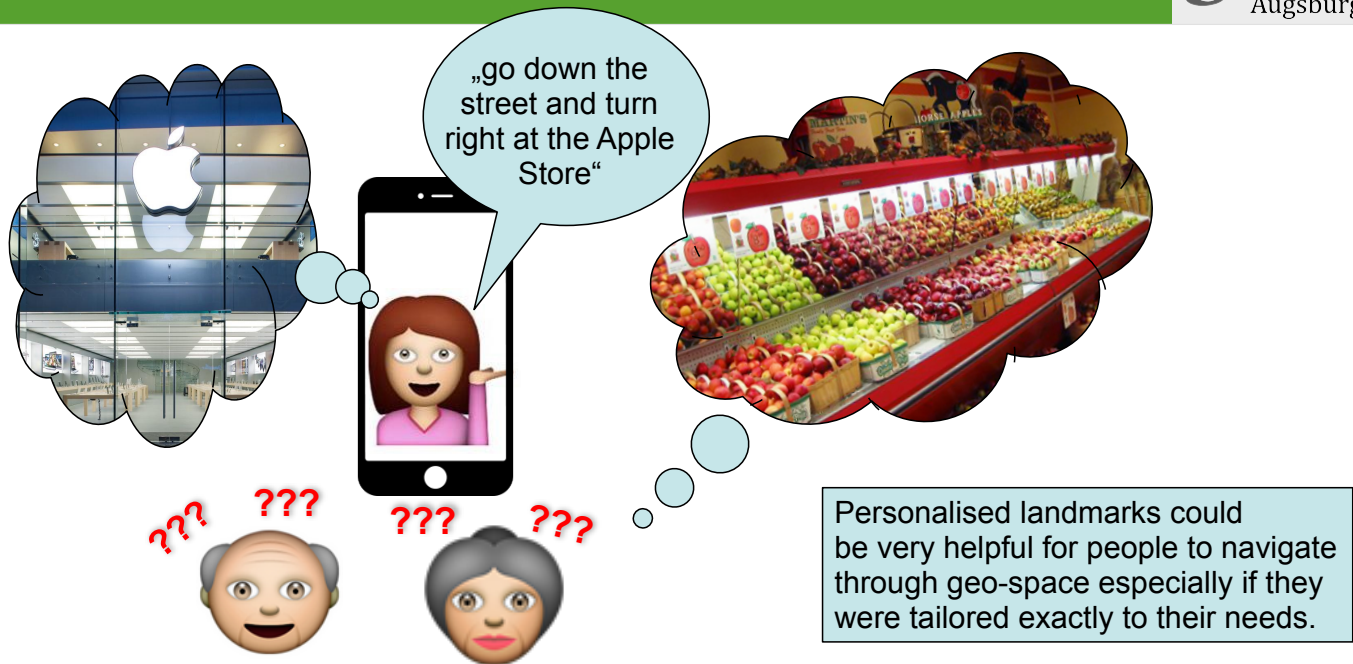
Eva Nuhn and *Sabine Timpf*

University of Augsburg

Current landmark research

potential landmarks

Spatial dimensions
- Visual
- Semantic
- Structural
- …

route-specific landmarks

data base

detect.

routing

- No considerations of **the personal dimension of landmarks**
- No investigation of the **integration of landmark information** directly **into the routing algorithm**

Elias, 2003: Determination of Landmarks and Reliability Criteria for Landmarks

Why should we consider personalised landmarks?

- Kevin Lynch (1960):
  Landmarks are salient features of the environment that give orientation clues and make the environment *more legible*.

- Presson and Montello (1988):
  A landmark may be any object in the environment that is easily recognisable or of personal importance, as long as its primary property is that of a *point of reference*.

- Sorrows and Hirtle (1999):
  "Landmarks are geographic objects of outstanding visual, cultural or structural *properties*"

- Richter and Winter (2014)
  "being a landmark is a role that objects from any category can play" - "landmarks are *mental constructs*"
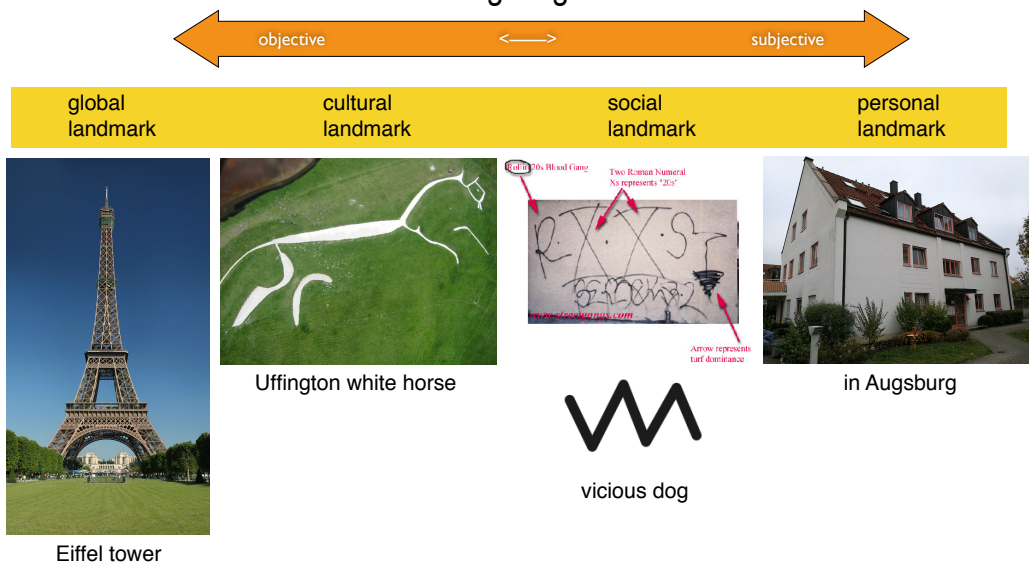
A personal view on landmarks

- viewpoint of a single person

- relation between
  - person
  - geo-spatial object
  - environment
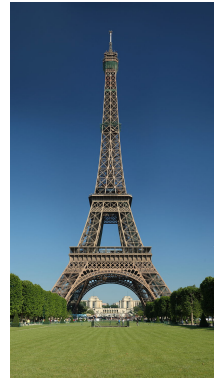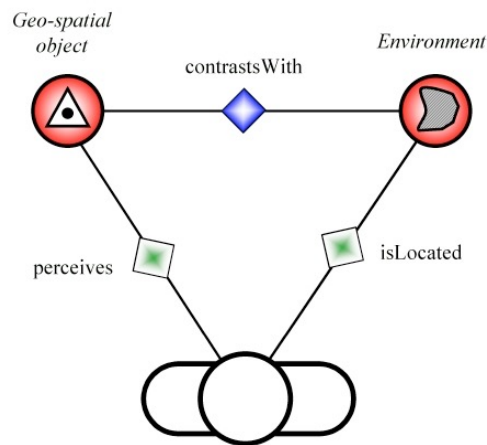
Caduff, D. and Timpf, S. (2008): On the assessment of landmark salience for human navigation. Cognitive Processing 9(4): 249-267.

Landmarks for navigating

- a continuum of landmarks in the context of navigating

| objective | <——> | subjective |

| global landmark | cultural landmark | social landmark | personal landmark |

Uffington white horse

vicious dog

in Augsburg

Eiffel tower

Are these different types of landmarks equally usable for navigation?

- differently depending on motivation:
  - goal-directed <-> explorative
  - active <-> passive

method \ motivation	goal-directed navigation		exploratory navigation
	known environment	unknown environment	
Piloting	x	x	x
Homing	x		x
Chunking	x		(x)
Using a template	(x)	x	x
Trail following	x	x	x
Habitual locomotion	x		
Cognitve map	x	x	x

Würth, R. and Timpf, S. "Ein Navigationsassistent für Fußgänger in der Stadt aufbauend auf den Strukturelementen von Kevin Lynch." Angewandte Geographische Informationsverarbeitung XVIII, Salzburg, 2006.

knowledge in the head

matching ?

knowledge in the world

knowledge in the pocket
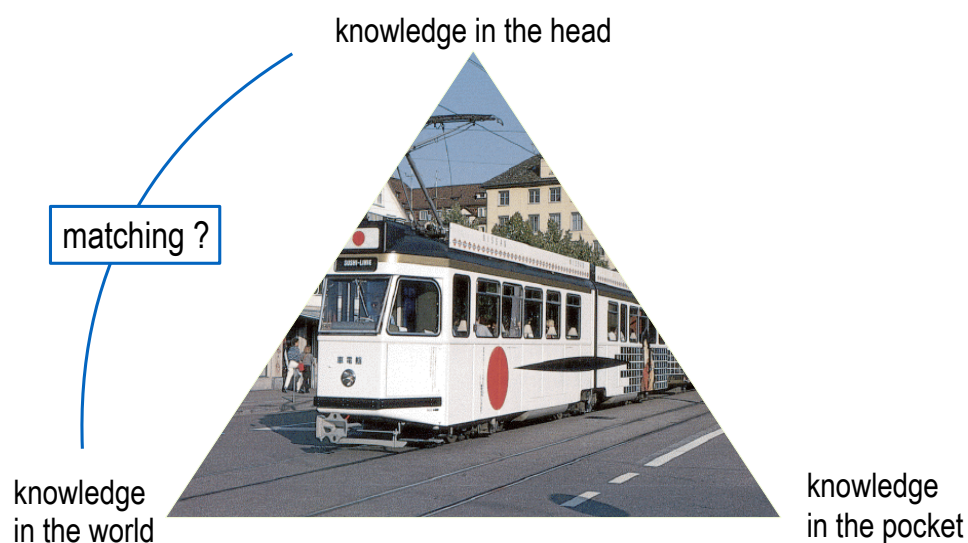
Timpf, S. "Wayfinding with mobile devices – decision support for the mobile citizen". In: S. Rana and J. Sharma (Editors), Frontiers in GI-Technology. Springer Verlag, 2005.
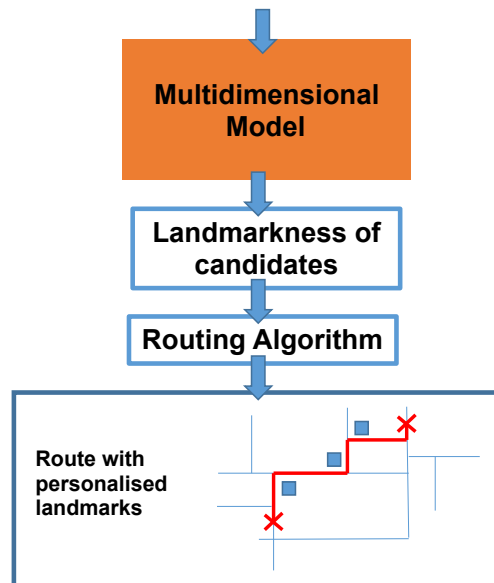
- Personal dimensions

  - User's background (Gender, age, place of birth, education)

  - User's interests (e.g. arts, theater, ….)

  - User's goals (reaching a familiar destination, reaching a novel destination, exploratory travel)

  - User's knowledge (survey, route, landmark)

  - … ?

Spatial Dimensions
- Visual
- Semantic
- Structural
- …

Selected start and destination
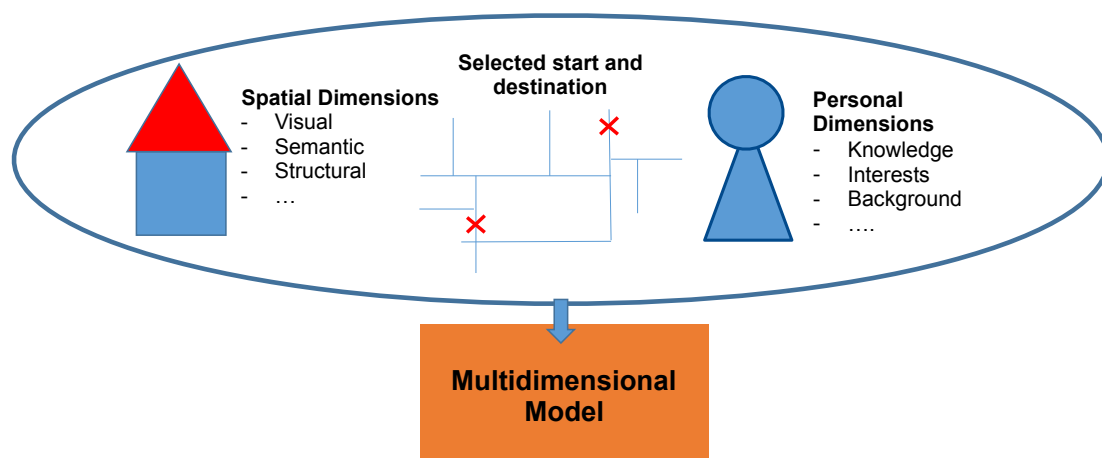
Personal Dimensions
- Knowledge
- Interests
- Background
- ….

Multidimensional Model

- assumption: personalised landmarks are needed (and wanted)

- multi-dimensional model to provide all known dimensions of landmarks (physical, social, cultural, personal, …) -> formal model of landmarks

- investigating when and how landmarks should be incorporated into the computation of the route

- future work:
  - identify all personal dimensions and how to measure them
  - case studies including data gathering (interviews, questionnaires …)
  - determine the sensibility of computing a route with or without personal dimensions