

CS412/CSC2506 Project Proposal

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I. INTRODUCTION

For the course project, we propose to compare different Probabilistic Graphical Model *learning algorithms* in terms of their speed, performance and memory. Specifically, we plan to follow the approach described in [1]. Two of the algorithms compared in [1] are explained in greater detail in [2] and [3], and we plan to study them as well.

We plan to implement and compare the following learning algorithms on the same graphical model using the same dataset:

- Iterated Conditional Modes (ICM)
- Exact EM
- Gibbs Sampling EM
- Variational EM
- Structured Variational EM
- Sum Product EM

The target application for this project is foreground/background segmentation, where the foreground and background images come from a pre-defined library. In this case, the graphical model is built around four sets of variables:

- f : class index for the foreground
- m : a binary mask ($m_i = 1$ indicates that pixel z_i is a foreground pixel)
- b : class index for the background
- z : the observed pixel intensities

II. DATASET

Parallel to the problem described in [1], we have generated a similar dataset where each image consists of randomly picking a background image and a foreground image and paste them together.



Fig. 1. Background images



Fig. 2. Foreground images

Fig 1 shows the background images used, fig 2 shows the foreground images used, and fig 3 shows some of the generated



Fig. 3. Samples of combined images

images. Only the generated combined images are presented to our model and are used for model learning.

REFERENCES

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