

# Enhancing the Performance of Cervical Cancer Screening using the Item-Item Collaborative Filtering

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## Abstract

Collaborative filtering algorithms hold significant promise in the field of cervical cancer screening. This study investigates the application of item-item collaborative filtering approach to enhance the performance of identifying benign metaplastic, abnormal koilocytosis, and abnormal dyskeratotic cervical cells. The state-of-the-art in cervical cancer screening primarily relies on cytology testing, facing challenges of sensitivity and specificity, leading to false positives and negatives. By leveraging collaborative filtering techniques, this research aims to address these limitations and improve screening outcomes. This study is a retrospective study that was conducted by using the publicly available datasets of cervical cell samples collected from multiple healthcare institutions. The study employed a cross-sectional design and machine learning methodologies for data preprocessing and feature extraction. The item-item collaborative filtering approach was trained on a dataset of annotated cervical cell images by cytologists, with validation performed using a separate number of datasets to assess performance metrics. The results demonstrate the effectiveness of collaborative filtering in accurately identifying specific cervical cell abnormalities, achieving a sensitivity of 90.7%, specificity of 84.3%, and an ROC-AUC of almost 92%. These findings highlight the potential of collaborative filtering as a valuable tool in augmenting early detection and reducing false results in cervical cancer screening programs. Further validation studies and integration into existing screening protocols are recommended to offer the clinical adoption of the proposed approach.

**Keywords:** Item-Item Collaborative Filtering; Cervical Cancer; Screening; Cervical Cell Abnormalities

