What If I Speak Now?
A Decision-Theoretic Approach to Personality-Based Turn-Taking
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Summary
We use an Influence Diagram to model an agent’s interpersonal interaction goals from which we generate its turn-taking behavior.

Our Approach
- verbal contributions delayed until speaking becomes the best policy
- speech in progress aborted as soon as waiting becomes the best policy
- personality and interpersonal stance represented by chance nodes
- interaction goals and their weights defined via utility nodes
- behavior choices and their parameters represented by decision nodes

Challenges
Turn-taking mechanisms for conversational agents need to...
- be robust with regards to noisy or ambiguous input
- avoid unnecessary delays or overlaps
- be consistent with the personality and interpersonal attitude required by the scenario
- be transparent to human developers and interaction designers in order to be re-usable and adaptable to new contexts

First Prototype
- Dialog Manager
- State Machine
- Influence Diagram
- Behavior Realizer
- Text-To-Speech
- Shared Information Board

Input Processing
- Voice Detection
- Voice Event
- Semantic Content

Simulation
- conversation between two embodied conversational agents
- Bayesian network continuously updated with agent’s own role and observed voice activity from interlocutor
- pre-scripted dialogue annotated with semantic content
- relevant sentence prefix triggers next intended contribution
- influence diagram decision monitored before and during execution of speech command

Experiment Design
- stimuli:
  - short conversations between two identical virtual agents
  - text scrambled to avoid bias by scenario-based roles
- 2x2 conditions: each agent varied between introverted and extraverted
- measurement:
  - online survey, 116 participants
  - within-subject: all four videos presented in random order
  - Extraversion, Agreeableness, and Status statements rated for each agent and video

Experimental Results
- Hypothesis: perceived Extraversion higher when configured as extraverted
  - measured Extraversion: • higher when configured as extraverted • difference more notable when partner was extraverted • left agent more extraverted, probably due to initiative and amount of text

Hypothesis: perceived Agreeableness lower when configured as extraverted
- measured Agreeableness:
  - lower when the agent was configured as extraverted
  - in line with theoretical relationship between personality and interpersonal stance

Next Steps
- gaze behavior generation and interpretation
- parameter training from human dyad data
- more interaction goals and personality factors
- inclusion of semantic information

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