Run LIRA-Ising Example

Katy McKeough

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Introduction

In this tutorial we will show you how to run the entire minimal boundary process as detailed in the paper. The first step is to use Low-counts Image Reconstruction and Analysis (LIRA) to estimate the expected multiscale counts in each pixel of our image. Next we separate the image into two partitions: the region of interest (ROI) for which we would like to define the minimal boundary around and the background. To so so we run the Ising Gibbs Sampler which allows us to assign probabilities to each pixel of boing in the (ROI) while favoring similar assignments of adjacent pixels through the using the Ising distribution a priori. Finally we use these estimated probabilities to estimate the minimal boundary. We do this via maximizing the posterior (MAP) in two ways. The first is an ad hoc approach where we find the maximum in a subet of predetermined pixel assignments. The second is taking advantage of Genetic Algorithms (GA) to find the global maximum in a larger space. Details of this procedure can be found in the McKeough et al. (TBD) paper currently hosted on Overleaf.

Procedure

LIRA

The source code and instructions for LIRA can be found on GitHub at . Once y

Ising Gibbs Sampler

Ad Hoc MAP

GA MAP