



**INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI  
SHORT ABSTRACT OF THESIS**

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Programme of Study : Ph.D.

Thesis Title: Models & Methods to Enhance the Navigational Experience in Extended Reality

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**SHORT ABSTRACT**

This thesis focuses on enhancing navigational experiences in Extended Reality (XR) by addressing key challenges in Virtual Reality (VR), Augmented Reality (AR), and Mixed Reality (MR). It covers the both aspects of the XR navigation namely, travel and wayfinding. Key contributions include developing a model predicting natural walking speeds for VR tours, thereby enhancing realism. It also conducts a comprehensive review of CS, presenting a novel taxonomy and mitigation framework, and identifying research gaps. Additionally, it optimizes VR tour durations to minimize discomfort and CS without compromising realistic walking speed. The thesis further predicts users' emotional states during VR tours using HMD sensors to personalize experiences and reduce CS. Another contribution is "BreathWalk," a controlled breathing navigation method that mitigates CS and improves user preference. Lastly, it improves off-screen Point of Interest (POI) visualization in handheld AR to enhance the wayfinding experience. It is achieved by reducing visual clutter and enhancing spatial awareness. Collectively, these contributions promise immersive, comfortable, and intuitive XR experiences across various applications.