


# MED TECH OUTLOOK

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## NeuroReality



*The annual listing of 10 companies that are at the forefront of providing Neurology solutions and impacting the industry*

## NeuroReality Cognitive Rehabilitation with Virtual Reality

Mr. Bakker was standing on a floating platform in outer space. On his left was the inter-dimensional portal that had brought him to space, and on his right, stood his trusted companion Koji—a friendly dog is there to help him on his quest. Mr. Bakker’s mission was simple. He needed to identify the shape in the spaceship in front him, and then look around for a wormhole presenting him with the same shape. While the narrative sounds bizarre in the current time, it is, in fact, a carefully-crafted virtual reality game that aids in cognitive training and assessment. The architect of such a gamified approach to cognitive rehabilitation? NeuroReality. Headquartered in Amsterdam, NeuroReality develops virtual reality (VR) games that can train a variety of cognitive skills such as calculation, attention, memory, visuospatial abilities, executive functions, and reaction time. The founder and CEO of the company, Faviola Dadis, says, “Through our neuroscience-backed game, Koji’s Quest, stroke survivors can train their impaired cognitive skills and rehabilitate themselves.” She adds, that the importance of telehealth solutions is being highlighted during these sensitive times while healthcare systems all over the world are struggling to provide quality care due to a lack of recourses.

Koji’s Quest aims to utilise three essential neurophysiological abilities of the brain: neuroplasticity, the mirror neuron system, and the reward system. With goal-and-task-based training, the game stimulates cortical reorganisation by repeated activation of affected brain regions. Patients can slowly learn to use affected cognitive functions by playing the game, or simply watching how Koji, the non-playable character (NPC), moves, acts, and take decisions to perform a particular task and repeating that.

Notably, NeuroReality is a spinoff of Faviola’s Ph.D. research which is a collaboration between the University of Utrecht Helmholtz Institute and the VU University Amsterdam department of Clinical Neuropsychology. As an enthusiast of classic old-school games such as Pokémon, Super Mario Bros., and, Magic: The Gathering Faviola wanted to apply a similar simplified gaming approach in VR-assisted neuro-rehabilitation of patients with stroke, dementia, and traumatic brain injury. This curiosity led her to establish NeuroReality. Today, her company also has collaborative



research initiatives with a number of universities, rehabilitation centres, hospitals, and patient organisations.

What makes NeuroReality stand apart from other medtech startups is its primary focus on stroke survivors. While on a global scale, stroke is a major health problem; approximately 46,000 people suffer from a stroke in the

Netherlands alone. Stroke affects both grey and white matter and impacts functional brain networks involved in cognitive and motor function. While traditionally, there has been stroke rehabilitation to treat cognitive impairments, these conventional approaches pose several limitations: it is time-consuming and tiresome for patients, costly, labour, and resource-intensive, reliant upon the adherence of a patient, and its availability is subject to location. Further, these traditional approaches act as a reminder of the physical impediments of the patient, albeit unintentional. Against

this backdrop, Koji’s Quest provides a fun and immersive rehabilitation opportunity to stroke survivors. “Each game is tailored to fit the user’s abilities, helping individuals stay challenged while still allowing those with severe cognitive impairment to have a good gaming experience,” adds Faviola.

Based on the game’s early results, NeuroReality is currently in the process of setting up clinical trials for Koji’s Quest. At this juncture, Faviola is confident that once Koji’s Quest is made commercially available, it is going to be at the forefront of benefitting and aiding doctors in identifying hidden health issues. Determined to bring forth a revolution in neuro-rehabilitation, Faviola concludes by saying, “Soon, brain training will be like going to gym and training your muscles through repetitive tasks.”

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