CONTRIBUTIONS TO THE USE OF VIRTUAL AGENTS TO STIMULATE SOCIAL INTERACTION IN CHILDREN WITH AUTISM SPECTRUM DISORDER



UniversidadeVigo

Student: Luis Fernando Guerrero-Vásquez Advisors: Martín López-Nores & Jack Fernando Bravo-Torres

Motivation of the work

- ☐ People with Autism Spectrum Disorder (ASD) have deficiencies in social and communication skills [1], the impact of which can be diminished with adequate early intervention [2].
- ☐ Information and Communication Technologies (ICT) have made great contributions in promoting the inclusion of people with disabilities [3]. Specifically, ASD has received lots of attention recently, and there exist technological aids for detection, diagnosis and treatment.
- ☐ Children with ASD show great acceptance to interact with virtual agents [4].
- ☐ Recent advances in enabling areas of audio and video recognition, processing and synthesis have led to new proposals on how to stimulate social interaction in children with ASD, and to generate more efficient therapies [3-5].

Thesis Objectives

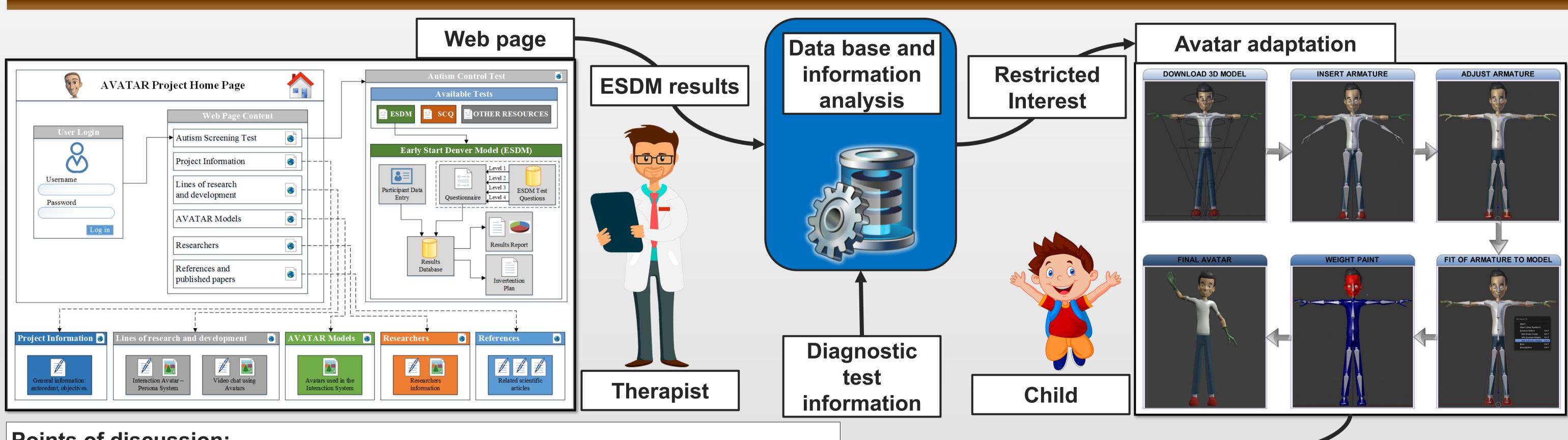
- ✓ To design and implement a system to enhance the social skills of children with autism through interaction with Virtual Agents.
- ✓ To implement Virtual Agents controlled by people and combined with Artificial Intelligence.
- ✓ To promote interaction through a mediating expert system, grounded on knowledge models of the ASD domain.
- ✓ To automate an intervention tool that allows the constant monitoring of children with ASD.

Live animation / Virtual puppet

Research Plan (changes w.r.t. 2017 highlighted)

#	Task	Duration	2016			2017					2018					2019						2020							20	21
	Task		9	1	2 1		9 1	.0 11	12	1	2 .	8	9	 :	12	1	2 3	3	. 10	11	12	1	4	5		8 9		12	1	3
1	Study of state of the art and analysis of intervention tools	12																												
2	Automation of intervention test to monitoring the progress of children (The Early Start Denver Model)	11																												
3	Design of interaction system: Virtual Agent - Person	13																												
4	System Implementation	15																												
5	In-field testing in collaborating institutions	20																												
6	Analysis of results	28																												
7	Thesis report	7																												
8	Publication of results	43																												

Results & Discussion



Points of discussion:

- The web page structure was modified according the Early Start Denver Model (ESDM). This test consists of an evaluation tool of 446 questions distributed in 4 levels that evaluate specific domains.
- Avatar adaptation is based on restricted interest obtained from the results of diagnostic tests.
- Using the final avatar, we are working on a system that detects the movements and facial expressions of the person and transmits them to an avatar.

Webinar: On April 4, 2018 the webinar "AVATAR: Autism Virtual Agent To Augment" Relationships in children" was presented.

Publications: In this year we have developed three scientific articles with the proposals and advances of the avatar-person interaction system [8][9][10].

Next Year Planning

- Acceptance testing of Virtual Agents in controlled experiments with collaborating institutions.
- System to identify and motivate facial expressions in children with ASD.
- > Journal publication with the results of the acceptance test and the use of the web page to apply the ESDM.

References

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- [9] "Restricted Interest-based adaptation of Avatar for interaction with children with Autism Spectrum Disorder" Submitted and accepted to World Congress on Medical Physics & Biomedical Engineering, Prague 2018.
 - [10] "AVATAR: Contribution to Human-Computer interaction processes through the adaptation of semi-personalized virtual agents" Submitted and accepted to IEEE Argentina Biennial
 - Congress (ARGENCON 2018).