Surmising of location with vague embodied agent’s instructions

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Introduction
How design the appearance of interactive agents?
Most agents are designed a face or a head.
*Physical interaction
Joint attention
*Paying attention to others’ attention to relate behavior with its intention

Interaction between human and vague embodied agent
Natural and spontaneous for humans?

Experiment
Participants: 15 students
Procedure: (1) Agent’s question
- “Kono suji ha nanidesuka?”
- Participant’s Answer

Analysis Method: Mapping location of the number to polar coordinates

Hypothesis(1): Demonstrative pronoun
- Kono: near to agent
- Sono: near to human
- Ano: far from both

Hypothesis(2): Distance
- Near: near to human’s body direction
- sin(A): Near > Far

Hypothesis(3): Position
- Front: vis-à-vis
- Diagonal: L
- Side: side-by-side
- cos(A): Diagonal < Side, Front

Analysis (three-way ANOVA) and Result

Far: Sono < Kono < Ano
Near: Sono, Kono < Ano
Kono < Sono < Ano

Hypothesis(1) supported

Front: Kono < Sono < Ano
Side: Sono, Ano < Kono
All levels: sin(θ(H)) > 0

Diagonal: Kono, Sono < Ano

Joint attention was roughly achieved by demonstrative pronoun and their physical position

Is it possible to achieve joint attention?

Three-way Repeated-Measures Design
- Demonstrative pronoun (Kono/Sono/Ano)
- Position (Front/Diagonal/45 degree)/Side)
- Distance (Near (25 cm)/Far (70 cm))

Analysis (three-way ANOVA) and Result

Far: Sono < Kono < Ano
Near: Sono, Kono < Ano
Kono < Sono < Ano

Hypothesis(1) supported

Far: Side > Front, Diagonal
Diagonal: no difference

Hypothesis(3) not completely supported