



INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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Programme of Study : **Ph.D.**

Thesis Title: **Design and Evaluation of Naamya: A Bend Gesture-based Tool to Draw Primitive Geometric Shapes for Users with Blindness or Low Vision**

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SHORT ABSTRACT

To overcome the challenges and limitations of analogue tactile drawing tools for users with blindness or low vision, this thesis aims to investigate the potential of bend gestures as the primary input modality of a digital tool for drawing primitive geometric shapes. In this thesis work, we conducted six studies where the first and second studies aimed to understand the existing drawing tools and strategies used for drawing. The third and fourth studies aimed to design the preferred bend gesture space with additional descriptors and bend gesture completion strategies. The fifth and sixth studies aimed to design the digital drawing tool (Naamya), followed by its evaluation compared to a pegboard-based drawing tool (Taylor Arithmetic Slate). We found Naamya and Taylor Arithmetic Slate to be equally effective in drawing primitive geometric shapes containing straight lines. Naamya also leads to significantly less number of slips during drawing. Most notably, the perceived inherent tactile and kinesthetic feedback of bend gestures and the spatial directions associated with the bend gestures offer several advantages to Naamya. This thesis work laid out four major contributions. The contributions of this thesis will help Human-computer Interaction (HCI) researchers and User Experience (UX) designers design drawing tools and bend gesture-based interactions for users with blindness or low vision.