Detecting Child-Adult Eye Contact using A Single Pair of Wearable Eye Tracking Glasses

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Motivation

• Eye contact plays a crucial aspect in the social development of young children.
• Atypical patterns of gaze and eye contacts have been identified as potential early signs of Autism Spectrum Disorder (ASD) [1].
• Current uses of eye tracking in autism research is limited by only presenting stimuli on a computer monitor.

Method

Gaze point of the adult
Random Forest Classifier
Eye Contact Detection
First Person View Video
Face Analysis of the Child
3~5 minutes free playing

Fig. 2 Flow chart of our system.

• The eye tracking glasses records the first person view video and captures the adult’s gaze.
• We use computer vision method to analysis the child's face in the video and predict their gaze direction.
• Eye contact is then detected as the event of simultaneous, mutual looking at faces by the dyad.

Conclusion

• We present a novel alternative approach to measure child-adult gaze behavior in dyadic naturalist interactions.
• The method is applicable to monitor the eye contact events as early cues for Autism. And the preliminary results are promising.

Technical Details

SMI Eye Tracking Glasses [3]

Fig3. A random forest is learned from training data to detect eye contacts

Results

Quantitative Results

• One session from one subject
• Over 12K frames, 60% for training

Fig4. Examples of successful (first row) and failure (second row) cases.

Annotation

Eye Contact
Ground Truth

Fig. 1 An automatic system for detecting moments of eye contact between an adult and a child, based on a single pair of wearable eye tracking glasses worn by the adult.

Acknowledgement

Potion of this work were funded in part by the National Science Foundation under Grant No.CCF-1029679. Any opinions, findings and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation (NSF).

Reference

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Contact