“Using Robots to Improve Socialization Skills of Autistic Children”

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Abstract

Autism presents itself as a delay in verbal and non-verbal communications as well as difficulties in social relationships. The best moment to detect the autism in a child is between the first 2 and 3 years of life, when the treatment is more effective. That is why parents must verify their child’s behavior, such as his/her response with smile when someone smiles to him/her, maintaining eye contact, babbling, and making noise to get what he/she wants. If a child shows a delay in this kind of behavior that is a signal to begin the search for help. Research has found that autistic children respond and interact better with animals and machines than with human therapists. Since children with autism are interested in electronic devices the interaction between the child and the robot is easily introduced. The goal of my project is to develop an algorithm, using Python as the programming language that guides a humanoid robot through an interaction intended for an autistic child. My approach guides a human participant through short (15-20 minutes) and repetitive routines that engages the motor and socialization skills. Using mohbos as a tool, therapists can improve socialization skills in autistic children. This approach can better serve in developing the socialization skills of the child. Another advantage of the robot is that we can program it to execute different activities precisely with repetition. Reusability allows the therapist to track the progress of the child and his social skills as it improves over time.

Introduction

Robots have become great tools in every aspect of the live. Since the creations of the machines they have represent a much easier and effective way of achieve our goals. In this project we want to use the benefits that the robots can offer to help the autistic children. The autism usually manifests itself as a delay in the verbal and non-verbal communication (socialization). Research has confirmed that autistic kids can interact better with robots and machines, than with the therapist. The robot also is an excellent tool for the therapist because the machines can execute the same class or lesson multiple times in the exact same way. This helps the therapist to track better the learning process of the child. For this experiment we want to develop a behavior for the robot that allows the interaction between the child and the robot through the game Simon says. This game was selected because it requires from the child concentration and some basic socialization skills such as mimic or copy the movements of the robot. The humanoid robot was programed using the software Choregraphe and the programming language Python. Since the robot was humanoid it has arms and legs that make it look more like us. Also the robot has cameras that allow it to recognize people, objects and voice, which are excellent features to generate a more comfortable interaction with the autistic child.

Materials & Methods

In a regular computer with the software Choregraphe, we use and create different behaviors in order to make the simulated robot execute the game Simon says. Then we use Webots, more realistic virtual simulator, to apply all the physics limitations that the real world present. Once both simulators were able to run the program without errors the program was send to the real robot.

Conclusions

Using Choregraphe we were able to create a behavior that allows the interaction between the robot and autistic children. This through the game Simon says in which the robot ask questions and also give some instructions to the user. This way the user is being stimulated to socialize with the robot, and the robot was able to identify the answers using its voice and vision recognition system. As the research continue, the programming techniques and the interactions will also improve, leading to a new, innovative and effective ways of treatments for the autistic children.

Literature Cited / Acknowledgements


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