

# DIGITAL PATHOLOGY & IMAGE ANALYSIS

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## Study on the performance of an artificial intelligence system for image based analysis of urine samples

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In this study, we evaluate the performance of Shrava, a cloud based Artificial Intelligence (AI) system for automated analysis of images captured from urine samples. Identification and morphological classification of objects in urine sediments by Shrava was compared with the results from Sysmex UF-1000i urine analyzer and manual microscopy. Thirty urine samples were analysed for the study, wherein, on an average, 50 different fields of views were captured at a magnification of 400x from slides prepared from the samples. Classification of objects from the captured images was verified by three qualified medical experts and sensitivity, specificity, and accuracy of the classification results were calculated. Classification performance of Shrava was evaluated for RBCs, WBCs, crystals, epithelial cells and organisms (yeast and bacteria). The specificity for classification was above 97% for RBCs and above 99% for all other objects, while sensitivity was above 99% for yeast and epithelial cells, above 97% for RBCs, WBCs, and bacteria, and above 87% for crystals. Overall, classification accuracy for all objects was 96.4%. We also evaluated the sensitivity of Shrava for the above mentioned objects vis-a-vis reports obtained through a combination of urine analyser and manual microscopy and it was found to be 96.19%. Shrava was found to be effective in identifying and classifying objects in urine sediments. It saves time by aiding pathologists as a screening solution and also accelerates the turnaround time, thereby, increasing the productivity of pathologists and the laboratory.

### Biography

Renu Ethirajan has completed her MBBS and DNB Pathology from Father Muller Medical College, Mangalore, India. She is currently working as Director Pathology for SigTuple, an organization that provides healthcare solutions driven by artificial intelligence and image processing. She has worked as a Consultant Hemato-Oncopathologist and has reported flowcytometry for more than 8 years at HCG Cancer Hospital, Bangalore. She is also trained in molecular diagnosis like fluorescent *in-situ* hybridization and immuno-hematology. She has presented multiple papers in reputed CMEs and conferences. She has participated at the National Indian Conclave as a panelist on artificial intelligence.

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