

Motivation

- Manually segmenting new medical images for training data is tedious and time-consuming
- Interactive segmentation** tools seek to alleviate this burden

Existing DL Approaches:

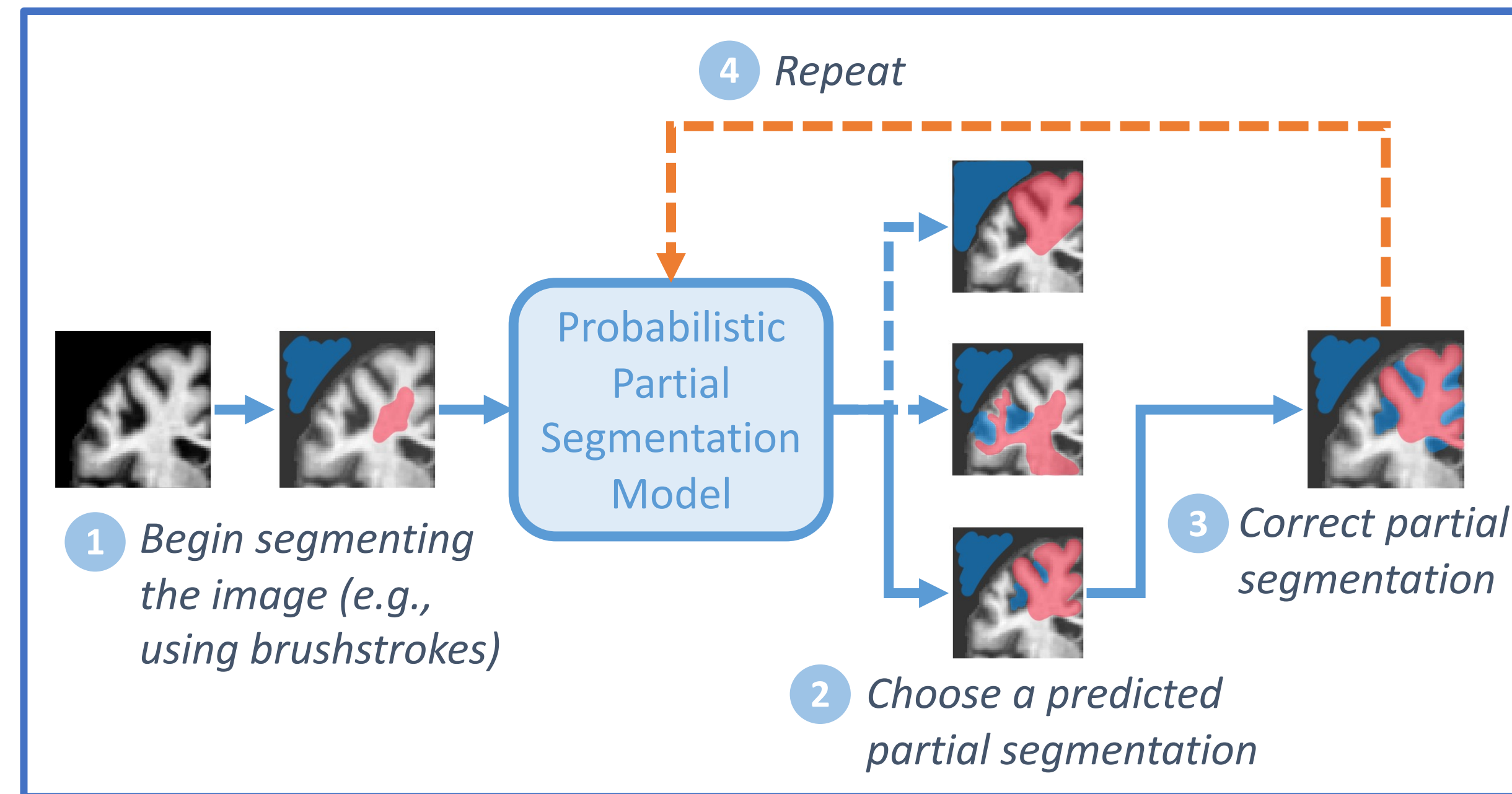
- Focus on predicting in-domain segmentation from initial user inputs and then refine the prediction based on user corrections

Goal: help users accurately segment images from new domains with fewer corrections

Our Approach:

- Given an input image and partial segmentation, **predict multiple more complete segmentations**
- Users can pick one they like best, make corrections and iterate

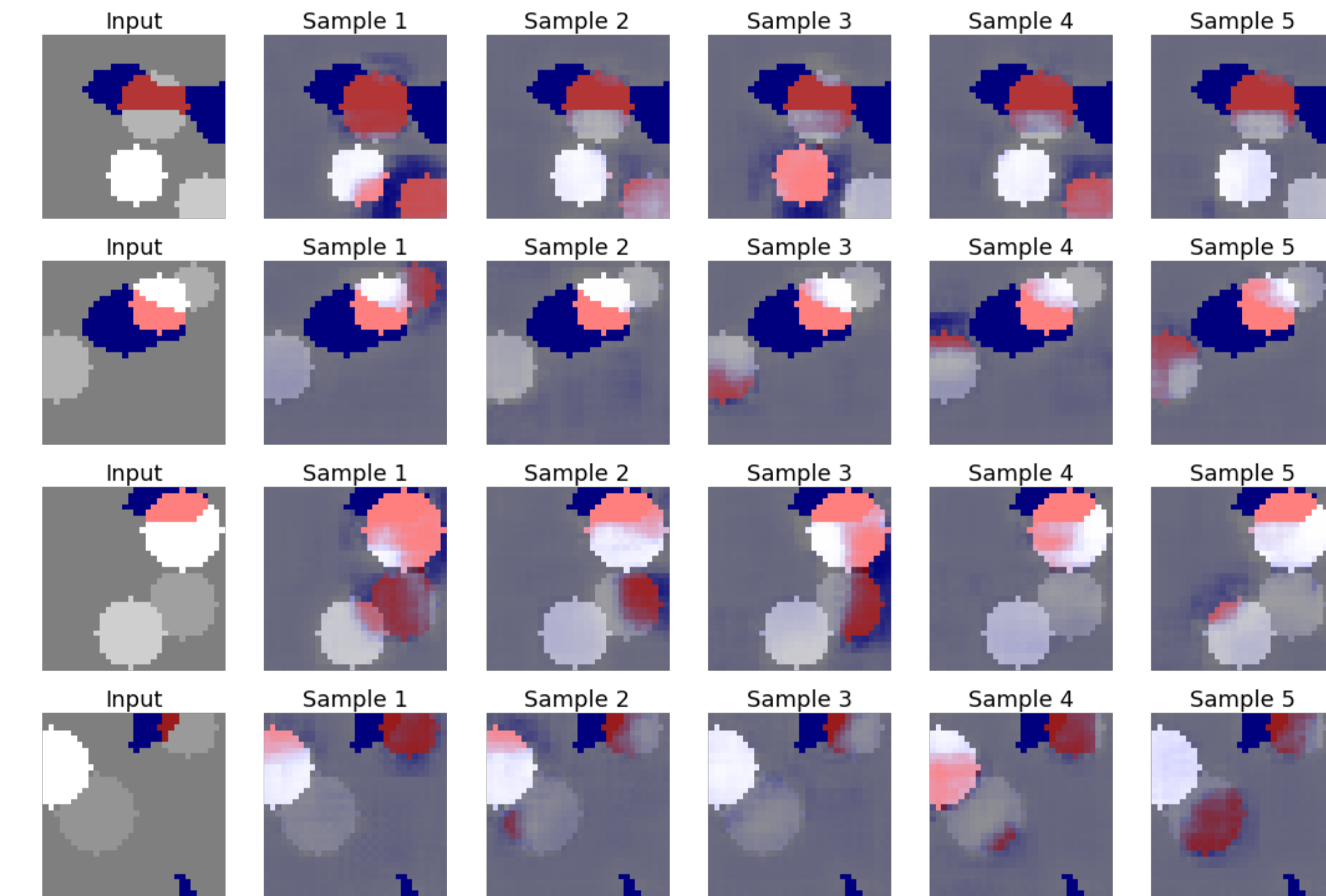
Schematic



Experiments

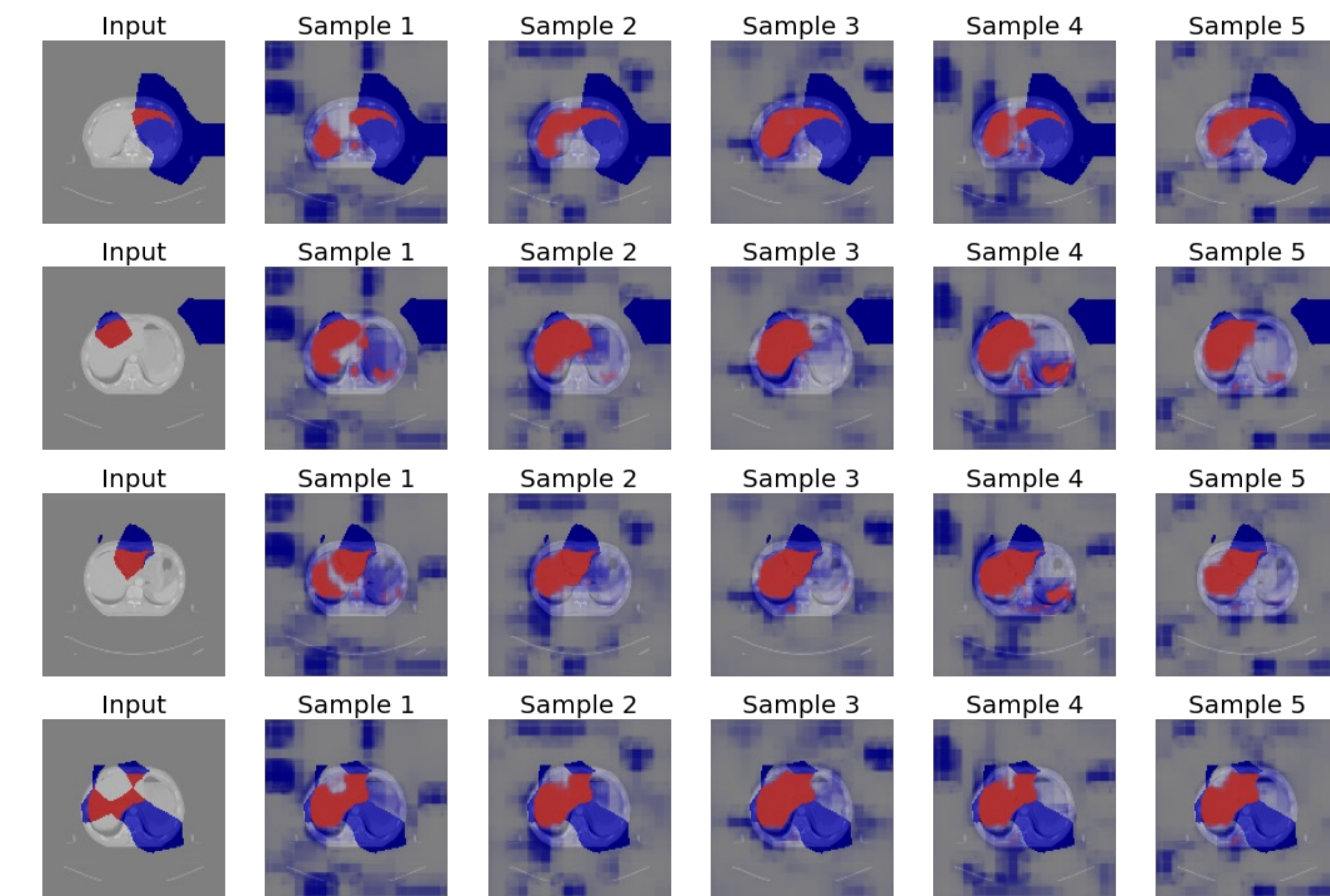
Toy Data: randomly generated images of 3 disks

Results: the predicted partial segmentations grow on average 82% with a mean Dice of 0.87 on the added segmentation



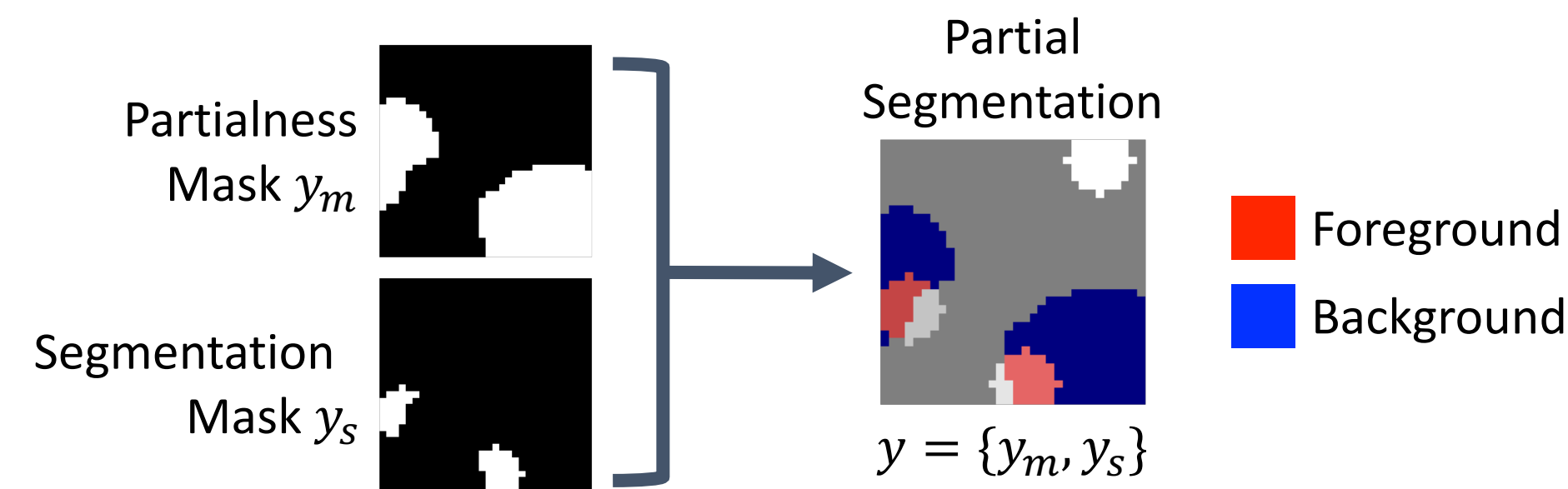
Real Data: 2D slices from 3D Abdominal CT from 150 subjects with labels for Liver from WORD

Results: the predicted partial segmentations grow on average 218% with a mean Dice of 0.81 on the added segmentation

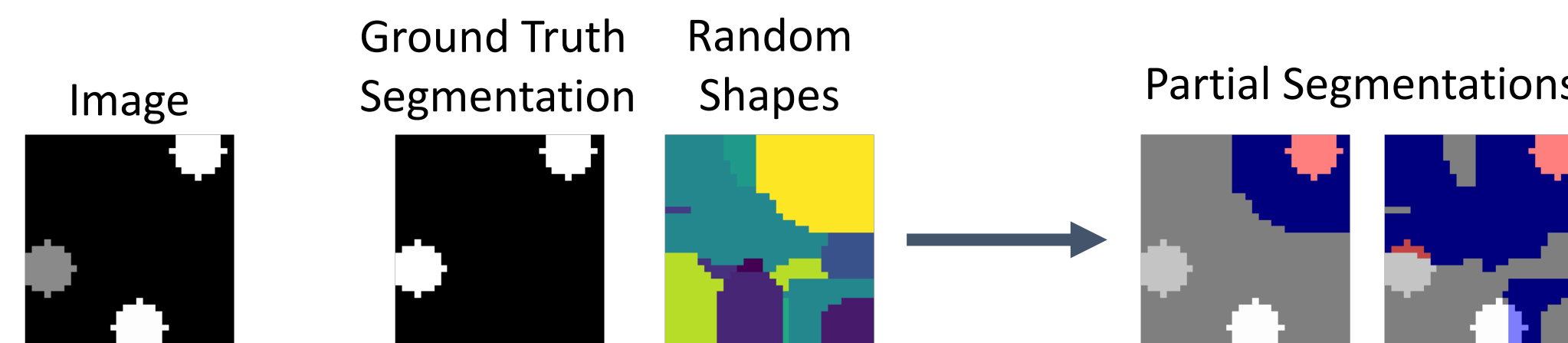


Given the same input and different $z \sim \mathcal{N}(0,1)$, the decoder predicts diverse more complete segmentations

Methods



Simulating Pairs of Partial Segmentations



Probabilistic Generative Model for Partial Segmentations

