INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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Programme of Study : Ph.D.

Thesis Title:
ONLINE HANDWRITING REPRESENTATION AND SYNTHESIS USING SINUSOIDAL MODEL

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Thesis Submitted to the Department/ Center : **ELECTRONICS AND ELECTRICAL ENGINEERING**

Date of completion of Thesis Viva-Voce Exam : 04/08/2021

Key words for description of Thesis Work : Handwriting recognition, handwriting synthesis, sinusoidal model

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SHORT ABSTRACT

Handwriting is mainly controlled by the relation between the horizontal and vertical velocities. These velocities have an oscillatory and bell-shaped nature. Therefore, this thesis aims to represent online handwriting using a sinusoidal model and explore its efficacy for handwriting analysis and synthesis. In contrast to the various shape information extracted from the (x,y) coordinates, the sinusoidal model can extract movement-based information from the handwriting velocities. This alternative information can be utilized in different areas of handwriting-based applications. Based on this motivation, we propose a multi-component sinusoidal model for online handwriting. The horizontal and vertical velocities are modeled using multiple sinusoidal oscillations such that it can efficiently represent complex handwriting trajectories. The proposed multi-component sinusoidal model provides a mathematical representation of the handwriting control process, which can be explored for handwriting representation, handwriting modification, and handwriting synthesis. Therefore, in the second part of our work, the sinusoidal parameters extracted from the online handwriting are used as features for online handwriting recognition. In the third part, we explore the sinusoidal model for handwriting modification by varying the parameters extracted from the original writing. The modified handwriting is used for data-augmentation to improve the performance of the handwriting recognition system. Finally, in the last part of our work, we introduce a concatenation based personalized handwriting synthesis system using the sinusoidal model.