



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

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Programme of Study : Ph.D.

Thesis Title : NOVEL APPROACHES FOR BASIC UNIT MODELING IN ONLINE HANDWRITING RECOGNITION

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SHORT ABSTRACT

An unconstrained, writer-independent, large vocabulary online handwritten word recognition system can be developed by modeling the basic recognition unit of the script. The basic recognition unit or the basic unit for brevity, represents the set of patterns (characters/strokes) for which the handwriting models are created. This thesis focuses on developing novel methods for basic unit modeling in online handwriting recognition. Three different directions of work are presented in this thesis for basic unit modeling. In the first part, two novel strategies are proposed to improve the classification ability of an existing basic unit recognition system by performing a reevaluation of the decision of a classifier. The classifiers namely hidden Markov model (HMM) and Dynamic time warping (DTW) are considered for the same. The second part of the thesis presents two new feature representations for the basic units, mainly from a probabilistic viewpoint. In the first representation, the probabilistic features are derived from a set of Gaussian Mixture Models (GMMs) which are learned on the existing feature space. On the other hand, the second feature representation is extracted directly from the trace of online handwriting by adopting a convolution neural network (CNN). The third part of the thesis explores the hybrid deep neural network – hidden Markov model (DNN-HMM) framework to model the basic units. Finally, all the different explorations made in the thesis are combined and the integrated system is evaluated on online handwritten word samples. The experiments are performed on databases of two scripts namely Assamese and English. We empirically show that the results obtained are promising with regard to the prior works reported in the literature.