Foreword

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Dear Service Robotics Community,

The current growth rate among all sectors of the service robotics industry is very promising for those of us that are deeply invested in this market or who are considering to found a startup. This promise applies equally to both industrial service robots, as well as the personal service robots that assist humans in their everyday lives. Taking it a step further, just imagine the synergetic benefits we could gain if we mesh the learnings from the last 40 years of experience in traditional industrial robotics with this newer service robotics field.

Industry 4.0 and the Internet of Things (IoT) promise flexibility and individualization for future production concepts. Until recently, robots have been mostly restricted to providing benefits in repetitive applications, working with consistent precision and repeatability. The future demands other capabilities – particularly in the fields of professional and consumer service robotics. If robots are to move into other fields they must become more flexible and provide benefits in a larger variety of situations.

Piece by piece, robotics is moving from the strictly structured environments of industrial production into the more unstructured private environments. Robot systems need to adapt to uncertainties and variability in their surroundings. Such tasks are a matter of course for humans, but very difficult for today's robots systems. For example, service robots have to be able to recognize different objects in individual environments with different lighting levels, irrespective of whether the objects are of different sizes or have a dirty or reflective surface. Especially personal robot assistants will not be programmed by its users, but rather instructed through natural language dialogues including gestures. Programming or instructing robots could also take the form of imitation learning where robots learn to perform certain tasks from observing humans. Machine learning in general is a promising technology to advance the autonomy of robot systems, which is required to help an ever growing elderly labour force at work places and infirm persons in their daily activities.

According to calculations by the German Federal Statistical Office, the labour force could shrink by up to 30 percent by 2060 in comparison to 2013. At the same time, experts expect every eighth citizen to be in the elderly category within the next 50 years. As a

result, around nine million people in Germany would be at least 80 years old, more than twice as many as in 2013. That will be a tremendous challenge for the healthcare sector, especially considering there is already a significant shortage of skilled labour in the field of nursing. Automation can assist in meeting this challenge.

The key to mastering these problems is the rapid advance of medical technology. What sounded like science fiction just a few years ago is today reality. For example, robots can remove infectious healthcare waste and can, in certain cases, take on processes such as issuing prescriptions, packaging, labelling, storage and dispensing of medications. That minimizes the risk of infections or errors for employees and patients.

But robot technology is not just on the march in diagnosis and therapy. Robots are also already being used for medicinal and nursing logistics, where they are helping personnel with simple tasks such as the transport of medicine and laundry in hospitals and nursing homes. What is most important: One robot has to be able to carry out more than just one job. That is what we call the “Multi-Purpose Approach.”

Nowadays, a huge global footprint of startups and researchers is working to reinvent the whole field of healthcare. One could observe that strong consolidations and strong partnerships from different areas are taking place in the field of surgical robotics. For example, companies like Ethicon (part of Johnson & Johnson) and Verily (part of Google) formed the new company VerbSurgical. Or, to mention another example, the license for the MIRO medical robot developed by DLR was sold to Medtronic. Besides this, established manufacturers of industrial robots extend their portfolio within the medical robotics sector. Every day, new opportunities and applications are coming to light in order to serve this huge and growing market. These consolidations and strategic directions are mirrored by the market growth of more than 20% in 2016.

Further growth in this field depends on having established players on the market. The combination of the field of industrial robotics and service robotics could be the key. Technologies like mobile robotic systems navigating autonomously, the direct collaboration between humans and robots taking all aspects of safety into account and of course IoT have to be transferred to the field of service robotics. This could guide us to the next level and it could be an enabler for a new service robotics platform.

With all of this information, we are optimistically facing the future.

Best wishes,

Michael Otto