

#### LOUISVILLE AUTOMATION & ROBOTICS RESEARCH INSTITUTE

emotional cortex in the brains of children with ASD.

during different activities.

- Baseline time: quiet sitting time



# **Physiological Signal Analysis for Emotion Estimation** of Children with Autism Spectrum Disorder

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Figure 3. NAO robot

### Results

For our primary analysis, we chose to assess how heart rate (HR) varies across different activities during the intervention at ULAC. The same analysis was performed in all sessions and the results were consistent to what is shown in Figs 4 and 5. HR can indicate how a person's muscular and central nervous system reacts to varying behaviors [2]. We considered three

81 82 83 84 85 86 86 81 86 81 86 86 86 86 86 86 86 86 86 86 86 86 86					
Timeline (s)					
Chat Time Robot Time					
ala fan Dantiain ant 1 (D1)					
als for Participant I (PI)					
0 2 0 5 0 5 0 5 0 5 0 5 0 5 0 5 0 5 0 5					
Chat Time Robot Time					
als for Participant 2 (P2)					

Participants
P1
P2
<b>Table 1.</b> Mea * <i>p</i> <0.05 for For P2, Robo
As summarized statistical different engaged in. It all same. These result that utilizes the be linked to char from signals colled activity of galvar processed, analy An accurate emotion interactions with decisions during
<ol> <li>Picard, R. W., Vyzas, E., Affective Physiological 2</li> <li>Groden, J., Goodwin, N Plummer, B. (2005). "As disorders," Focus on Au</li> </ol>
Acl
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#### Results

Baseline (M)	Baseline (SD)	Chat Time	Robot Time
95.87	10.02	111.77*	104.17*
91.50	12.64	86.37*	92.13

an HR results as beats per minute (bpm) a paired sample t-test comparison to Baseline ot time is statistically the same as Baseline.

### Conclusions

ed in Table 1 the comparison of the mean HR shows a ence between different activities that the children Iso shows one instance in which the means are the ults are significant and can support broader research E4 wristband to collect physiological signals that can nges in emotions. In future work, additional features ected by the E4 (e.g., maximum amplitude of phasic nic skin response, mean of skin temperature) will be zed, and used to train a Machine Learning algorithm. otion estimator can ultimately allow a robot to adapt children with ASD based on these signals and make an intervention accordingly.

## References

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