ESTIMATION OF ENGAGEMENT LEVELS OF AUTISM AFFECTED CHILDREN USING AFFECTIVE COMPUTING

FINAL YEAR PROJECT

BY

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INTRODUCTION

- This System primarily involves building a method of enabling the tracking of facial expressions in ASD affected children and analyzing the affect and engagement levels of the children in socio-communication interactions by the video feed acquired in real time.
- In this system, the face of the ASD affected children is segmented from the video feed using faster R-CNN and the facial expressions from the images are detected by Resnet and their engagement level is estimated with the help of the facial expressions detected from the video feed.
- The model is trained with multi culture data i.e., facial image expressions of ASD affected children from Japan and Serbia where this is the training and validation data allotted and unknown images are given as testing data.

ABSTRACT

Children with Autism Spectrum Conditions have persistent challenges in social communication and interactions, and restricted and repetitive patterns of behaviour and interests–all of which pose serious challenges for their socio-emotional lives and the lives of their families. However, to enable naturalistic interaction between social robots and a child, these robots must be equipped with a type of socio-emotional intelligence that allows them to learn and recognise the child's behavioural cues and respond in a more natural and engaging way. A Data-driven approach was used in the context of autism therapy to design a robot perception module that can automatically adapt its interpretations of children's affect and engagement by accounting for cultural and individual differences between children with autism. Faster R-CNN is used to segment ASD affected child face and the facial expressions are detected by resnet an the level of engagement is noted

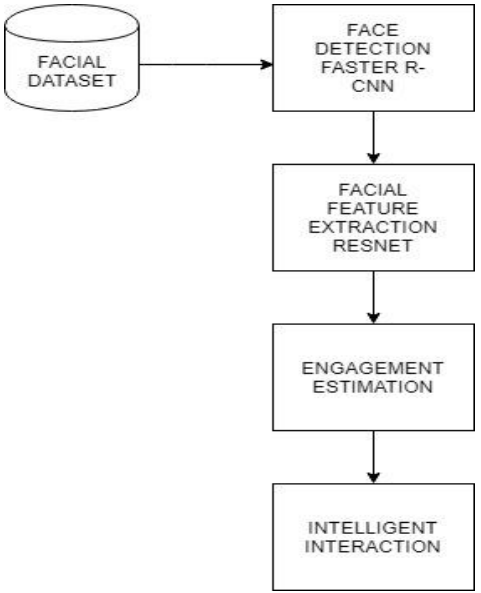
OBJECTIVE

- Affective computing is one area which has improved over years by image processing and deep learning. There are many papers developed over these years in affective computing.
- On the other hand there are many children been affected from autism spectrum from their birth. Autism Spectrum Disorder is a serious problem occurring in children affecting their social life
- Still date there is no fully backed data-driven approach used in the context of Autism Therapy. ASD affected children possess atypical facial expressions compared to normal children. Detection of their facial expressions will help to understand their feelings and engagement levels which is the main solution developed in affective computing.

LITERATURE SURVEY

TITLE	AUTHOR	METHODOLOGY
CultureNet: A Deep Learning Approach for Estimation from Face Images of Children with Autism	Yuria Utsumi et.al	Performance of deep learning models in the task of automated engagement estimation from face images of children with autism was introduced.
The Affective Computing Approach to Affect Measurement	Arvid Kappas et.al	Affective computing approach towards automated affect measures that jointly model machine-readable physiological/behavioral signals with affect estimates as reported by humans or experimentally elicited

SYSTEM ARCHITECTURE



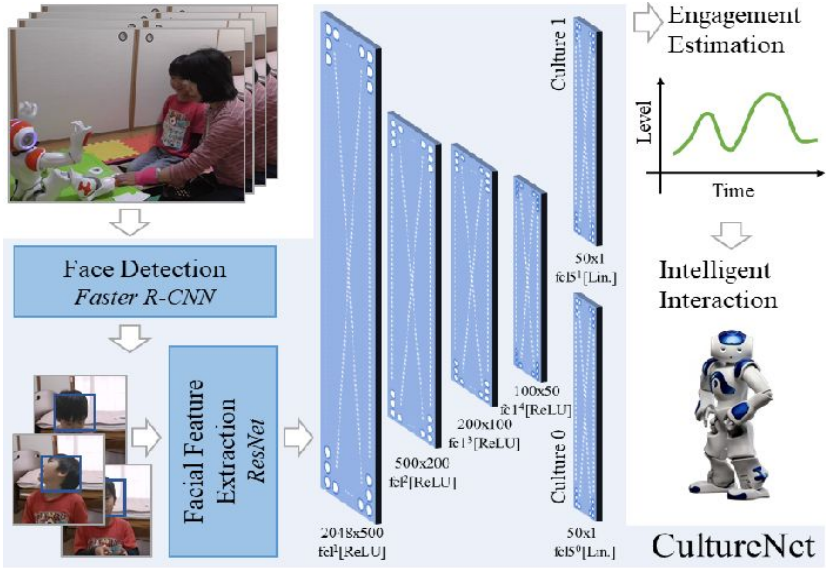


Fig. 1: Automated estimation of engagement directly from

MODULE DESCRIPTION

- Data collection and data pickling
- Drowsiness Detection
- Training the data
- Saving the weights and testing the model.

CONCLUSION

- In this work, different deep learning settings for automated estimation of engagement from face images of children with ASC, who participated in one-day robot-assisted autism therapy are investigated.
- These results reveal important findings in terms of how deep learning can be used to leverage face-image data of children with ASC to attain better estimation of target engagement.
- More specifically, the role of the cultural label as the driving factor in learning deep models for their generalization to different children with ASC: within and across two cultures (Asia vs. Europe) is identified.

FUTURE WORK

- This system primarily involves estimating the engagement level of the autism affected child and the main parameter we set is facial expressions.
- Parameters like body temperature, Speech can be recorded by sensors and the complete characteristic traits like sensing, perception and interaction can be estimated for the betterment of Autism affected children

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