Background

- Cervical cancer is the third leading cause of cancer mortality worldwide and the second most lethal cancer in developing countries; more than half of women who develop cervical cancer have not been screened appropriately.
- Visual inspection with acetic acid (VIA) along with primary HPV testing is a cost-effective screening method in resource-limited settings.
- The first step to automated cervical cancer screening using computer vision methods is to segment the cervicographic features.

Methods

- Validate the performance of the trained CNN by calculating the Jaccard Index, or Intersection over Union (IoU), for a set of labeled validation images.
- The SharpMask CNN architecture consists of the DeepMask feedforward CNN (left) with a bottom-up structure for image segmentation followed by refinement modules (middle and right) in a top-down structure.
- N = 300 (72.9%) manually labeled cervigrams trained the CNN and the model was validated on N = 111 (27.1%) of the images.
- An IoU value of 1 indicates a model that completely predicts the ROI.

Results

- Discriminative CNN architecture yields state of the art image segmentation of cervigrams.
- Model trained on a small fraction of the pilot dataset (14%). Training the model on a larger number of images will likely yield higher segmentation accuracy (IoU).
- Automatically segmented cervigrams from our model trained on the complete dataset will next be used to train a classification CNN to predict malignancy.

Conclusions

- Loss function and IoU of DeepMask model during training.
- Intersection over Union (IoU) for 300 training cervigrams and 111 validation cervigrams.

References

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