Her algorithm is helping children with cerebral palsy

Her vision: worldwide collaboration is making the predictions of artificial intelligence more and more precise.

ETH doctoral student Rosa Visscher is working with clinicians to research better treatment for young patients with cerebral motor impairment. Her trump card: data science.

“Walking seems such a simple thing. But try teaching a robot to walk – it’s a hugely complex task.” The 23-year-old Rosa Visscher from the Netherlands first became fascinated in her current research field back in secondary school, when she met a kinesiologist while taking part in a university programme for gifted youngsters. She studied for a Bachelor’s degree in Human Movement Sciences at the University of Groningen and, thanks to an Excellence Scholarship from the ETH Foundation, moved to ETH Zurich for her Master’s. She quickly noticed: “I can think bigger here!”

Her doctoral thesis, funded by the Ralf Loddenkemper Foundation and supervised by Professor William R. Taylor at the Institute for Biomechanics and Professor Reinald Brunner at University Children’s Hospital Basel (UKBB), focuses on children with cerebral motor impairment. She not only benefits from the fact that all the disciplines relevant to her research field are represented at ETH, but also from the specialist clinics found in Switzerland. The young researcher works closely with UKBB’s gait laboratory. More than 20 years of gait analysis has produced data

on about 2,000 children.

Decision support for clinicians

“It’s currently very difficult for doctors to gauge which procedures and treatments will produce the best results for a child,” explains Visscher. Cerebral motor impairment takes various forms, and potential treatment ranges from occupational therapy to an orthopaedic device or an operation. How an individual child will react to specific treatment depends on so many factors that machine learning is becoming a tool in the prediction of a treatment’s success. Visscher uses anonymised data sets to train an algorithm that will one day be able to help doctors in the decision-making process.

Certain patterns are already beginning to emerge. It is becoming apparent, for example, which gait characteristics are associated with children who will not benefit from wearing orthopaedic devices – an important finding since children are very reluctant to wear them. An operation, on the other hand, often entails a lot of pain for the children. Visscher’s research should one day allow a child, its parents and the doctors to use personalised visualisations to build up a very specific picture of the child’s gait before and after a debatable procedure: “We want fewer treatments that make next to no difference. We want children to spend less time in hospital. And we want maximum mobility for patients.”

Dialogue is key

The way ahead is challenging. Visscher knows how much work is needed before academic research such as hers can be applied in everyday clinical practice: “Since the start of my Master’s degree, I’ve been spending two days a week at the clinic. It’s the only way to get an in-depth understanding of the data.” Mutual understanding and respect between the clinicians and herself has grown from month to month. “The first time I was asked for my

Artificial intelligence will not replace doctors. It will help them to make better decisions.

Rosa Visscher
Doctoral student at the Laboratory for Movement Biomechanics