

MONASH CENTRE FOR ELECTRON MICROSCOPY

Towards Fast Viewing Parameter Estimation in Cryo-EM Reconstruction

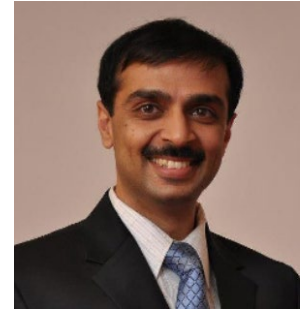
Date: Tuesday, 28th May 2024

Time: 11:00am – 12:00pm

Venue: Theatre S10,
16 Rainforest Walk, Monash Clayton Campus

Abstract

Many currently employed techniques for cryo-electron microscopy iterate between the viewing angle parameters and the structure itself, leading to very high computational complexity. In this talk, we outline our work in progress towards a non-iterative form of viewing angle parameter estimation. First, our technique considers a two-dimensional unknown view angle tomography problem, where we make an assumption that the knowledge of the viewing parameter distribution is available a priori. Using dimensionality reduction and the concept of order statistics of the parameter distribution, we present an algorithm for reconstruction and derive analytical error bounds for it. We then proceed to present an algorithm to deal with the case where the viewing parameter distribution is unknown. Lastly, we outline directions for extensions of this algorithm to the 3D case.



A/Prof Ajit Rajwade,
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Computer Science and
Engineering at IIT
Bombay.*

Biography

Ajit Rajwade is an Associate Professor in the Department of Computer Science and Engineering at IIT Bombay. He obtained his bachelors degree from the University of Pune, Pune (India), his masters degree from McGill University, Montreal (Canada) and his PhD degree from the University of Florida, Gainesville (USA) -- all in computer science and engineering. He worked as a postdoctoral researcher at Duke University, Durham (USA) prior to joining IIT Bombay as a faculty member. His research interests are in signal and image processing and computer vision, with a focus on image and video restoration, compression and reconstruction, tomography, compressed sensing and sparse regression. He is also interested in areas of data science such as probability density estimation, graph signal processing and group testing. In these areas, he has published more than 60 papers in prestigious international conferences and journals. He is a senior member of the IEEE and an associate editor of the journals Signal Processing (Elsevier) and the IEEE Open Journal on Signal Processing. He is a recipient of an excellence in teaching award from IIT Bombay.

Convener: Professor Laure Bourgeois

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