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# One-way translation: an opportunity for NLG and MT research to interact

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# Overview

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- Introduction
  - The approach of Nigel Ward
  - Extensions & variations
  - General questions
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# Introduction:

## Research Context I

**Nigel Ward** (\*'01,'03): criticized research agendas:

1. too **idealistic**: perfect translation, open domain
2. too **incremental**: stepwise improvements
3. unfocused

His proposal: “**One-way translation**”

- mobile device that **aids cross-lingual human-human communication**
- focus on **usability**
- domain-specific



# Introduction:

## Research Context II

**Alex Waibel ('07):**

- **support** human-human interaction:
  - “**C**omputers in the **H**uman **I**nteraction **L**oop” (CHIL)
- humans overwhelmed by technological complexity:  
flexibility of choice vs easy of use
- application scenarios:
  - **assistant-like services:** logistical support (phone call), reminders (names of attendees at meeting)
  - focus on **multi-party communication** (meetings)
  - **cross-lingual communication**



# Introduction:

## Research Context II cont.

### **Alex Waibel ('07):**

- projects: CALO (DARPA), CHIL, AMI (FP6)
- **recognition** challenges **dominate**:
  - person tracking and identification
  - head pose, focus of attention
  - activity analysis, e.g. action items
  - ASR: spontaneous, accented, 'specialized' speech
- **idealistic**: goals such as translating lectures



# The approach of Ward

## One-way translation

- partial automation of translation
- only **generate** (speech), **no recognition**
- **user** provides the **input**, and much more:
  - interpretation of operators' utterance
  - turn taking
  - producing smiles and gestures
- limited, task-orientated domains: airports, train-stations, restaurants, hotels
- mobile device



# Ex. One-way translation (P&W '01)

[train station in Mahale]

1. **User:** selects utterance on screen

“Hello. I do not speak Rutungu, so I will talk through this interpreting device. Is this OK?”

2. **Ticket Agent:** ... looking confused ...

3. **User:** shows map and circles city

“Thank you. I would like a round trip ticket to here.”

4. **Ticket Agent:** checks schedule and says something

5. **User:** “I’m sorry, my machine can only translate one way. Is a ticket available?”



# Ex. One-way translation (P&W '01)

6. **Ticket Agent:** ... looking confused ... then has an idea and makes puffing motion.
7. **User:** clicks through menus, then launches:  
“No-smoking, if available, please.”
8. **Ticket Agent:** says something else which user ignores. Agent comes back with ticket and points to the price.
9. **User:** pays and launches  
“Which platform does the train leave from?”
10. **Ticket Agent:** says sth and makes gesture



# Ex. One-way translation (P&W '01)

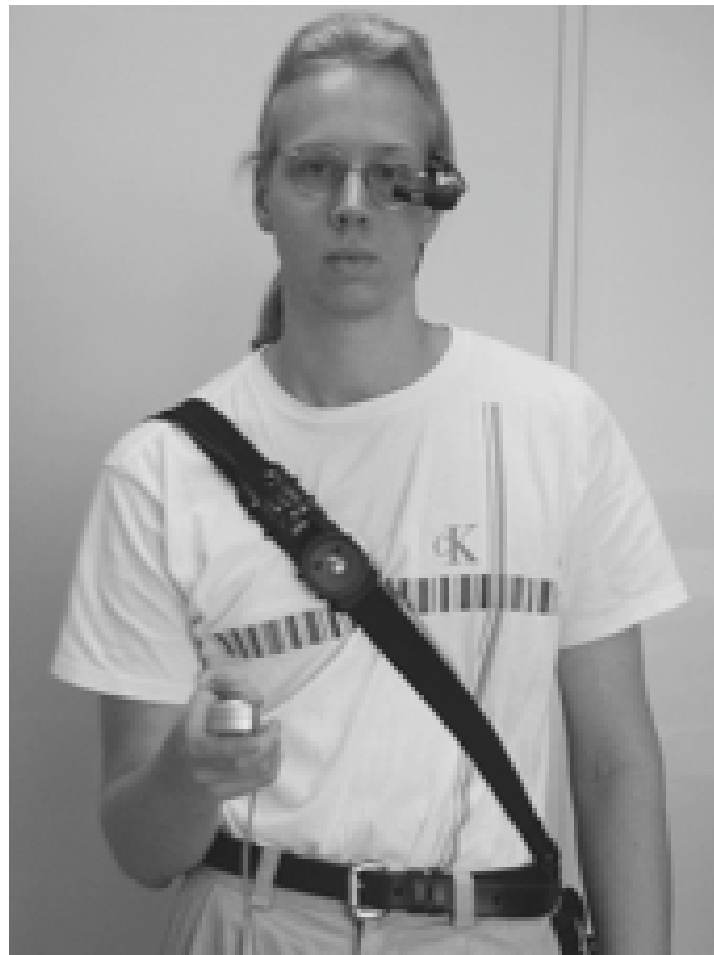
11. **User:** “Could you please write that down for me?”
12. **Ticket Agent:** scribbles number 6 on ticket
13. **User:** smiles her thanks and launches  
“Thank you very much.”
14. **User:** has some time to spare and goes to noodle stand ... [starts another conversation]



# The approach of Ward

## One-way translation

- **Face-to-face conversation:** head-mounted display allows users to **look at each other**



(P&W '01)



# The approach of Ward

## One-way translation

- Head-mounted display shows options:



(P&W '01)

- mouse used to select option



# Comments on Ward's One-way translation

1. focus on the **output** ('NLG' and 'MT'):  
combines *aspects* of several research fields:  
NLG, MT, dialog, speech processing, HCI
2. **limits** the requirements for **recognition**:
  - takes advantage of user's recognition capabilities
  - requires limited resources: only TTS, not ASR



# Comments on Ward's One-way translation

3. implements ideas of CHIL:
  - *supports* human-human conversation
  - *aids* cross-lingual communication
4. takes **HCI** issues seriously
5. starts with limited, but extensible domain



# Comments on Ward's One-way translation

## Open issues:

- relies on **user's recognition capabilities**: may be limited
  - need to ask good questions (dialog strategies),
  - how to grow with user's capabilities?
- number of **output options** limited
- task-based dialogs, but **no dialog model**
- **HCI** issues:
  - misconception: machine does not understand
  - head-mounted display may look strange
  - refusal to communicate via this device



# Extensions & Variations

- **HCI** design:
  - no head-mounted display but
  - **tablet**-like device that **displays more options**  
(looks less scary but user needs to look down)
- **Co-generation** of user options and target language:
  1. *generate* user options (NLG)
  2. *generate* translations (MT, simultaneously)  
(... user selects in source language ...)



# Extensions & Variations

- Constraint-based view of the generation process:

**Input** to generator/MT **underconstrained**:

1. user choice
2. dialog context, task model
3. limited recognition technologies (optional)

➔ **overgeneration-and-ranking** (Langkilde & Knight; Varges; White)

- **Corpora:**

- no corpora for one-way translation
- static corpora vs **online learning**



# General Questions

## 1. One-way translation:

- do you think it might work?
- domains? beyond task-driven dialog?
- potential use of MT, NLG (corpus-based or not)?

## 2. What other CHIL-style applications have been tried?

## 3. Mobile Speech-to-Speech MT systems:

- BBN 2007 (Stallard et al): 'displayless',  
BLEU 0.31-0.62: sufficient for communication?



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