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BEDSIDE ASSISTIVE MANIPULATOR

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These days the average age of our society is rapidly increasing, which results in more and more people suffering from injuries, aftermath of diseases or even disabilities. Some people are not even able to leave bed, which makes them unable to live on their own and they need someone to take care of them in their daily lives. However, the health care staff is limited, so it is impossible to assign a nurse or a guardian to every single person in need. That is when a bedside assistive manipulator could help to unburden humans and take over some activities of a guardian, such as simple object manipulation, for example handing needed stuff to the patient and taking it away, help with drinking through a straw, positioning the bed and pillows or checking the patient's body temperature.

This paper presents the first parts of the project being carried out in Łukasiewicz – Krakow Institute of Technology, which include literature review, a general concept with assumptions and design of a manipulator prototype, later to be constructed, verified and validated. It was found that most of the assistive robots commercially available on the market are service robots in form of humanoids which are made for specific jobs like receptionists, sales representatives or event hosts. The only commercial assistive manipulators that have been found are manipulators designed for purely one activity like surgical operations (Da Vinci robots) or feeding (Obi, My Spoon). There are also two American projects on mobile manipulators assisting immobile patients, but the results in both cases were not commercialized. One of them is PR2 by Willow Garage, which works with designed automated bed (Autobed) on which the patient is lying. It can manage the bed position and handle the basic pick and place operations. The second one – EL-E, being a product of a collaboration project between Georgia Tech University and Emory School of Medicine, is a simple mobile manipulator capable of picking and handing small stuff from the closest area.

The aim of this project is to design a bedside stationary manipulator that will be able to perform more complicated handling tasks to help the immobile patient lying in a standard size bed at home. The design of the manipulator is planned to be implemented in a bigger project of a mobile assistive platform. This final medical device is to be later made available for general use at home.