

“Design and realization of a remote controlled robot dummy.”

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This report is a bachelor thesis which is completed at the company “Speaking images”. The bachelor thesis is an assignment of the program “Industrial Design Engineering” at the “University of Twente”. The company Speaking images was in need of expertise in the field of robotic design. Speaking images needed these expertise to make a remote controlled robot dummy or in other words an “animatronic character”. The company produces its own dummies that are used in different branches, for example in a performance. The dummies made by Speaking images are currently controlled by hand, therefore the performer is bound to the dummy. With the design of a remote controlled dummy, the performer receives more freedom to control several dummies from a distance without the need of physical contact.

The objective of the thesis was to answer the research question; “How can robotics be integrated in the existing dummies to improve the current control of dummies”. The main research question was divided in central and sub questions. To be able to answer the different research questions, each question consisted analysis phase, a design phase and an evaluation. In the analysis phase the gained information determined how the execution in the design phase should proceed. In the design phase there is been experimented with the findings of the analysis phase, after which a design was made. In the evaluation/conclusion phase there was determined if the design was sufficient or if it should be redesigned.

The first prototype of the robot was made from different parts that where purchased and homemade, but it lacked of precision and was too time consuming. Eventually, the most important design step was to switch from hand-making mechanical parts to develop them in a CAD program and to print them with a 3D printer. 3D printing brought the design to a new level where it is possible to make more complex structures and still be able to keep the motor placement compact.

There was a new key question added, namely how to make an elastic skin for the robot. The new 3D printed robot consisted of many moving parts and needed an elastic skin instead of the clay skin Speaking images uses for its dummies. How to produce an elastic skin was discovered after analyzing the movie industry. To prevent clay from slipping into the mechanics, a clay model mask had to be designed, which had the same dimensions as the robot.



Fig.1 Speaking images hand dummy

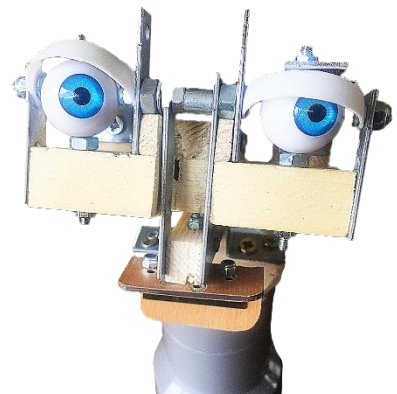


Fig.2 First prototype



Fig.3 3D printed final design

Figure six shows the final result of the robot dummy. The sixteen different motors used in the robot dummy are operative, the only thing remaining is to write a program to control the motors all together. There is a controller designed to control the dummy, but the controller is not yet developed.

The main research question “How can robotics be integrated in the existing dummies to improve the current control of dummies” is not only documented but also realized in a prototype. Unfortunately, there was too little time to make the robot fully operative, therefore there is still a small step to perfection needed.



Fig.4 Clay mask



Fig.5 Controller design

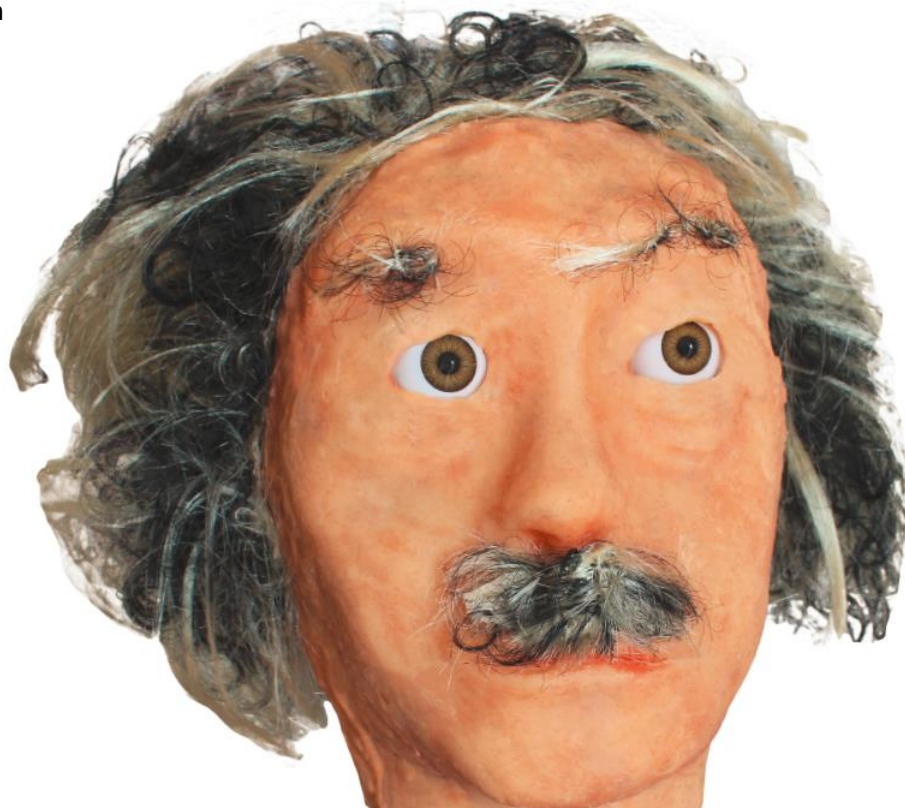


Fig.6 Final result