

Situational Context and Navigational Assistance

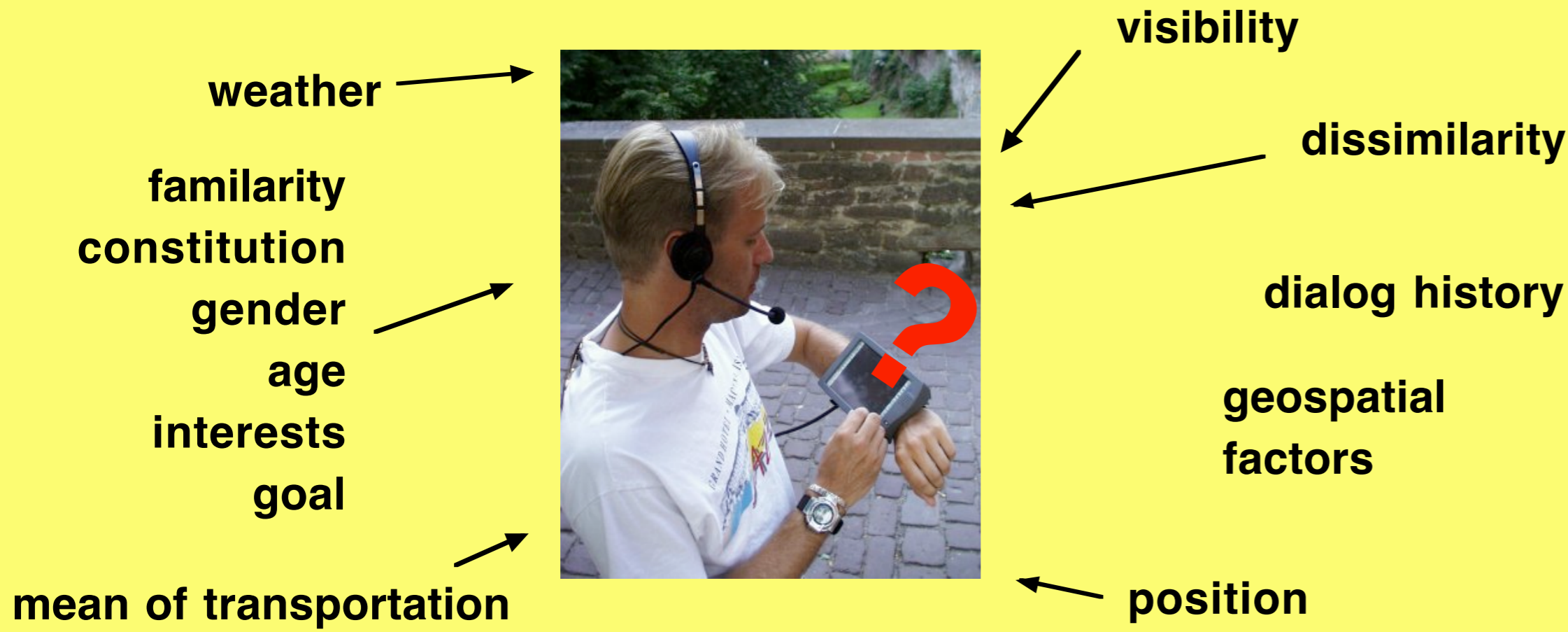
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Motivation

- situational context impacts spatial reasoning
- mobile systems are especially affected
- spatial and non-spatial factors have to be integrated

Scenario

navigational assistance in a mobile setting, e.g., guidance, localization, identification, information



MAUT Multiattribute Utility Theory

- an evaluation scheme from decision analysis (Keenley/Raiffa: *Decisions with Multiple Objectives*. Wiley&Sons,1976.)
- MAUT has been succesfully applied to various problems, including user modeling and GIS decision support.
- an evaluation function $v(x)$ assigns a value to each object x , which consists of a weighted sum over value dimensions i

$$v(x) = \prod_{i=1}^n w_i v_i(x)$$

- each evaluation function $v_i(x)$ can again consist of a weighted sum but over relevant attributes a :

$$v_i(x) = \prod_{a \in A_i} w_{ai} v_{ai}(l(a))$$

where w_a =attribute weight, $l(a)$ =attribute level, $v_a()$ =mapping of $l(a)$ to evaluation

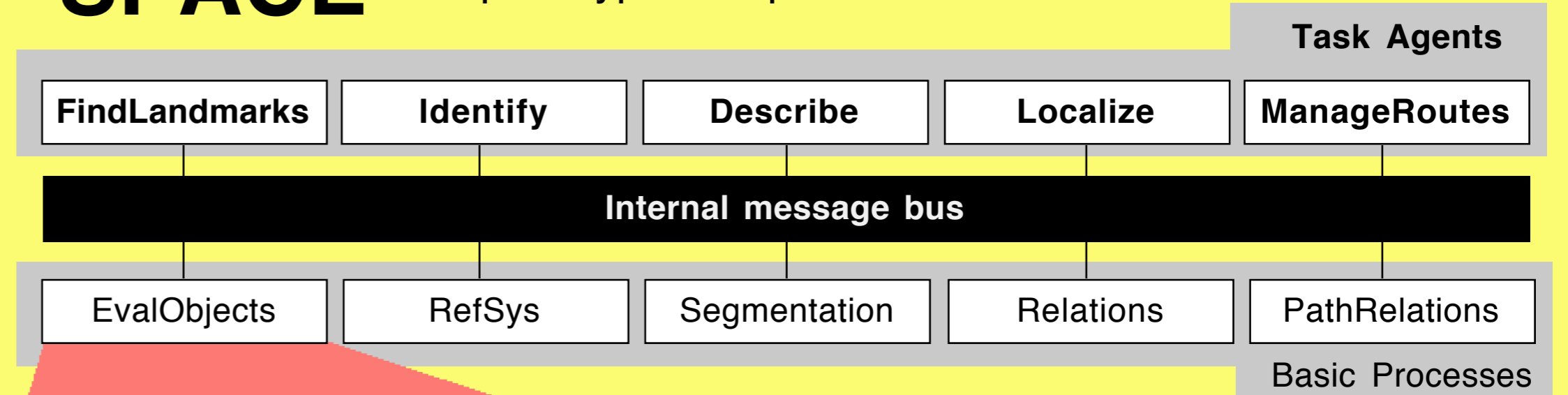
- approach: introduce weight function dependent on *task*

Challenges

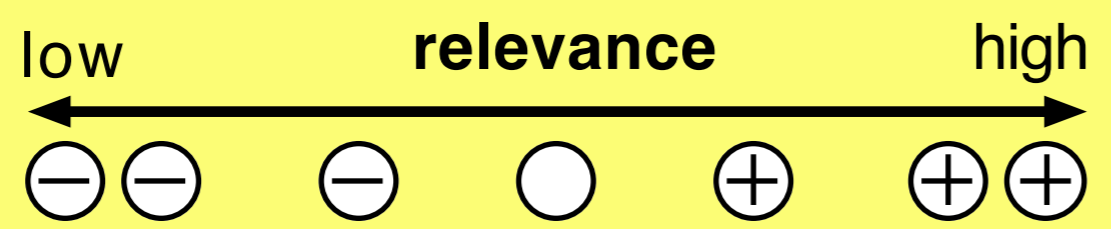
- determination of relevant dimensions
- determination of weights
- measurability of attributes/factors
- handling of missing information
- multiple influence of single attributes

SPACE

a prototypical implementation



Attributes



		low	high	Find landmarks	Get more information	Identify object	Segmentation	Relations	Path Relations
Dissimilarity	Color								
	Size								
	Texture								
	Height								
	Available Info.			++	○	○			
User Model	Same Obj. type			○	+	++			
	Constitution						+		
	Age						+		
	Familiarity						+		
	Gender								
Context	Interests								
	Goal								
	Granularity						+		
Dialog History	Weather						+		
	Transportation						++		
Geospatial	Prementioned			--	++	-			
	Last mentioned								
	Containment			++	○	○			
	Direct visibility			--	+	++			
	Closeness			--	+	+			
	Closen. Route			--	○	+			
	Relative Size								
	Angle							++	
	Distance							++	
	Angular Change						+		++
	Distal Change					+		++	