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Ph.D. DISSERTATION DEFENSE

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Title:	DATA-DRIVEN GEOMETRIC WORKFLOWS FOR CAMERA LOCALIZATION
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ABSTRACT

Visual localization aims to estimate the spatial relationship between a camera and its environment based on visual media captures. However, the increasing need for robustness in challenging environments and the requirement to solve semantic-centric problems has presented challenges for geometric localization workflows. Conventional methods rely on hand-crafted heuristics that struggle to meet the growing demands of such environments. On the other hand, emerging deep learning methods face issues with generalization and interpretability due to their geometry-agnostic nature. To address these challenges, this dissertation presents a hybrid localization workflow that leverages both geometric and data-driven priors. We summarize four of our works that achieved remarkable progress in terms of robustness, accuracy, and interpretability by utilizing our proposed workflow. The four works span across different fields, including visual odometry, object localization, floor plan localization, and viewpoint learning, respectively.

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