INSENSION Behavioural states of people with PIMD

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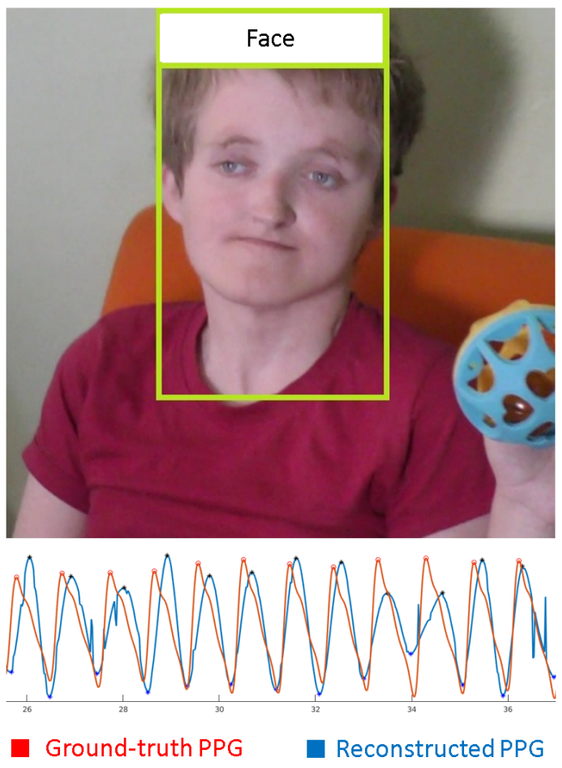
People with PIMD



People with PIMD face extreme difficulties in everyday life.They are a heterogeneous group. Severe cognitive, motor and sensory disabilities makes this population relianton outside care fo most daily tasks, and thus extremely vulnerable.

2. Source of knowledge

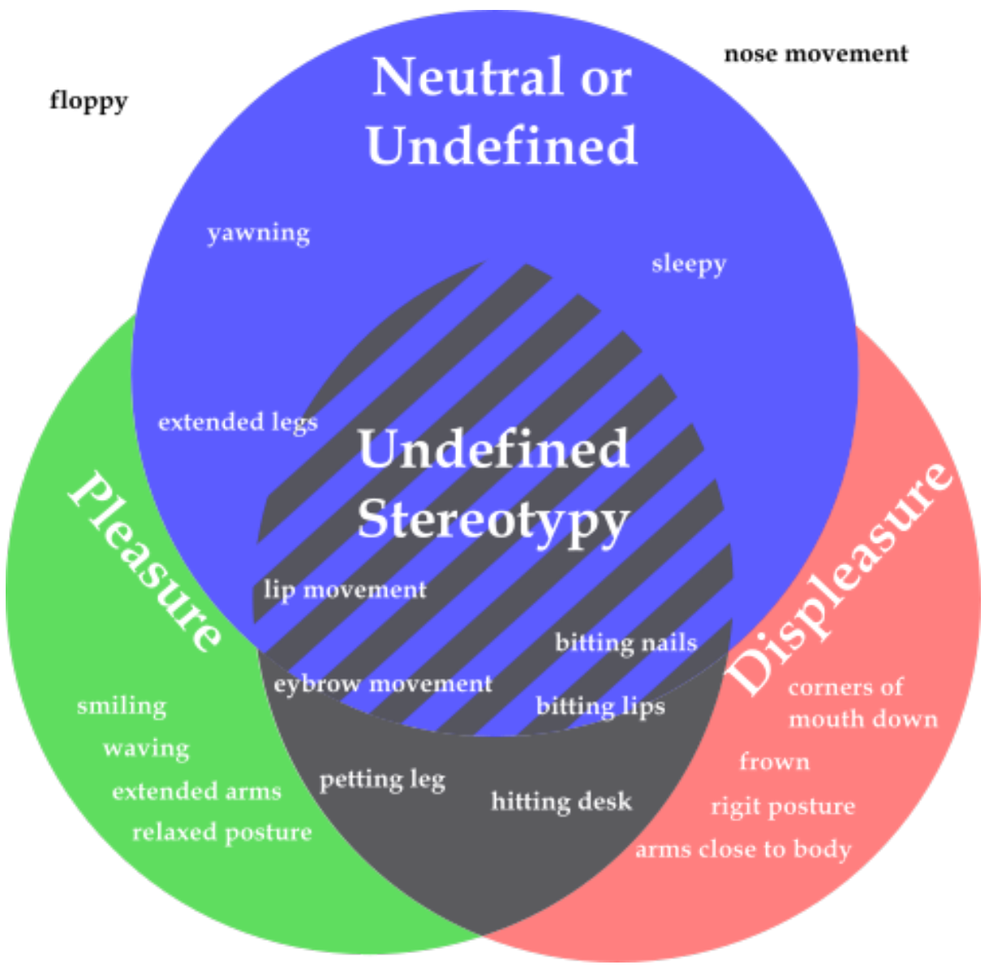
We use multiple-angle recordings with normal and heat-vision cameras. Parts of these videos were annotated and used as training and test data. Expert knowledge was collected and incorporated into the behavioural state recognition to improve decisions.

1. Introduction

People with profound intellectual and multiple disabilities (PIMD) would benefit greatly from intelligent systems in their vicinity. They are unable to use them due to relative high complexity of these systems. The main problem is their lack of producing or understanding of symbolic communication.

The goal of our work is to provide an intelligent framework that enables them to communicate their wishes and feelings to the outside world.

3. The Unique Non Verbal Signals Method

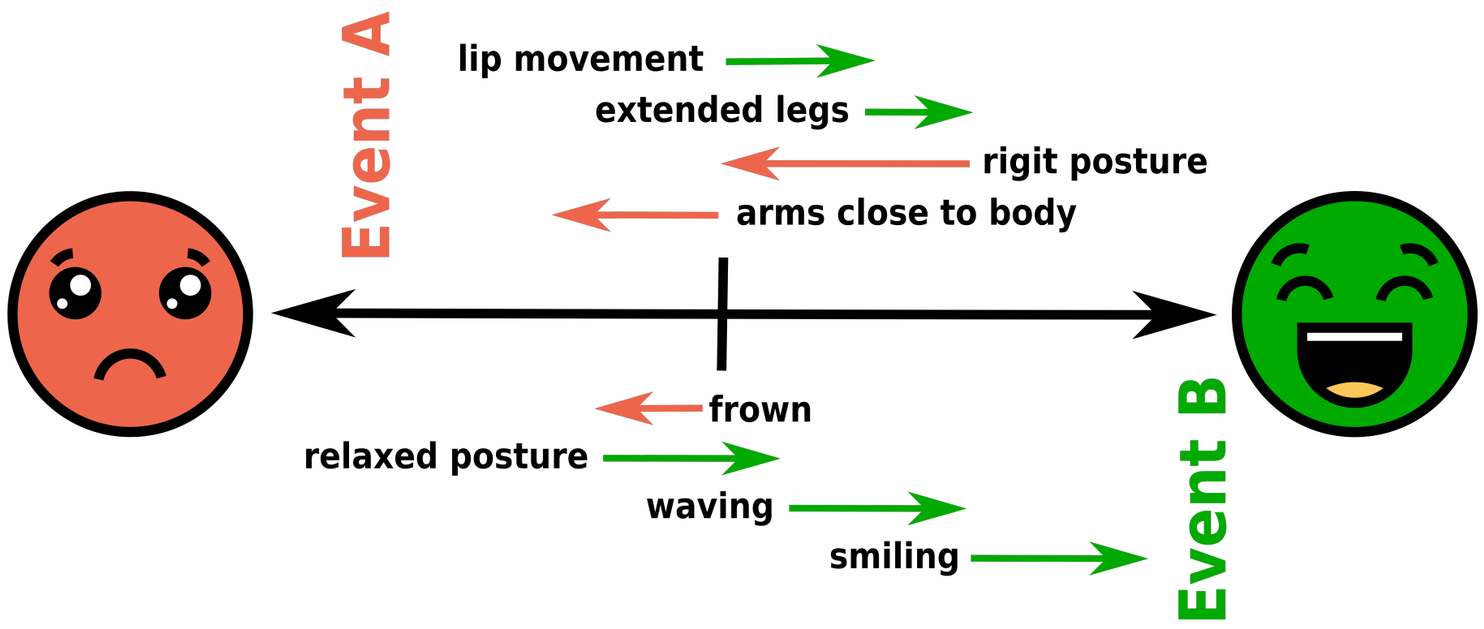


The Unique Non Verbal Signals Model makes it's decision based on the idea that there exists a NVS that will for instance signify pleasure, but will never be used to signify any other behavioural statehe people with PIMD a model is trained for each individual.

In order for us to detect pleasure, we must from a set of all detectable NVS associated with pleasure, remove all NVS, that are associated with displeasure or neutral state.

Deciding on the behavioural state based on the set of NVS is simple. We check if there are any NVS that are specific to pleasure, either from the expert knowledge or from the annotated examples.

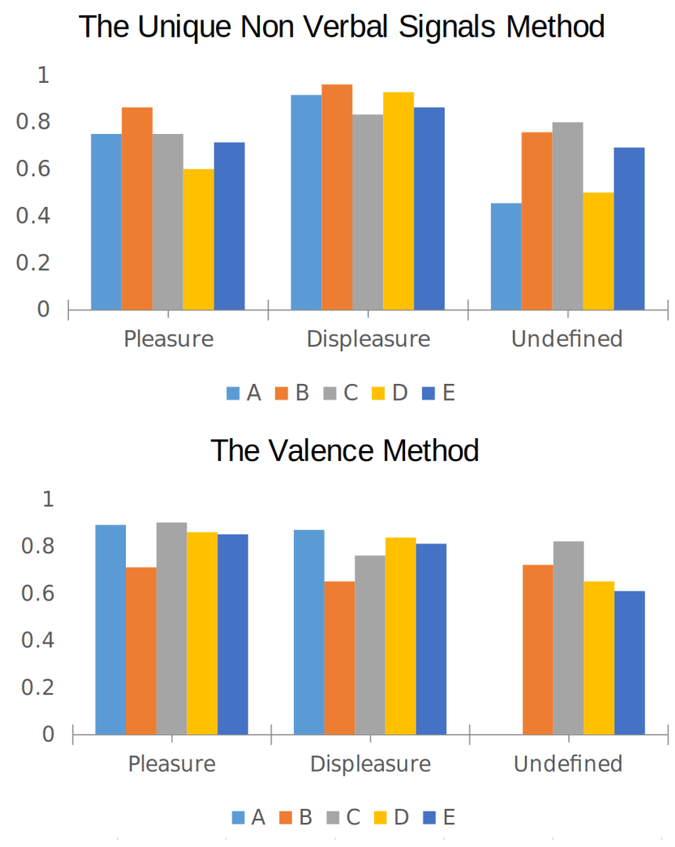
4. The Valence Method



The second method treats the significance of the NVS as an indicator of behavioural state on a continuous interval. We assume that each NVS has a certain correlation with valence. In our case valence is a number that is correlated with the three behavioural states *(displeasure, neutral, pleasure)*. If there is little or no correlation between pleasure and the NVS it should gravitate towards negative values.

At its core this is a minimisation problem where we try to find the thresholds for the intervals that produce the smallest classification error.

5. Conclusions



The advantage of Unique Nonverbal Signals Model and Valence model over the more common Machine Learning algorithms is the ability to incorporate prior knowledge from the assessments.

6. Acknowledgements

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