0.0.1 Dialog and Generation

The final thematic area seeks to employ the foundational methodologies to dialog and generation. Our approaches to the problem of generation range from primarily cognitive perspectives to the development of a front-end for an ATP system. Cognitive research seeks to identify architecture and mechanisms which support human language production. The aim is to determine the kinds, and levels, of representation that people utilise; the strategies they exploit, and the contextual factors that modulate the incremental construction of utterances. In the medium term, it is hoped that such work can be integrated with emerging computational models of text and speech generation.

The development of dialog models is explored through well-defined application scenarios, which helps making the problem feasible for graduate level research. The foundational methods discussed above converge in this area – it spans the range from inference-based and data-intensive approaches to cognition research.

In Saarbrücken the area is represented by Crocker's work on the cognitive and computational modeling of human sentence production, Siekmann's work on proof presentation, Pinkal's work on dialog processing and dialog semantics, Barry's development of synthesized spoken language models, and Wahlster's work on planning argumentative dialogs between virtual agents.

Dialog and Generation are represented strongly among the Edinburgh participants. Moore is working on generation with an emphasis on content planning and generation of context sensitive utterances, Pickering conducts experimental studies of human language production, Oberlander and Webber are both pursuing text and discourse generation, and Taylor has several active projects in speech synthesis. With respect to dialog, Klein is interested in NL control of computational devices via dialog, Moore in mixed-initiative and real-time dialog, and Steedman in spoken discourse and dialog. His project on speaking virtual and simulated autonomous human agents is related directly to Wahlster's project in this area.

Example Thesis Topic: Projecting personality in synthesised speech: manipulating perceived dominance and competence.
Supervised by Barry (Saarbrücken) and Oberlander (Edinburgh).

There is a growing body of work on simulating emotional state in speech synthesis. However, less work has been carried out on verbal correlates of long-term personality traits. Nonetheless, it has been demonstrated that for perceived personality features such as conscientiousness and extroversion, verbal behaviour has at least as strong an influence as non-verbal behaviour. Certain simple measures of a speaker's verbal behaviour, such as vocabulary diversity and speech rate, correlate well with their perceived dominance and competence. But other prosodic features than speech rate, such as length of intonation phrases and choice of pitch accent categories, voice quality and use of pause fillers and utterance-precursing vocalisations, can also be expected to contribute to the strength of these dimensions.

The thesis would investigate methods for manipulating salient personality-related variables in synthesised spoken discourse, and determine to what extent people's judgments about the underlying system follow or diverge from the patterns that have been found in the personality literature. In Edinburgh, Jon Oberlander has substantial experience in tailoring text generation for specific user needs, and also has joint projects with Taylor on intonation in discourse-oriented speech synthesis. In Barry's group in Saarbrücken, both temporal structuring within varying speech rates (Trouvain) and the interaction of prosodic structure and voice quality as indicators of speaker attitude (Schröder) are under investigation. This combination of phonetic-phonological investigation in Saarbrücken with the broad range of cog-

nitive and discourse expertise in Edinburgh represent an promising framework for the cross-disciplinary questions inherent in this research.

Additional Thesis Topics

- Glottal Source, Pitch Contours and Temporal Structure in the Synthesis of Emotion, Attitude and Information Weighting (Barry/Taylor)
- Coadaption of production and comprehension mechanisms (Crocker/Pickering)
- Interaction of dialogue structure and general reasoning techniques in a tutoring system (Pinkal/Webber)
- Explaining Mathematical Proofs (Siekmann/Oberlander)
- Evaluation Methodology of Generation Systems (Uszkoreit/Moore)
- Robust Dialog Strategies for Life-like Characters (Wahlster/Moore)
- Using how people talk about health and illness to develop better retrieval systems for consumer health information (Webber/Uszkoreit)
- Using discourse information structure to specify appropriate intonation for spoken language translation (Steedman/Wahlster)
- Generating Spoken Summaries from Multiple Sources (Moore/Uszkoreit) **↑Neu**