Natural Language Generation for Public-Space Social Robots

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Face-to-face conversation with socially intelligent robots
Features of face-to-face dialogue

1. Unrestricted **verbal** expression
2. Meaningful **non-verbal** acts such as gestures and facial displays
3. Instantaneous **collaboration** between speaker and listener

“Unrestricted” verbal expression?

Language **input**
Cloud-based ASR is promising (Google, Nuance, etc) but still error prone in public spaces

Language **output**
Most systems use either fully canned text or templates
E.g., proceedings of HRI 2017 – only one paper reported using any other technique for output generation

Case in point: Olly the Robot

https://www.thedatalab.com/case-studies/emotech-olly-the-robot

“Emotech, a company that specialises in AI technology, wanted to develop the world’s first robot with personality - one which can identify specific users and then cater for their individual preferences and needs - even going as far as anticipating them.”

Detailed description of all components of the system:

User > Speech > ASR > NLU > DM > NLG > TTS > User

“The next step is Natural Language Generation (NLG), and currently this is template-based.”
Natural Language Generation (NLG)

Sub-area of computational linguistics that deals with the automated production of high-quality spoken or written content in human languages

NLG for dialogue systems receiving increasing attention – Siri, Alexa, chatbots, etc

Recent special session at SIGDIAL: https://sites.google.com/view/nlg4ds2017

Emphasis on generating descriptions of options (restaurants, bus routes, etc) in context

Neural models + large corpora contribute to new research techniques for NLG

Proceedings of last year’s INLG conference: https://eventos.citius.usc.es/inlg2017/

Still not widely used outside academic settings due to difficulty of controlling output
NLG in Social Robotics: Opportunities and Challenges

Benefits of NLG over templates/canned text
- Flexibility in the long term
- Ability to use in multiple languages
- (Potentially) higher-quality output (or at least less repetitive)

Challenges
- Short-term higher development cost
- Lack of generally usable NLG resources (this is changing, but still not off-the-shelf)
- Lack of knowledge of potential benefits
Fluent social interaction (The Good Place, Netflix)

https://youtu.be/etJ6RmMPGko
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Social robotics in Glasgow:
http://glasor.inp.gla.ac.uk/

MuMMER:
http://mummer-project.eu/