# Augmented Reality Neurorehabilitation System for Parkinson's Disease


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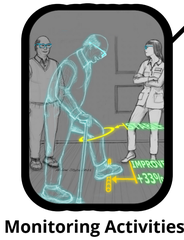
## 1. 3D Body Data Capture

Enhancing Clinical Visits

Enhancing Exercises at Home

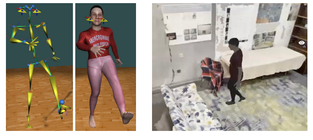


Monitoring Activities of Daily Living (ADLs)

## 2. Patient Reconstruction

Egocentric Tracking and Reconstruction

3D Joint Positions and Environmental Mapping



Egocentric Perception and Video-Understanding

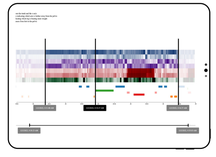
Scene, Object, and Action Class Outputs

## 3. Task Recognition

Reasoning System

## 4. Visualization

Customized Feedback and Updated History



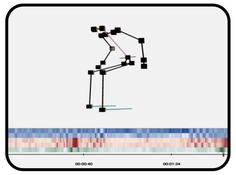
Immersive Analytics and Post-hoc Feedback

Targeted Visualizations

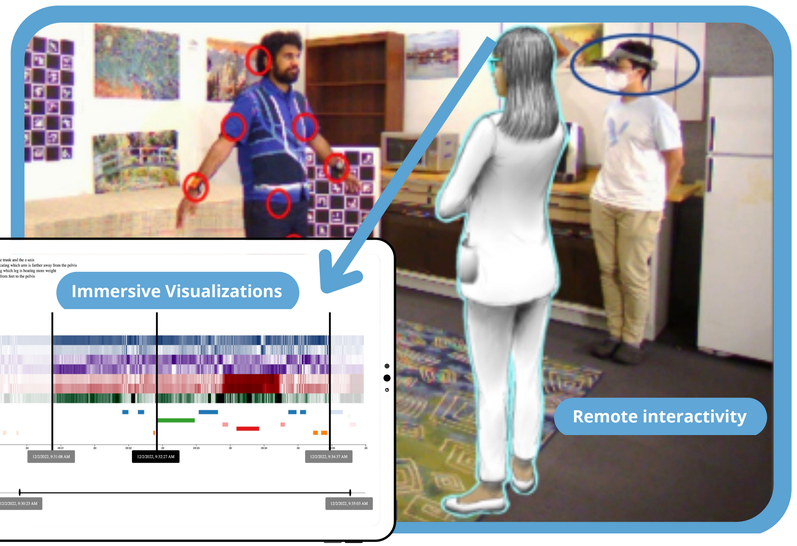
Patient

Clinician

Care Partner



## Motivations



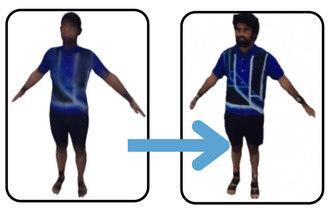

## Introduction

Our system aims to improve clinician decision-making and outcomes for individuals with PD undergoing augmented reality (AR)-based neurorehabilitation. Currently, our focus is on collecting, constructing, and presenting a given patient's ADL data to clinicians and care partners via a head-mounted display (HMD). This system's pipeline encompasses 4 main steps: **collecting data**, using said data for **patient reconstruction** in a virtual environment, **recognizing patient's ADLs**, and presenting interactive **visualizations** of said ADLs to clinicians and care partners. Future iterations of our system will address additional neurorehabilitation goals (i.e. enhancing clinical visits and at-home patient exercises).

## Future Goals

Usage of more compact AR headset

IMUs embedded into clothing



No use of external cameras (entirely egocentric)

Reconstructions closer to ground truth (more geometrically accurate)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