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On the Local to Global Language Transition

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Outline

- Languages and Information Age
- Human Language Technology
- Emerging Technologies
 - Ubiquitous Computing
 - ASR in Ubiquitous Computing
 - Multilingual Speech Recognition
- Funding for Research in Local Languages
- Global Collaboration Opportunities
- Proposals

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Languages and Information Age

- Challenge for *any* language in the information age:

NATURAL INTERACTIVITY

- Natural interactivity issues:
 - human-machine communication becomes as natural as human-human communication
 - combination of modalities in communication (speech, gesture, text, graphics, facial expression, etc.)
 - system-mediated human-human interaction can include group of users

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Languages and Information Age

- Possible division of languages in the information age:
 - **Local languages:**
human language technology (HLT) to support the natural interactivity does not exist, therefore, use of the language could become restricted
 - **Global languages:**
the HLT supports an unrestricted natural interactivity and use of the language

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Human Language Technology

- Multidisciplinary research in computer science, linguistics, engineering, psychology, etc., addressing:
 - Spoken Language Input
 - Written Language Input
 - Language Analysis and Understanding
 - Language Generation
 - Spoken Output Technologies
 - Discourse and Dialogue
 - Document Processing
 - Multilinguality
 - Multimodality
 - Transmission and Storage
 - Mathematical Methods
 - Language Resources
 - Evaluation

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Human Language Technology

- HLT overview:

<http://cslu.cse.ogi.edu/HLTsurvey/HLTsurvey.html>

- Some major recent and future HLT conferences:

<http://www.icslp2000.org/>

<http://www.hlt2001.org/>

<http://eurospeech2001.org/>

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Ubiquitous Computing

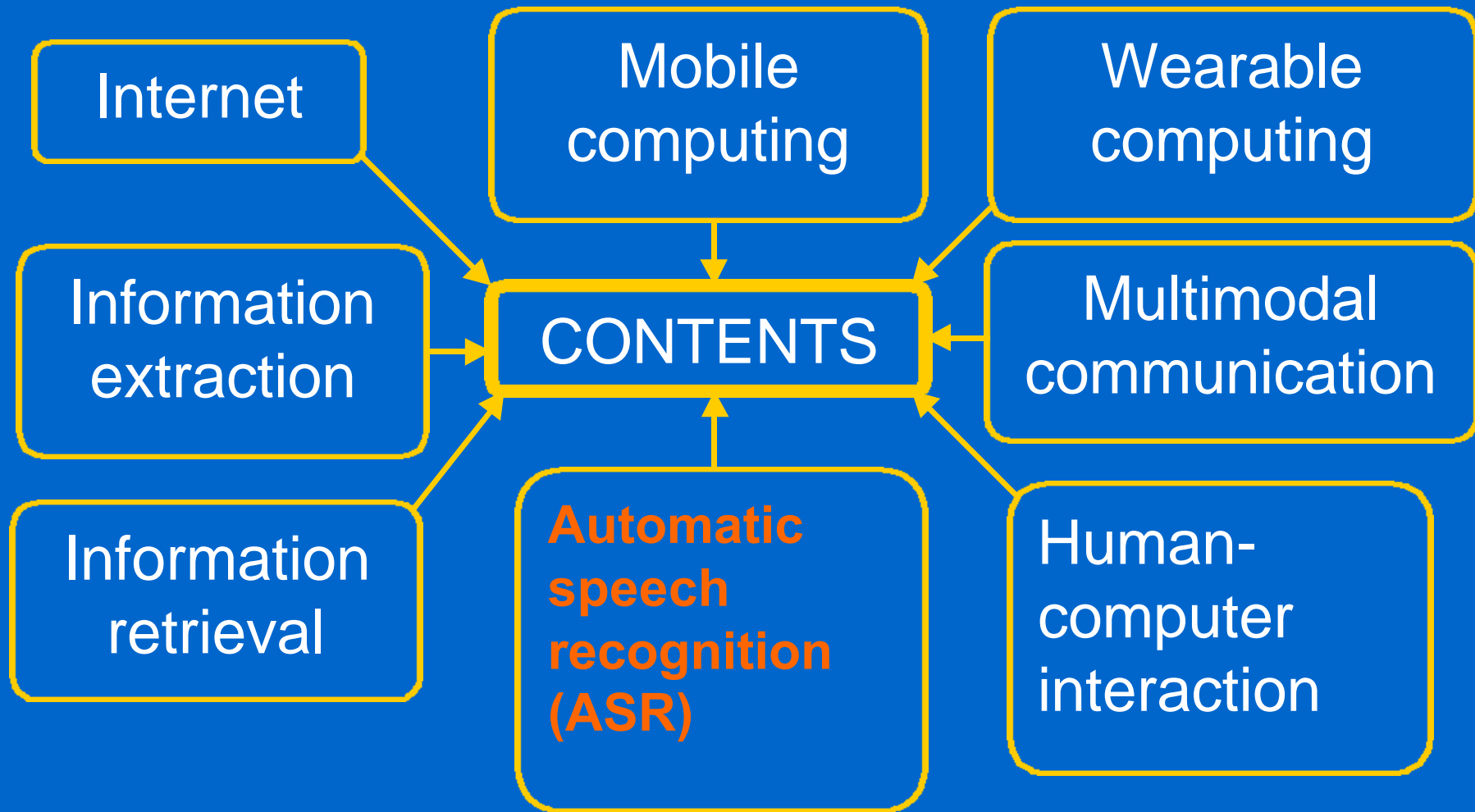
- Emergent research in ubiquitous, pervasive, invisible and wearable computing focuses on:
 - applications of ubiquitous computing in everyday environments (home, office, mobile) or more task-focused domains (maintenance, repair)
 - interaction styles, including both input (recognition-based pen, voice) and output (ambient displays)

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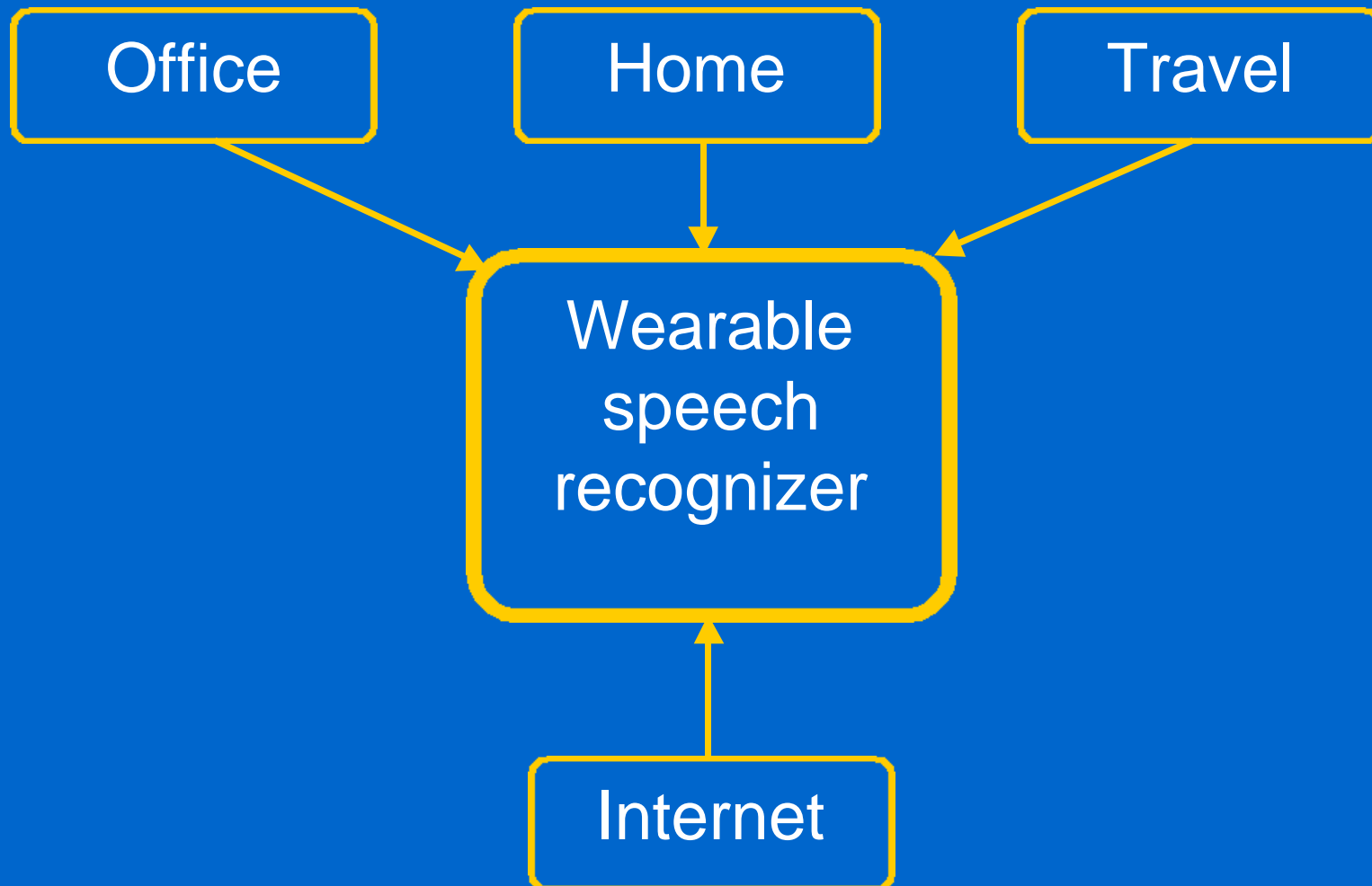
Ubiquitous Computing

- information appliances (mobile, handheld, wireless and wearable technologies and devices)
- intelligent, aware or attentive environments
- context-aware computing
- sensing devices and techniques
- social implications including evaluation and other non-technology specific aspects of ubiquitous computing

Ubiquitous Computing



ASR in Ubiquitous Computing



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ASR in Ubiquitous Computing

- General ASR challenges:
 - the lack of **complete** structural representations of speech (speaker (voice quality, gender, dialect), speaking style (stress, emotion), task (dictation, spontaneous speech), context)
 - **additional** acoustic variation in speech (channel distortion, noise (cocktail party effect, background noise, reverberations), echoes, dropouts, microphone (distortion, directional characteristics))

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ASR in Ubiquitous Computing

- Specific ASR challenges related to the local languages:
 - **resources** (eg., the lack of appropriate spoken language and/or multimodal databases)
 - **insufficient research** in the local languages

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Multilingual Speech Recognition

- Promising recent research avenue relevant to **any** language, addressed at the CLSP/JHU NSF Workshop:

Toward Language-Independent Acoustic Modeling

<http://www.clsp.jhu.edu/ws99/projects/asr/>

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Multilingual Speech Recognition

- Language independent phones:
to minimize the target language resource requirements
- Primary goal:
establish monolingual baselines
 - train on English, Spanish, Mandarin,
and Russian
 - evaluate on Czech

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Multilingual Speech Recognition

- Secondary goal:
 - minimize the target language training data
(Is it possible to combine models for a target language without training data for that language?)
 - use a priori information about the proximity of languages
 - combine phones based on similarities/confusions in source languages

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Multilingual Speech Recognition

- Lessons learned (on how to get acceptable speech recognition performance without access to the target language training data):
 - **proximity** of target language to the source languages is very important
 - **separation** of systematic channel variations and the language-dependent factors

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Multilingual Speech Recognition

- Future directions:
 - study of language-dependent effects on a controlled database
 - characterization of the acoustic proximity of languages
 - impact of channel independent features and acoustic model representations

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Funding for Research in Local Languages

- HLTcentral query, <http://www.hltcentral.org/> :
Explicit Funding towards Minority Languages?
 - **DART**, Wider Dissemination and Application of Terminological Research in Minority Languages in the Area of New Technologies, 01/00, 12 months
 - **MELIN**, Minority European Languages Information Network, 01/98, 15 months
 - **SPEECHDAT**, Speech Databases for Creation of Voice Driven Teleservices, 03/96, 34 months

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Funding for Research in Local Languages

- HLTcentral query, <http://www.hltcentral.org/> :
Explicit Funding towards Minority Languages?
 - few HLT projects address minority languages explicitly
 - negotiated duration is among the shortest within the pool of approved projects
 - why this should be?

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Funding for Research in Local Languages

- HLTcentral query, <http://www.hltcentral.org/> :
Explicit Funding towards Minority Languages?

Funds are primarily awarded to

- projects aiming towards **market applications** having the potential of high economic impact
- consortia including partners having **substantial** research potential and abundance of resources, including established systems integrators with a large background pool of potential users

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Funding for Research in Local Languages

- Alternative funding for local languages
 - the Soros Foundations Network
<http://www.soros.org/>
 - the Volkswagen Foundation
<http://www.volkswagen-stiftung.de/english/basicinf.htm>
 - the Hewlett-Packard Europe Philanthropy programme
<http://hplbwww2.hpl.hp.com/egp/index.html>

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Global Collaboration Opportunities

- International Speech Communication Association (ISCA) initiated activities through the **Special Interest Groups** (ISCA SIGs)

<http://www.isca-speech.org/sig.html>

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Global Collaboration Opportunities

- ISCA SALTMIL SIG:
Speech And Language Technology for Minority Languages
 - <http://isl.ntftex.uni-lj.si/SALTMIL/>
 - **Discussion list** at <http://www.egroups.com/group/saltmil>
- ISCA EduSIG:
Education in the field of speech communication

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Proposals

Possible action lines for the local languages:

- to **collaborate** in education and research
- to initiate joint research projects considering the **proximity** of languages
- to focus on research issues related to the **portability** of Human Language Technologies
- to initiate a new **Journal on Local Languages**
- to actively **promote** the local languages issues