Automatic White Blood Cell Detection and Segmentation in Microscopy Images of Thin Blood Smears

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METHOD

The proposed algorithm includes three main steps:

- Pre-processing
  - To extract regions of interest (ROI) and perform illumination correction and color enhancement

- White Blood Cell Detection
  - To specify the location of any white blood cell present in an image using a range filtered version of the image

- White Blood Cell Segmentation
  - To segment the detected cells employing an accurate level-set algorithm

DATASET & ANNOTATION

- More than 1300 slide images containing about 1350 WBCs were acquired at Chittagong Medical College Hospital in Bangladesh

RESULTS

- We evaluate the two processing steps of our algorithm, cell detection and cell segmentation, separately:
  - WBC Detection Step
    - Measure: Value
      - Precision: 96.37
      - Recall: 98.57
      - F1 Score: 97.36
  - WBC Segmentation Step
    - Measure: Value
      - Jaccard Index: 82.28
      - Dice Index: 78.33

CONCLUSIONS

- The outcome of the proposed method for sample images from our dataset is demonstrated below.

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REFERENCES