MAPPING SPEECH RESEARCH IN HCI: TRENDS, THEMES AND CHALLENGES

LEIGH CLARK
UNIVERSITY COLLEGE DUBLIN

@lmhclark
@cogsis
@hci_ucd

The CogSIS Project
UPCOMING EVENTS

Mapping theoretical and methodological perspectives for understanding speech interface interactions

CHI 2019 part-day workshop: 4th May; Glasgow, UK

http://speech-interaction.org/chi2019/

CUI 2019: Conversational User Interfaces conference

22nd-23rd August 2019; Dublin, Ireland

cui2019.com
Total US Adult Population: 252 MILLION

- May 2018: 54.4 MILLION
- Jan 2018: 47.3 MILLION

Smart Speaker Reach: September 2018
57.8 MILLION

Source: Voicebot Voice Assistant Consumer Adoption Report 2018
AmazonBasics Microwave
Voice-controlled microwave

MAP OUT:

PUBLICATION TRENDS
RESEARCH METHODS
RESEARCH THEMES
speech interface; voice user interface; voice system; human computer dialog*; human machine dialog*; natural language dialog* system; natural language interface; conversational interface; conversational agent; conversational system; conversational dialog* system; automated dialog* system; interactive voice response system; spoken dialog* system; spoken human machine interaction; human system dialog*; intelligent personal assistant
INCLUSION/EXCLUSION CRITERIA

**INCLUDE**
- Speech focused
- Full conference / journal papers
- English

**EXCLUDE**
- Embodiment
- No interaction evaluation
- Non-full / non-peer reviewed

1181 → 68
RESEARCH METHODS
DIRECTION OF COMMUNICATION

User-system dialogue (44)
User input only (16)
System output only (12)
## CONCEPTS MEASURED

<table>
<thead>
<tr>
<th>Concept</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>User attitudes</td>
<td>36</td>
</tr>
<tr>
<td>Task performance</td>
<td>33</td>
</tr>
<tr>
<td>Lexis &amp; syntax</td>
<td>20</td>
</tr>
<tr>
<td>Perceived usability</td>
<td>18</td>
</tr>
<tr>
<td>System usage</td>
<td>15</td>
</tr>
<tr>
<td>User recall</td>
<td>7</td>
</tr>
<tr>
<td>Physiological data</td>
<td>3</td>
</tr>
<tr>
<td>Other</td>
<td>11</td>
</tr>
</tbody>
</table>
RESEARCH THEMES
SYSTEM SPEECH PRODUCTION

Synthesis

Content
MODALITY COMPARISON

Keyboard and/or mouse

Digital pen
USER SPEECH PRODUCTION

General production

Addressee identification

Alignment
ASSISTIVE TECHNOLOGY & ACCESSIBILITY

Tabletop designs - physicians, deaf patients & interpreters

Mobile interface - limited hand dexterity

Voiced-based browser plugin - blind users
Early design insight - speech to access GUI-based software

Interface for a large-scale game
IPA EXPERIENCE

Disparity between people’s mental models of IPAs & reality of interaction

Human likeness can negatively affect IUX

Embarrassment of public use

Structure of multiple user interaction w/ Siri
CHALLENGES & ONGOING RESEARCH
MORE THEORETICAL UNDERSTANDING FOR:

1. LANGUAGE PRODUCTION TO SYSTEMS
2. PERCEPTION OF SYSTEMS
3. DESIGN IN LIGHT OF THESE
Proliferation of humanlike voices in non-human artefacts can create unrealistic expectations of capabilities

POLITENESS & FACE

Politeness linked to concept of face (Goffman, 1952; 1967)

Social self-image dependent on societal norms and rules

Usually best interest to save face
Politeness Example

No politeness

Connect... Give each piece a twist...
Attach... ...so it’s in line with the feet
Locate... ...so the end is closest to the top of the body

Politeness

Just connect..... Just give each piece a little bit of a twist...
Basically, attach.... ...so it’s more or less in line with the feet
Now just locate.... ...the end should be closest to the top of the body
How similar is appropriate?

“I don’t care if she is a tape dispenser. I love her.”
KEY POINTS

1. Speech HCI fragmented

2. More theoretical development/application can help improve cohesion in the field

3. Theories can help explain & understand, but can also be redefined and re-conceptualised in HCI

4. Current work at HCI @ UCD looking at UCD looking design choices affecting partners models, language production, user perception; humanlike ≠ always good aim


