Viewing Graph solvability in structure from motion

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Federica Arrigoni

Federica Arrigoni is a tenure-track assistant professor (RTD-B) with the Politecnico di Milano (Italy). She received her MS degree in Mathematics from the University of Milan (Italy) in 2013, and the PhD degree in Industrial and Information Engineering from the University of Udine (Italy) in 2018. Her PhD thesis was awarded from the Italian Association for Computer Vision, Pattern Recognition and Machine Learning (CVPL) in 2018 and from the University of Udine in 2019. From 2018 to 2020 she was a junior researcher with the Czech Institute of Informatics, Robotics, and Cybernetics (CIIRC) of the Czech Technical University in Prague (Czech Republic). From 2020 to 2022 she worked as an assistant professor (RTD-A) with the University of Trento (Italy). She co-organized a workshop on "Traditional computer vision in the age of deep learning" at ICCV 2021 and tutorials on geometric computer vision at CVPR 2020 and CVPR 2022. She is associate editor of CVIU, she regularly serves as reviewer for CVPR, ECCV and ICCV, and she was acknowledged as an outstanding reviewer at CVPR 2021. She is the main author of the paper entitled "Viewing Graph Solvability via Cycle Consistency" that won the Best Paper Honorable Mention at ICCV 2021 (corresponding to top-5 papers out of 1612 accepted papers). Her research focuses on geometric problems in 3D Computer Vision.

Abstract of the talk

Structure from Motion (SfM) is a fundamental task in computer vision that aims at recovering both cameras and the 3D scene starting from multiple images. The problem can be conveniently represented as a "viewing graph": each node corresponds to a camera/image and an edge is present between two nodes if the fundamental (or essential) matrix is available. While several research efforts on SfM have focused on devising more accurate and efficient algorithms, much less attention have been devoted to investigating theoretical aspects. In particular, a relevant question is establishing whether a viewing graph is "solvable", i.e., it uniquely determines a configuration of cameras. This talk will give an overview on existing results on viewing graph solvability, starting from the calibrated case (where it is known that solvable graphs are those that are parallel rigid), reaching up the more complicated uncalibrated case (where the problem reduces to solving polynomial equations and it still offers open issues).