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UNIVERSITY OF HONG KONG DOCTORAL THESIS Event-based Vision

**for 6-DOF Pose Tracking and 3D Mapping**

**1**

Author: Weipeng GUAN Supervisor: Prof. Peng LU

**Co-Supervisor: Prof. James LAM A thesis submitted in fulfillment of the requirements for the degree of Doctor of Philosophy in the Mechanical Engineering Faculty of Engineering May 9, 2025 Abstract of thesis entitled**

**23**

Event-based Vision

**for 6-DOF Pose Tracking and 3D Mapping**

**1**

Submitted by Weipeng GUAN

**for the degree of Doctor of Philosophy at The University of Hong Kong in May, 2025 Simultaneous Localization and Mapping (SLAM) serves as a**

**22**

foundational technology for emerging

**applications, such as robotics, autonomous driving, embodied intelligence, and augmented / virtual reality**

**12**

. However, traditional image-based SLAM systems still struggle with reliable pose estimation and 3D reconstruction under challenging conditions involving high-speed motion and extreme illumination variations.

**Event cameras, also known as dynamic vision sensors**

**39**