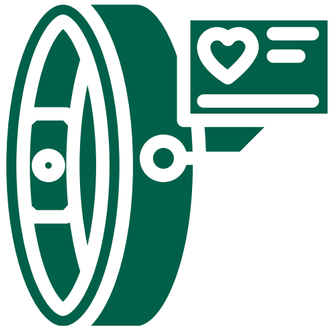
Assignment 1



AuraRing

RESEARCH PAPER PRESENTATION & ANALYSIS | **DESIGNING FOR INTERACTIVE SYSTEMS (DES205)**

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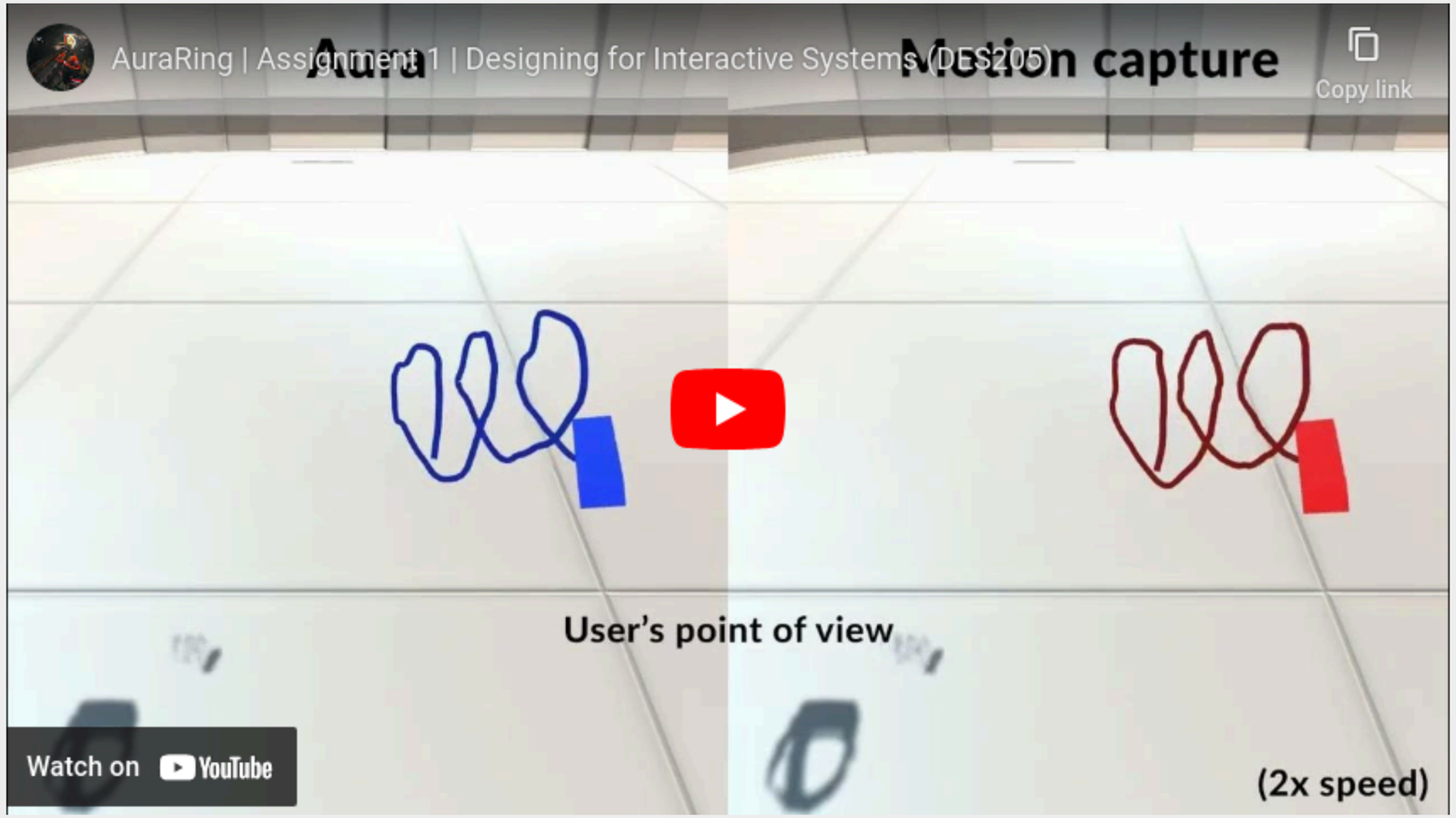
Content

Video Presentation



Introduction

AuraRing is a wearable system that tracks fine-grained finger movement using a ring with an electromagnetic coil and a wristband with sensors

Using low-power electromagnetic tracking, track finger motion in 5 degrees of freedom (3D position + 2D orientation).

Aura ring

Key Features

- High precision: 0.1mm resolution, 4.4mm accuracy
- Low power consumption: 2.34mW ring
- One-time factory calibration
- Wide application potential

Aura ring

PACT ANALYSIS

People

Activity

Context

Technology

People

Target Users:

- *AR/VR Enthusiasts – Immersive interaction.*
- *Designers – Precision input.*
- *Gamers – Gesture-based control.*
- *Trainees & Professionals – Skill development & fine motor tasks.*

Activity

Activities performed with the system:

- *Enabling simulation-based learning and training*
- *Handwriting and drawing in air*
- *Interacts with virtual environments with gesture based systems*

Context

Technology

People

Activity

Context

Context:

- *Optimized for indoor use, ensuring reliable tracking.*
- *Wearable computing enables real-time interaction.*
- *Works where optical tracking fails due to occlusion or poor lighting.*

Technology

Technologies:

- *Low-power electromagnetic tracking for efficiency.*
- *Sensor fusion with neural networks for precision.*
- *Real-time adaptive tracking for smooth interaction.*

The Five Dimensions

- **W** Words
- **V** Visual
- **P** Physical
- **T** Time
- **B** Behaviour

The Five Dimensions

Words

Implicit language via sensor data and calibration parameters; potential for text-based feedback in applications.

Visual Representation

Integration with AR/VR displays; renders smooth, accurate cursors and hand models.

Physical Objects

The wearable ring and wristband; emphasis on ergonomic design and unobtrusiveness.

W
Words

V
Visual

P
Physical

T
Time

B
Behaviour

The Five Dimensions

Time

High sampling rate (≈472 Hz) allows for capturing rapid movements and transient events (e.g., taps).

Behaviour

The system responds through two tracking methods:

- *Iterative, model-based optimisation for high accuracy.*
- *Neural network approach for computational efficiency.*

W
Words

V
Visual

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Physical

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Time

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Behaviour

Application in Other Domains

Health-Care

- *Rehabilitation*
- *Physical therapy*
- *Tracking fine motor skills.*

Simulation

Immersive controller-free interaction in

- *VR games*
- *Gesture recognition.*
- *Driver License Test*
- *Pilot Training*

Education

- *Labs with limited equipment or limited access to chemical compunds*
- *Interactive learning tools*
- *Virtual whiteboards and handwriting input.*

New Adjustments

User Groups

The ring could have different functionalities for different users based on their ages

Gesture Library

Users could download different set of gestures as per their preferences like shortcuts

Auditory Feedback

The ring could pair with additional hardware such as spectacles to provide low intensity audio feedbacks

Context

The gesture used can be based on the context and environment the ring is used in for better assistance.

Q&A

AuraRing is a versatile and precise interactive system that enhances human-computer interaction.

AuraRing

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