

## Literature Based Large Scale Multimodal Biomedical Image Classification and Retrieval

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**Dr. Mahmudur Rahman** received his PhD in Computer Science in 2008 from Concordia University, Montreal, Canada with an emphasis on Medical informatics and Image Retrieval. Prior to joining as an Assistant Professor at Morgan State University, Baltimore, USA, Dr. Rahman extensively conducted his research at the National Institutes of Health (NIH), USA for almost six years as a Research Scientist and recently worked as a Visiting Scientist. He significantly contributed to research and development of the image processing, classification, and retrieval methods extensively used in the NLM's **Open-i** search engine for biomedical literature. He has good expertise in the fields of Computer Vision, Image Processing, Information Retrieval, Machine Learning, and Data Mining and their application to retrieval of biomedical images from large collections.

**Abstract:** Given the rapid growth of scientific discovery concomitant with an exponential growth of biomedical literature, it is increasingly difficult to search for information in the right place at the right time within large volumes of literature. Overall, biomedical literature incorporates an approximation of 100 million figures, whereas the biomedical open access literature of PubMed Central of National Library of Medicine (NLM) alone contained almost two million images in 2014. It poses significant technical challenges to transform of massive volumes of image and text data from such a repository into useful information and actionable knowledge. Authors of journal articles frequently use illustrations (e.g., charts, graphs, maps, diagrams, color or grayscale photographs) to elucidate the text, or to highlight special cases as Region of Interests (ROIs). This creates a compelling need for innovative tools for managing, and retrieving images from large collections based on their contents (such as color, texture, and shape), commonly known as Content-Based Image Retrieval (CBIR). Until now, little attention is devoted to the use of images in the articles as the meaning of images cannot be understood by analyzing their content alone. My research goal may be formulated as seeking better ways to retrieve information from biomedical journal articles by moving beyond conventional text-based searching to combining both text and visual features in search queries. This talk will present my previous and on-going works based on participation in the ImageCLEFmed benchmark campaign during the last several years and development of NLM's Open Access Biomedical Image Search Engine (Open-i) towards achieving the above goal. In addition, I will also present my research in breadth about developing Decision Support Systems for different imaging modalities (US, MRI, dermoscopy), using Deep Learning for Biomedical Big Data, as well as show some possible future directions for collaboration. Abstract is here.

Contact Dr. Soo-Yeon Ji ([sji@bowiestate.edu](mailto:sji@bowiestate.edu)) if you have any question.