



Annotating data in social science to aid autistic children.

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Introduction

In the domains of social psychology and neuroscience, the research on non-verbal communication in everyday social interaction has been growing. It could be something as simple as nodding our heads in synchrony, shifting our gaze to signal someone or just altering our speech to get a response from an audience.

There have been researches in the field of behavioral psychology which studies human behavior and their social interactions. The focus of this research would be to come up with a computational model which can focus on social and behavioral aspects of patients with autism, go beyond the traditional methods of psychology to find an aid that might arise from the interaction between research into autism, technology and human socioemotional intelligence.

Measuring differences in interpersonal synchrony, where research on coordination between two or more people can be measured has been a promising line of inquiry in autism research. By using wrist(body)-worn accelerometers, one can take the research out of labs and use real life situations to study the synchronous movement in autistic children's everyday life. A major implication would be the intrusion of privacy and would require sensing everybody that the participants meets. This might create a difficulty in obtaining some form of reliable data.

Our aim is to demonstrate how this information can be used as an aid to researches studying autism, both as a way of charting a child's development and providing a mechanism of automatic video of long-term interaction. This information can also be used by parents, teachers and psychologists to help autistic children and make their everyday life easier.

This can be done by labelling the data to know if the wrist-worn sensors actually show the correct interaction among the autistic children and actors. Interpretation of wrist sensors is necessary in order to measure the interpersonal synchrony.

Hypothesis and Expected Results

- In the proposed work, we expect to label all the videos that have been retrieved from the activities. We expect to see differences in IS between neurotypical groups and autistic groups during various activities.
- We propose that a collaboration between autism research and affective computing could lead to several mutually beneficial outcomes—from developing new tools to assist people with autism in understanding and operating in the socioemotional world around them, to developing new computational models and theories that will enable technology to be modified to provide an overall better socioemotional experience to all people who use it.

Data Analysis and Methods

- There are various ways by which we can annotate the videos that have been collected from the experiment like, 2D and 3D boxes, polygon labelling, lines and splines.
- One way we can analyze our data is by Keypoint Labelling which is done by adding points to the objects. It is useful to capture the movement of body parts and other moving skeletal objects.

Our research is completely quantitative research. The data has been originally collected by using wrist-worn motion detectors. Some of the methods to analyze the data are:

- Cross-correlation (Pearson's correlation)
- Cross wavelength transform / Spectro analysis / frequency of time.

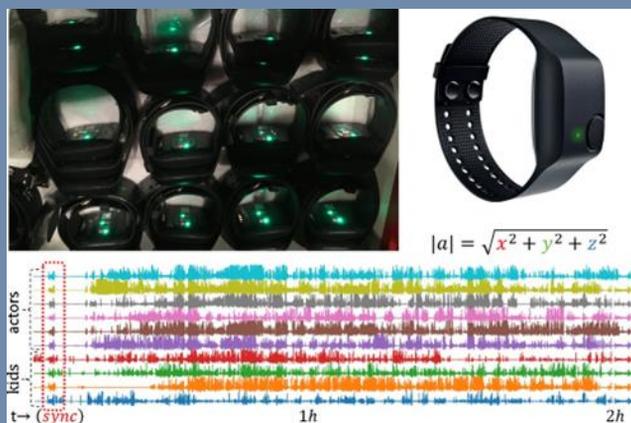


Fig1 - Wrist worn sensors, overall acceleration used in this work.

Research Questions

- Q1. What are the moments of synchrony amongst the autistic children and neurotypical children?
- Q2. How can we combine analyzing social human behavior and technology?
- Q3. What are the different ways by which we can label the videos in order to interpret the wrist-worn sensor data?