Paper Presentation

Paper Title:

A Virtual Reality Based System for the Screening and Classification of Autism

Group: Bruno Lemos & Claudio Asensio

Emails: blemos@ua.pt & claudioasensio@ua.pt

Course: MECT

Date of presentation: 28/11/2023

Paper Details

Paper Title: A Virtual Reality Based System for the Screening and Classification of Autism

Authors: Marta Robles, Christine Falter-Wagner, and Evelyn Wassiljew are with the Department of Psychiatry and Psychotherapy, Medical Faculty, LMU Munich. Marta Robles is also with Department of Clinical and Health Psychology, Autonomous University of Barcelona (UAB)

Published in: IEEE TVCG

Year of publication: 2022

Number of pages: 11

Citations: 10

Complete Reference: M. Robles et al., "A Virtual Reality Based System for the Screening and Classification of Autism," in IEEE Transactions on Visualization and Computer Graphics, vol. 28, no. 5, pp. 2168-2178, May 2022, doi: 10.1109/TVCG.2022.3150489

Why this paper?

A Virtual Reality Based System for the Screening and Classification of Autism

- Tries to solve a problem in today's world
- Potencial Societal Impact
- Innovative Solution for this problem

Motivation

A Virtual Reality Based System for the Screening and Classification of Autism

Autism

- Communication problems
- Social Interaction
- Repetitive behaviors

How can we detect autism ?

Contribution

A Virtual Reality Based System for the Screening and Classification of Autism

Simulated social interaction in a virtual supermarket

female male shop seller

The avatar's height could be adjusted

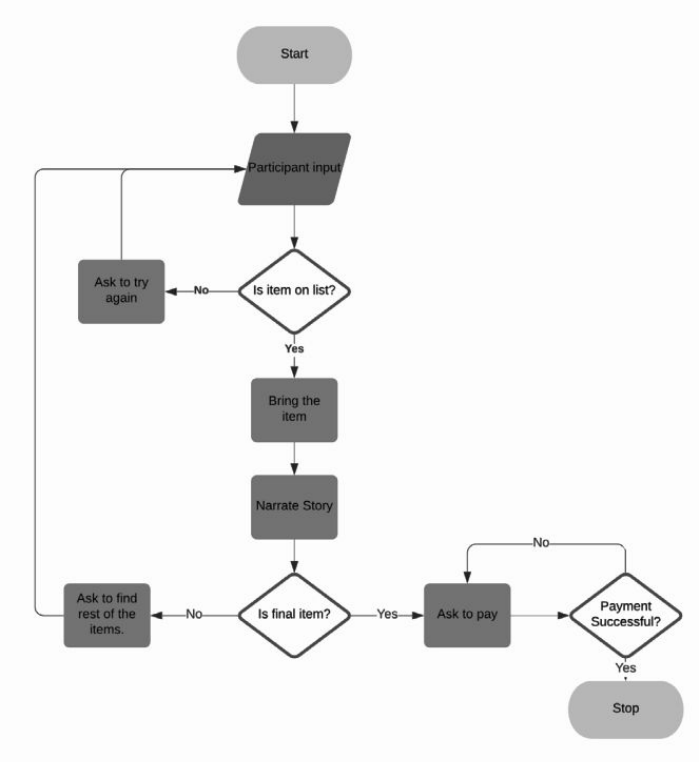
Contribution

A Virtual Reality Based System for the Screening and Classification of Autism

Simulated social interaction in a virtual supermarket

Contribution

A Virtual Reality Based System for the Screening and Classification of Autism



Methodology used

A Virtual Reality Based System for the Screening and Classification of Autism

Challenge

Different users may have varying levels of experience with VR

Introductory level

Methodology used

A Virtual Reality Based System for the Screening and Classification of Autism

Challenge

"Can we classify ASD on the basis of the expressed nonverbal behavior (gaze, voice, head motion) acquired through an patient-agent system?"

Check for Nonverbal behaviors

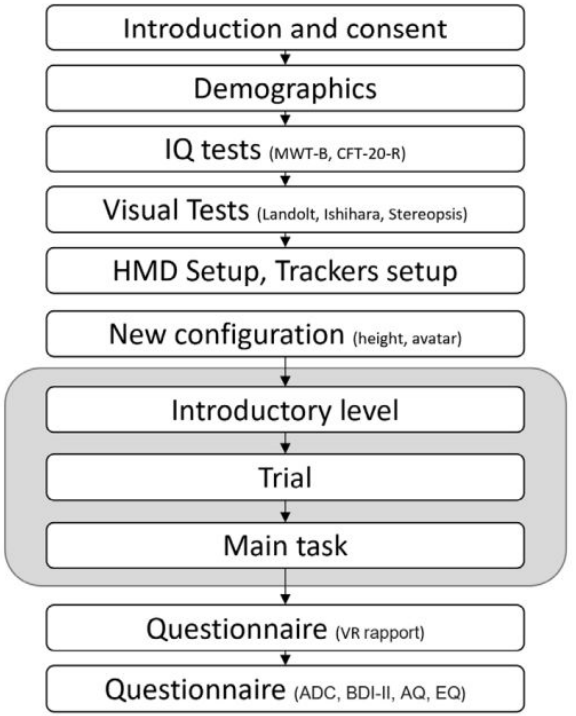
- Exported the acquired data into a CSV file
- Recorded and analyzed using machine learning algorithms
  - Python
  - Scikit-learn
  - Tensorflow

HTC VIVE Pro Eye VR System and the Tobii XR SDK

User Evaluation

A Virtual Reality Based System for the Screening and Classification of Autism

Goal	➔ Evaluate the effectiveness of the VR ➔ ASD vs TD
Tasks	Select items from a shopping list while a VA narrating facts about each item
Data Collection	➔ Gaze ➔ Head ➔ Body motion
Participants	Adults with clinically confirmed ASD and TD controls



Results obtained

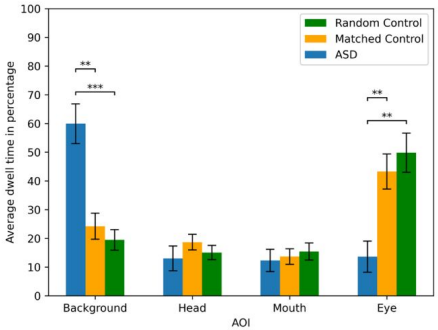
A Virtual Reality Based System for the Screening and Classification of Autism

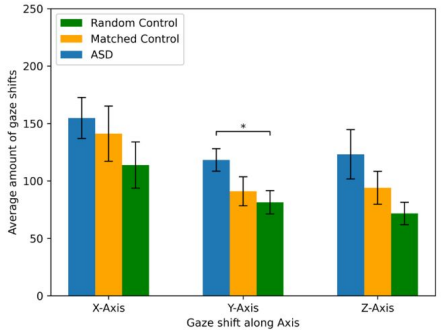
Results:

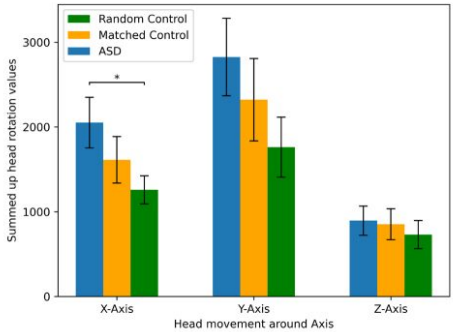
- The VR system achieved high accuracy in classifying ASD individuals based on nonverbal behaviors

Limitations:

- The results highlight the potential of VR as a tool for ASD diagnosis, although the limitations of sample size.







Main Conclusions

A Virtual Reality Based System for the Screening and Classification of Autism

Objectives		Develop VR system for autism classification
Results		High accuracy
Key features		Body motion Strong indicator

Diagnostic Potential : Assists in autism diagnosis, potential for assessing other disorders.

Ideas for future work

A Virtual Reality Based System for the Screening and Classification of Autism

- Bidirectional interactive social communication.
- Expand sample size
- Present in production

References used

A Virtual Reality Based System for the Screening and Classification of Autism

- Manual MSD - Versão saúde para a Família
  https://www.msdmanuals.com/pt-pt/casa/problemas-de-sa%C3%BAde-infantil/dist%C3%BArbios-de-aprendizagem-e-do-desenvolvimento/transtornos-do-espectro-autista

- M. Robles et al., "A Virtual Reality Based System for the Screening and Classification of Autism," in IEEE Transactions on Visualization and Computer Graphics, vol. 28, no. 5, pp. 2168-2178, May 2022, doi: 10.1109/TVCG.2022.3150489

Students Opinion

A Virtual Reality Based System for the Screening and Classification of Autism

- Good quality of research
- Interesting topic and approach
- Adequate detail without unnecessary complexity.

Thank you :)