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A Mathematical Model for COVID-19 Image Enhancement based on Mittag-Leffler-Chebyshev Shift

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Abstract

The lungs CT scan is used to visualize the spread of the disease across the lungs to obtain better knowledge of the state of the COVID-19 infection. Accurately diagnosing of COVID-19 disease is a complex challenge that medical system face during the pandemic time. To address this problem, this paper proposes a COVID-19 image enhancement based on Mittag-Leffler-Chebyshev polynomial as pre-processing step for COVID-19 detection and segmentation. The proposed approach comprises the MittagLeffler sum convoluted with Chebyshev polynomial. The idea for using the proposed image enhancement model is that it improves images with low gray level changes by estimating the probability of each pixel. The proposed image enhancement technique is tested on a variety of lungs computed tomography (CT) scan dataset of varying quality to demonstrate that it is robust and can resist significant quality fluctuations. The blind/referenceless image spatial quality evaluator (BRISQUE), and the natural image quality evaluator (NIQE) measures for CT scans were 38.78, and 7.43 respectively. According to the findings, the proposed image enhancement model produces the best image quality ratings. Overall, this model considerably enhances the details of the given datasets, and it may be able to assist medical professionals in the diagnosing process.

Keywords

Author Keywords: [CT scans](#); [COVID-19](#); [Mittag-Leffler](#); [Chebyshev polynomial fractional calculus](#)

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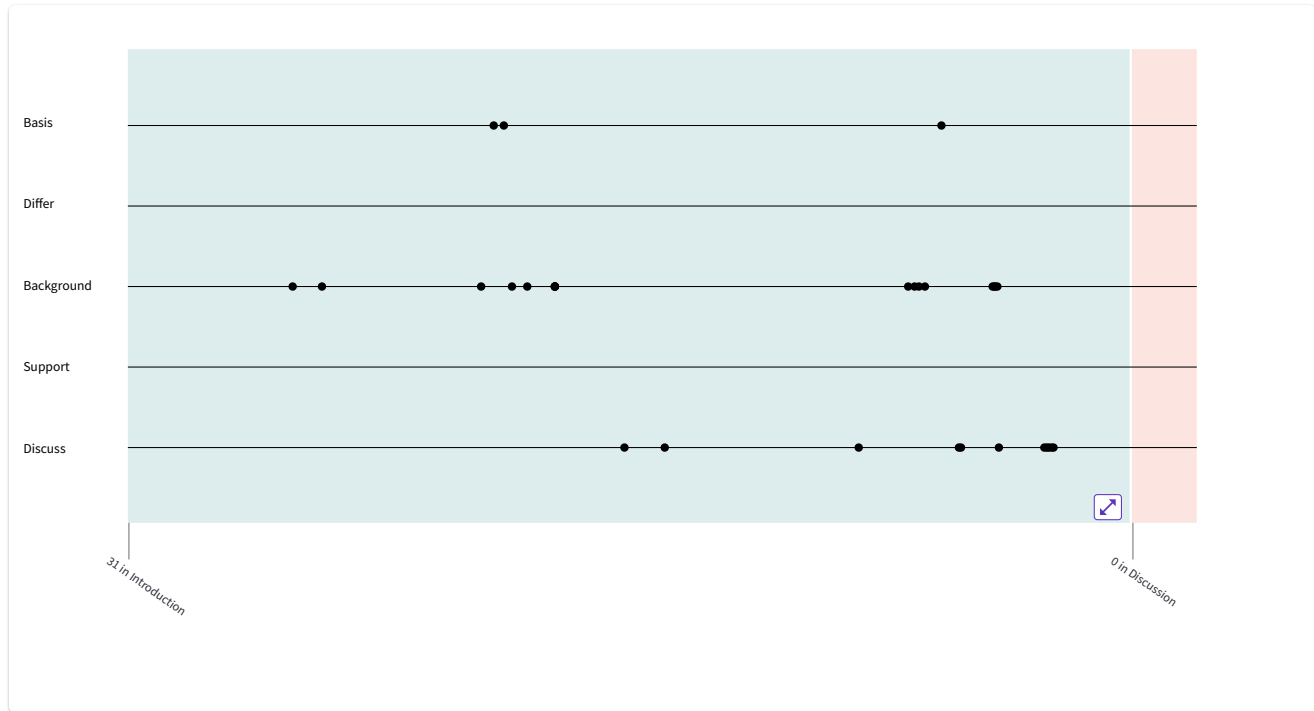
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