A BIOLOGICAL INSPIRED COGNITIVE MODEL OF MULTI-SENSORY JOINT ATTENTION IN HUMAN ROBOT COLLABORATIVE TASKS

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Background

Different attention computational models *

Few are addressing cooperative task

Neglecting the mutual presence

Our Research Goals

ASSESSMENT DURING ATTENTION PROCESS

CONSIDER THE MUTUAL PRESENCE

COMPARE THE BEHAVIORS
OUR CONTRIBUTION

1. Integration (Audio + Visual)
2. Acyclic extraction of a saliency (hot point)
3. Retinotopic response projection into allocentric spatial representation
THE EXPERIMENT

• Stimulation
  • 3 location Audio only
  • 1 location Audio + visual

• Temporal Stimulus
  • 240 Hz audio signal
  • Blue color

• Running the experiment
  • 6 subjects
  • 32 rounds each
  • 10 sec. on / 10 sec. off
RESULTS (ERROR COUNT)

• Compared error count between the human and the robot in A+V trials
• Significant deference in audio only trials
RESULTS (REACTION TIME)

• Wide Variability in RT for the robot
• Compared RT in average
• The robot isn’t as accurate as the human
RESULTS (HOT POINT MEASURE IN A+V)

• Swift increase when the stimuli is presented
RESULTS (LOCATION ERROR IN A+V)

- Error drop when the stimuli is presented
- < 0.1 error in most of the on time on average
- Error rise again when the stimuli is off
CONCLUSION

• Importance of joint attention
• It is difficult task for the robot
  • Reaction time
  • Localization accuracy
• Comparable robot and human performance when auditory and visual stimuli is presented
• Localizing the auditory stimuli is challenging
THANK YOU!

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