AIDISM: An Android-based Game to Educate Individuals with Autism on Basic First Aid using Artificial Intelligence

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Abstract— **People talked about how hard are to handle an autistic person on their everyday living. Autism is a difficult symptom to correct because it is a brain disorder that takes time and much work with doctors and teachers. Due to this reason, the researchers created a mobile application called Aidism that aims to educate the autistic individuals with the basic first aid and also to develop their self-reliance. This project used artificial intelligence for the characters to imitate people needing first aid.**

The results indicated that this application might be an effective technology for helping an autistic person in dealing with first aid.

Keywords- Artificial Intelligence, intelligent system, autism, android, human-like thinking, first aid

I. INTRODUCTION

Artificial Intelligence research and study empowers and enables many areas where machine have an obvious advantage. Education is one of those areas, where traditional teaching of students is not always effective. In some cases, individualized applications and programs outperform traditional class room learning experience in its effectiveness in student's progress. [1] According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-V), Autistic Spectrum Disorder is a group of alterations which appear between 12 and 14 months of age and is characterized by social interaction and communication problems and repetitive behavior.[2] It is a range of complex neurodevelopment disorders, characterized by social impairments, communication difficulties, and restricted, repetitive, and stereotyped patterns of behavior.[3]

Autistic individuals rarely have any idea of what first aid is and how to do them. The children also need to be taught to first aid. How much more if they are children with autism? How to assure that they will enjoy and learn the game? And what are the advantages that they will gain after playing the game? Due to these reasons, this study aims to improve their knowledge on first aid and because of the animated and interactive designs they will surely enjoy and learn the game. Within the group of individuals with autism, we can find a certain number of people who interact well with mobile devices and other types of technology. To improve their knowledge on first aid, this application will help them towards first aid education: for example, how to handle specific situations, basic knowledge about healthcare or medical specialties, all employing the use of current technologies such as smart phones or tablets, specifically running the android operating system.[4]

II. OBJECTIVES

The study aims to educate the autistic individuals to:

- Know more about the basic first aid
- Develop their self-reliance
- Enhance their capability of doing work for self-awareness in learning basic first aid
- Visualize their interaction with one another as a group, as an individual and as a learner in terms of first aid.

III. RELATED WORK

Video modeling requires the individual watch the target behavior through video and repeating the target behavior himself. Children with autism direct their attention to visual stimuli more than verbal stimuli in many research studies. Besides it is emphasized that there are many benefits of using video modeling in teaching chained skills to children with autism. It can also be said for the first-aid skills which is also a chained skill. (Teaching Basic First-Aid Skills against Home Accidents to Children with Autism through Video Modeling)[4].

Autism Spectrum Disorder (ASD) is a pervasive developmental disorder which affects individuals with varying degrees of impairment. Currently, there has been ample research done in serious game for autism children. Although serious games are traditionally associated with software developments, developing them in the autism field involves studying the associated technology and paying attention to aspects related to interaction with the game. Serious Games for autism cover matters related to education, therapy for communication, psychomotor treatment and social behavior enhancement. In this day and age, it has become a trend to transform well-known traditional games into a computerized version. This is done so that it can be played online and it gives it the capability to compete with modern video games. The aim is to make the games more appealing and thus to enhance

user's experience. Interaction may be one of the areas that need to be developed with extreme care, depending on the activities and skills to be worked on each of the games and target group. Keyboard and mouse are not always suitable since the technology has advanced and there are a series of possibilities predominant in this area. Nowadays, there are interfaces that are created to read brain's electrical signal called Electroencephalography (EEG) and turn it into movement in virtual environment. And in the future these interfaces can be useful for individuals with impaired mobility. (Serious Game for AutismChildren:Review of Literature) [5].

"cMotion" is another computer game that uses virtual characters to reinforce emotion recognition and logical problem solving to both normally developed children and high-functioning autistic children. The purpose of the game was how to deal with emergency situations in a fun and dynamic way.

"Picaa", a game in the iOS platform gave positive effects in the development of learning skills for children who have special educational needs. Due to the interface and the contents of the activities in "Picaa" which was adapted specifically for individual players, they have the opportunity to perform activities that previously were not accessible to them. Adaptability has been identified as a key design requirement for new technologies in the mental health care field. (Using Mobile Game Application to Teach Children with Autism Spectrum Disorder (ASD) Multiple Cues Responding: A Pilot Study) [3].

IV. SYSTEM ARCHITECTURE

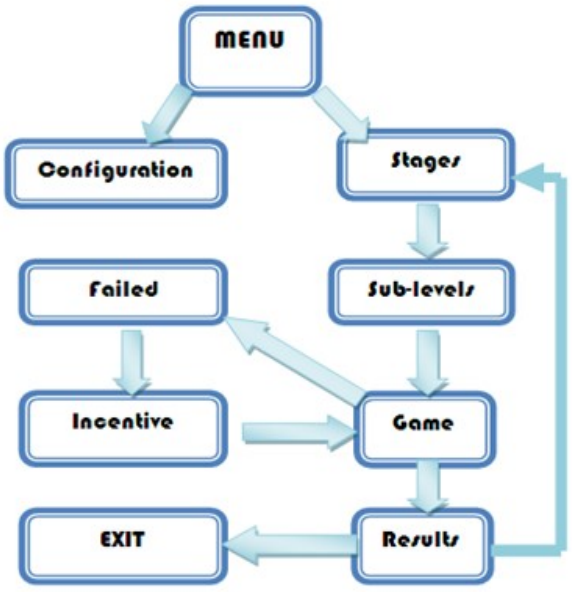

Figure1. System Diagram

The system is supplied with a simple architecture

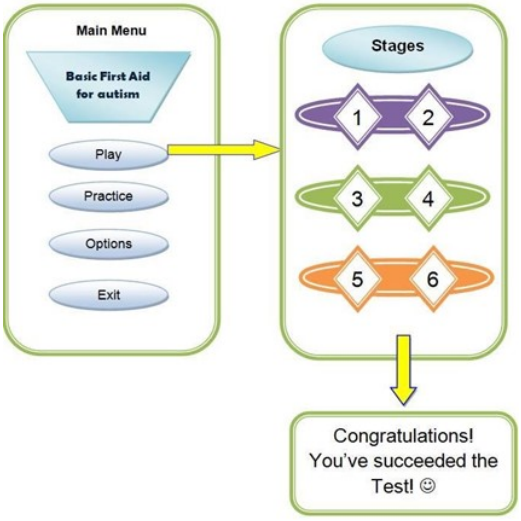

Figure1.1 System Diagram

This application has a simplified system for the users (autistic individuals) to easily navigate through the game. The application has a main menu that leads to the selection of stages. The game presented in this work is composed by six different Stages, namely, Stages l, 2, stages 3, 4, stage 5, and 6 every stages have sub levels in every stages it has a tutorial or demo on how to play the game and the user can play different animated interactive games where the user is the one who's in charge for example how to treat and cure the patients with bruises and wounds. In these cases the user can have knowledge on basic first aid and its preventive measures with the assistance of others in addition to an initial stage of adaptation to the basic first aid game.

1) Initial stage of adaptation to the basic first aid game: In this initial stage of adaptation, the user is given the opportunity to know each game. This stage has duration of 2-3 minutes, and it is a free game. That is to say, the user is given neither indication nor orders during this established time; the user must follow the virtual animated directions on it.

2) Stage 1 and 2: In these Stages, the required interaction level in the game is low, the easiest one and proper guidance is must.

3) Stage 3 and 4: In these stages, the interaction is now moderate, the user's interaction and knowledge level up, the games on these stages are now challenging and much complex to play.

4) Stage 5 and 6: These Stages requires a great interaction with the game, when the user reaches these stages the user is now knowledgeable and capable of doing basic first aid on their own.

After playing, the user will view all the list of scores and results of every stages and sub levels that if the user is well capable of.

V. FUTURE WORKS

In the future, the game is expected to have more features and varied mini-games and will have more powerful and complex Artificial Intelligence to simulate human-like reactions.

VI. CONCLUSION

Good results have been obtained by using virtual reality applications as therapeutic tools, thus helping people with autism to recognize awareness and improve their knowledge about Basic First Aid and cognitive skills.

The system intelligently teaches the user how to treat wounds and bruises that can be treated by Basic First-Aid. The application also has an Artificial Intelligence which the injured in the game has, making it more realistic to the target users. Its weaknesses and strengths lies on how the user uses it. Not every individual with autism knows how to use android devices and some will not even understand the purpose of the game.

Virtual reality makes it possible to create safe environments where they can learn rules and repeat the tasks. Furthermore, interacting with avatars where first aid situations are replicated enables patients to work on these situations and find more flexible solutions. This means that virtual environments may be good instruments to work on social skills with Autism condition.

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