

# AI and Robot Technologies in Brain Health

Therapy, diagnostic evaluation, modelling



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# Overview

- n What technologies and why?
- n Diagnosis
  - VR, exoskeletons
- n Therapy
  - Artificial pets for dementia sufferers
  - Robots for interactional impairments in autism
- n Modelling
  - Neurorobotics and Parkinsons

# What technologies and why?

- n Computer-based technologies widely used for many decades
- n New focus on real and/or virtual world interaction
  - More sophisticated stimuli
  - Greater range of sensory and motor engagement
- n Robots, VR, and combinations

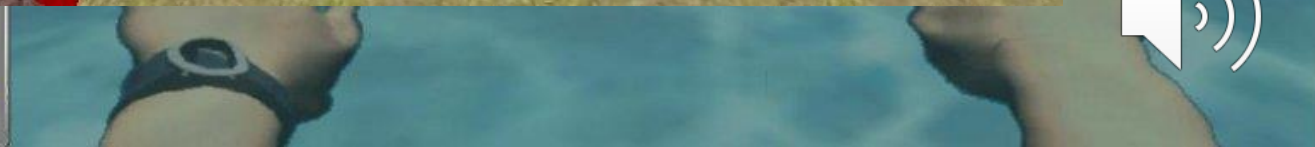
# 1. DIAGNOSIS

# VR in assessing dementia

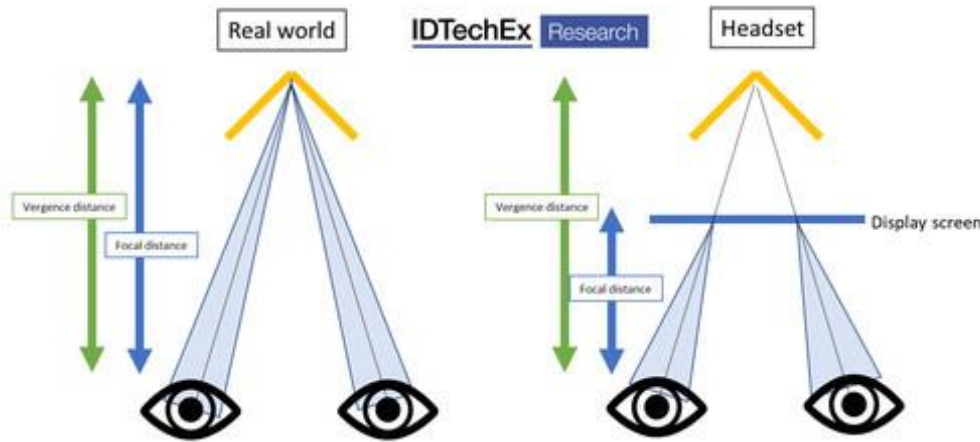




# Testing spatial and allocentric memory



# Headsets – immersive, but..



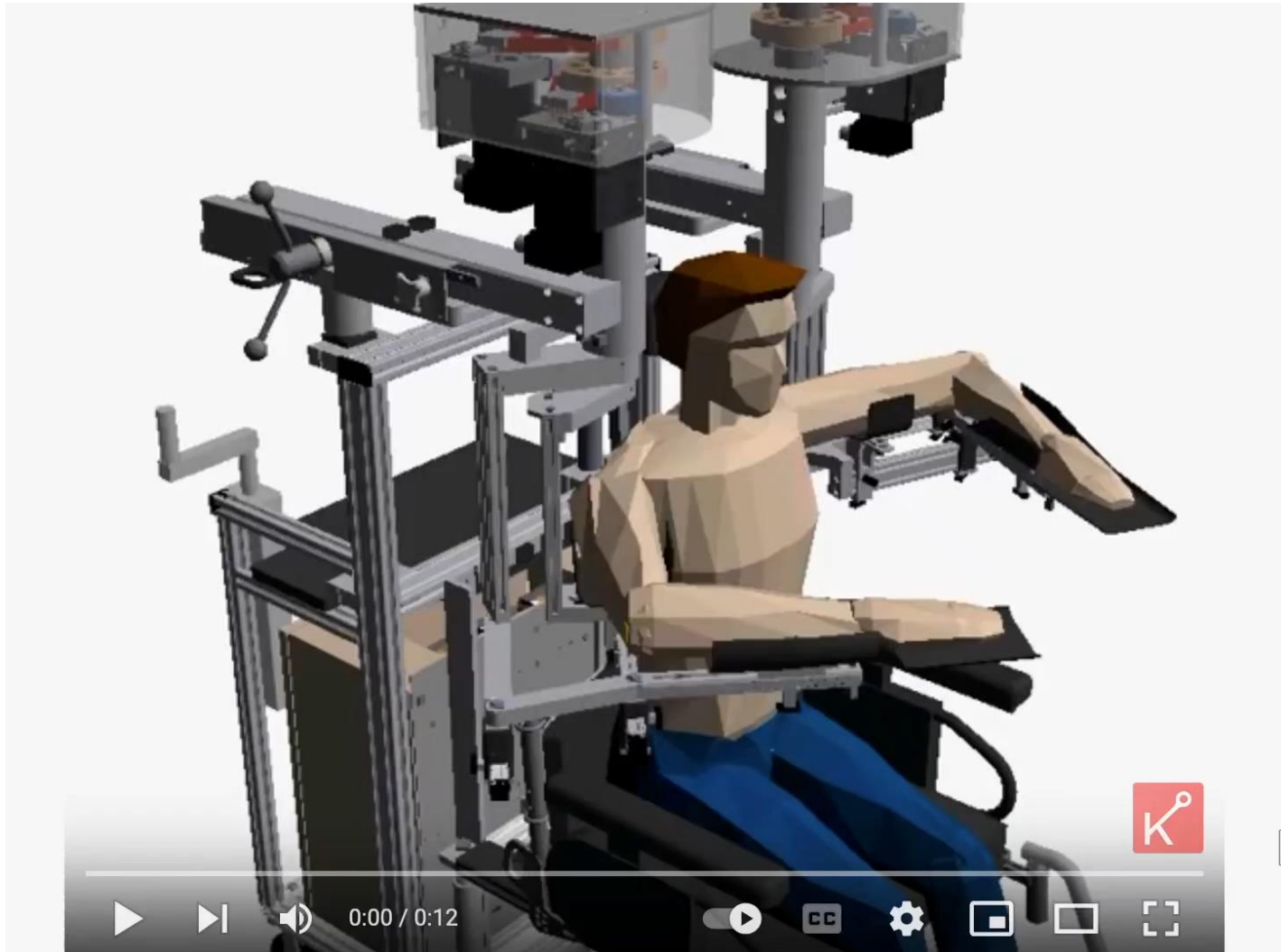
Vergence

Versus

Accommodation

- n Novelty effect
- n Cannot see your own body: disorienting?
- n Navigation mechanisms?

# Measuring motor action





# 2: THERAPY

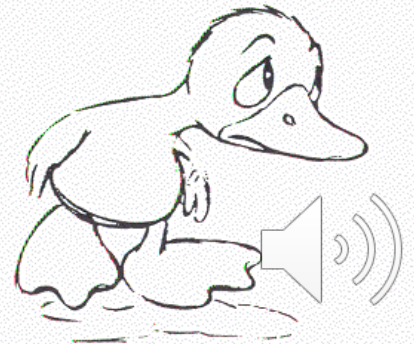
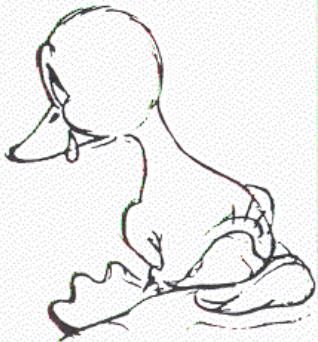
# Artificial pets



# Why does it work?

**Believability**

**Social actors**



# Ethical issues



# Children with autism

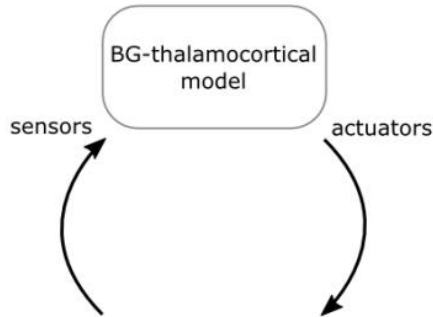




# 3: MODELLING

# Neuro4PD – Neurorobotics model of Parkinson’s Disease

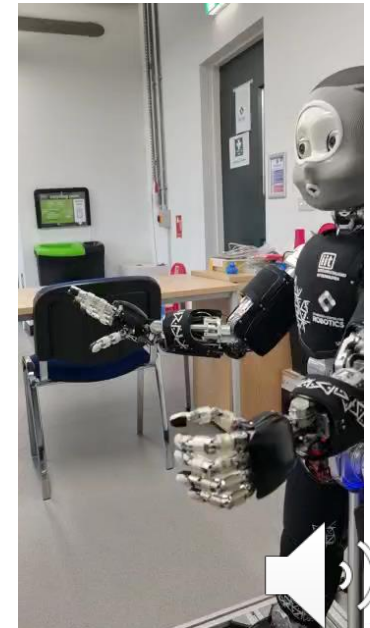
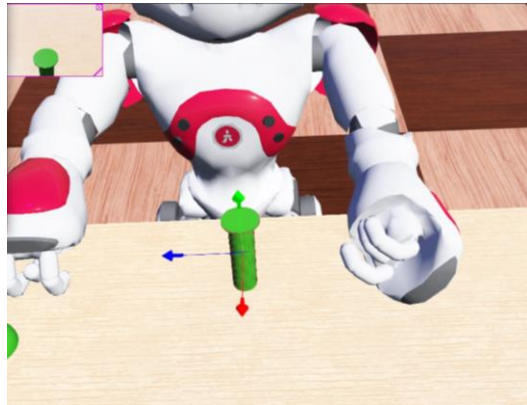
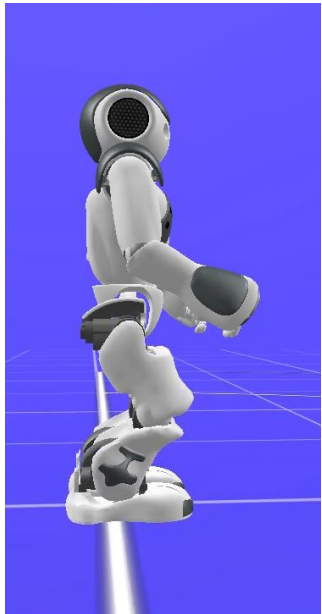
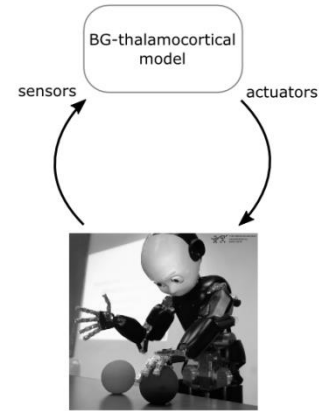
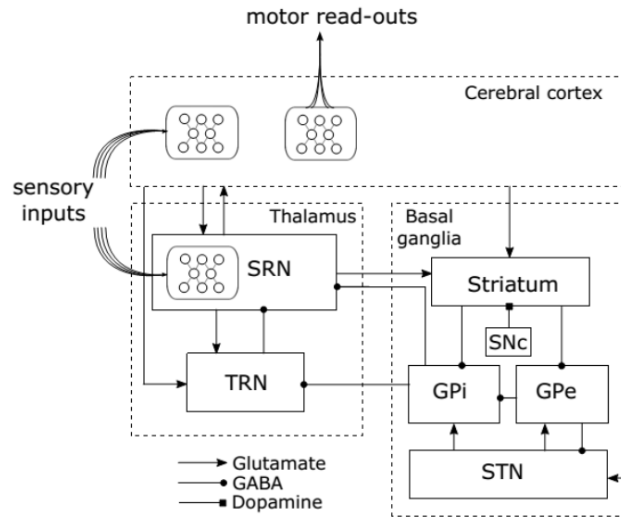
[www.macs.hw.ac.uk/neuro4pd](http://www.macs.hw.ac.uk/neuro4pd)

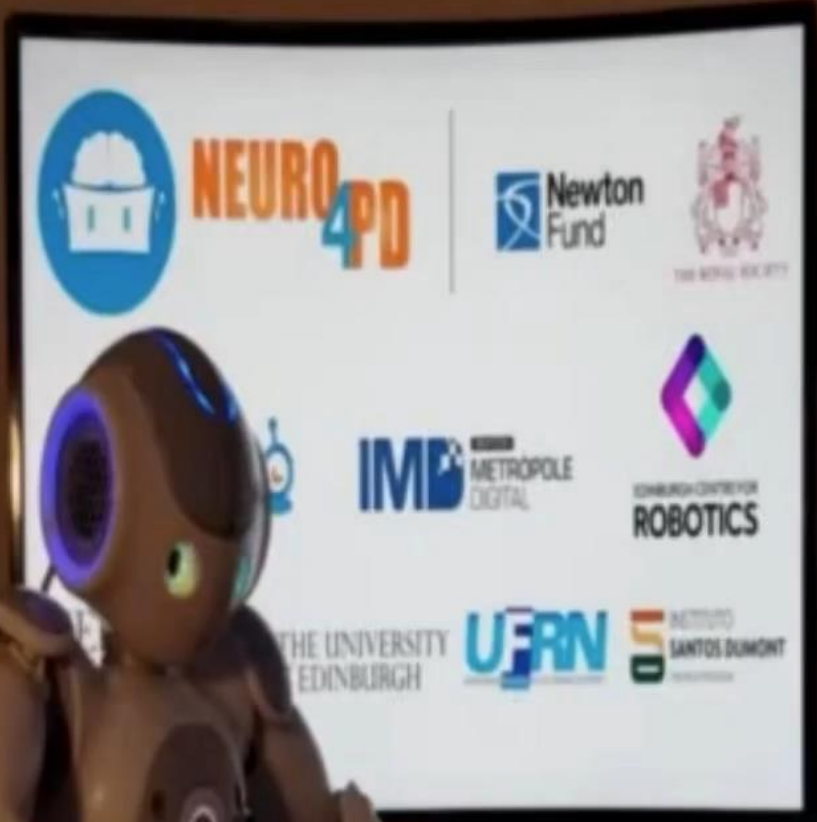


Reduce, Replace, Refine

Inform novel therapies

# Neurorobotics model





# Conclusions

- n Some applications are close to real-world use
  - Virtual pets
  - VR for spatial assessment
  - Exoskeletons
- n Some very much research
  - Neurobotics
- n Important to be realistic about the tech