

Master internship project

Title:

Measuring social behavior using ultrawideband tracking

Supervisor:

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Background:

Ultrawideband (UWB) tracking is a very robust technique to measure the spatial position and locomotion of freely moving persons. Each subject wears a small tag containing an active UWB transmitter. This signal is received by electronic devices, called anchors, which are typically placed in the corners of the room or the tracking area of interest. The signals are forwarded to the location server, which calculates the tag positions based on the difference in time of arrival of the UWB signals, with an accuracy up to 15 cm. Ultrawideband has several advantages over video: it can deal with large spaces and it does not lead to privacy concerns as no personal data is recorded. Psychologists at the Behavioral Science Institute (Radboud University) use this technique and a software tool called TrackLab (www.noldus.com/tracklab-human) to monitor the spatial behavior of children in a classroom in order to quantify activity levels, walking tracks, dyadic interactions and the dynamics of social behavior.

Goal of research project:

During this project, you will work with tracking data collected in classrooms (using TrackLab) in order to analyze the spatial behavior and social interactions of the children. You will investigate what are the best quantitative descriptors of specific actions and reactions that take place in the classroom context. This will include a review of the literature, formulating the research hypothesis, design of algorithms, development of a software tool, computation of parameters, and statistical analysis. Aspects of spatial behavior to be considered will include:

- Movement patterns, track shape
- Initiation of movement: who moves towards another subject and when
- Termination of interaction: who stops the interaction
- Dyadic interactions, relationship with personal attributes (independent variables)
- Distance between individuals, proximity, time spent in distance classes (radius around others)

Requirements:

- Knowledge: mathematics, statistics, data science
- Skills: programming in Python or R, excellent written and spoken English
- Interest: movement, behavior, development, psychology

Practical information:

- Duration: 4-6 months
- Start: January 2025 or later
- Location of work: Donders Center for Neuroscience, Huygens building