Zijian Dong   Curriculum Vitae

CONTACT
INFORMATION

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RESEARCH
BACKGROUND

- **Computer Vision**: 3D Reconstruction, Generative Model, 3D Descriptor Learning, View Synthesis

- **Robotics**: Semantic SLAM, 6D Pose Estimation

EDUCATION

ETH Zurich, Zurich, Switzerland   2018 – present

- M.Sc. in **Robotics, System and Control**
  GPA: **5.84/6** – Core Courses.

Xi'an Jiaotong University (XJTU), Xi'an, China.   2013 – 2017

- B.Eng in **Honors Engineering Program**.
  GPA: **94.14/100 (3.98/4)** , Rank: **1/62**.

- **The Special Class for Gifted Young**   2011 - 2013
  A honors program for nationwide selected junior high school graduates. Rank: **13 / 126**

Hong Kong University of Science and Technology (HKUST), Hong Kong, China   2016

- Undergraduate Exchange Program
  GPA: **4.1/4.3** .

RESEARCH
EXPERIENCE

Advanced Interactive Technology(AIT) Lab, ETH Zurich   Oct. 2019 – Mar. 2020

- **Category Level Object Pose Estimation via Neural Analysis-by-Synthesis**
  Supervisor: Prof. Otmar Hilliges, Prof. Andreas Geiger

  In this work, we combine a gradient-based fitting procedure with a parametric neural image synthesis module that is capable of implicitly representing the appearance, shape and pose of entire object categories, thus rendering the need for explicit CAD models per object instance unnecessary.

Computer Vision and Geometry Group(CVG) Lab, ETH Zurich   Sep. 2019 – Mar. 2020

- **IVO: Instance-based Visual Odometry**
  Supervisor: Prof. Marc Pollefeys, Dr. Zhaopeng Cui

  In this work, we propose a novel instance-based visual odometry by leveraging both category-level and instance-level semantic information. On one hand, we integrate the instance-level semantic constraint between map points and camera poses into a general visual odometry framework. In order to establish more constraints for feature-less objects, we propose to generate virtual 3D instance points. We also model the uncertainty of the object tracking to improve the robustness of the general VO framework. On the other hand, we propose practical dynamic object detection methods for both monocular and stereo visual odometry based on the instance-level semantic information.

Mixed Reality & AI Lab, Microsoft Zurich   Jan. 2019 – Aug. 2019

- **MVPDesc: Multi-View-Point Descriptor Learning for Registration of 3D Objects**
  Supervisor: Prof. Marc Pollefeys, Dr. Johannes L. Schönberger, Dr. Christoph Vogel

  We develop a learning pipeline for 3D descriptors, in which the algorithm can learn the local features of one point cloud from the projection of local patches of corresponding points in multi-view images onto its surrounding sphere by Spherical CNN. The resulting descriptors will be used to perform 3D matching or 3D object recognition and have better view-invariant or rotation-invariant properties comparing to existing descriptor learning methods like SIFT.

Robotics, Perception & AI Lab, CUHK, Hong Kong   Feb. 2017 – Jun. 2018

- **Autonomous Elevator Button Recognition System**
  Supervisor: Prof. Max Q.-H. Meng

  We propose an elevator button recognition system based on the convolutional neural networks. In consideration of the diverse button shapes, a contour extraction algorithm and the noise filtering are specifically designed to avoid the exhaustive search and reduce the consumed time. Then the fine-tuned CNN model is trained on our established elevator button dataset to achieve a more reliable recognition performance comparing to the template matching methods. Besides, the arrangement pattern of buttons is utilized to deduce the missing buttons and correct mistakes.

Department of Electronic and Computer Engineering, HKUST   Feb. 2016 – Jun. 2016

- **Self-balancing UAV Design**
  Supervisor: Prof. Shenghui Song

  We designed the overall structure of unmanned aerial vehicle with SolidWorks and choose the MPU6050 6-axis embedded accelerometer and gyroscope as sensors. After designing it, we applied the cascade PID control system to realize closed-loop control and used MATLAB simulation to adjust the parameters of PID controller. Finally this control algorithm was implemented with the embedded platform Arduino Nano.

SELECTED
PUBLICATIONS

1. Xu Chen⋆, **Zijian Dong**⋆, Jie Song, Andreas Geiger, Otmar Hilliges. *Category Level Object Pose Estimation via Neural Analysis-by-Synthesis*, submitted to the European Conference on Computer Vision (ECCV), 2020 (* indicates equal contribution.)

2. Guoxiang Zhou⋆, **Zijian Dong**⋆, Zhaopeng Cui, Marc Pollefeys, Torsten Sattler. *IVO: Instance-based Visual Odometry*, submitted to the European Conference on Computer Vision (ECCV), 2020 (* indicates equal contribution.)

3. **Zijian Dong**, Delong Zhu, Max Q.-H. Meng. *An Autonomous Elevator Button Recognition System Based on Convolutional Neural Networks*, IEEE International Conference on Robotics and Biomimetics (ROBIO), 2017**(oral)**

HONORS AND
AWARDS

- ***Winner Award*** of ETH Robotic Summer School Challenge.   2019

- ***ETH Scholarships***(5800 CHF).   2019

- ***Outstanding Graduate***(Top 5%).   2017

- ***National Scholarship of P.R. China***. (top 1%,highest undergraduate honor)   2015 2016

- ***National Endeavor Scholarship*** (top 2%).   2014

- ***National First Prize***, China Undergraduate Mathematical Contest in Modeling (top 1% of 22233 participating teams)   2013

WORK
EXPERIENCE

Mixed Reality & AI Lab, Microsoft Zurich   Jan. 2019 – Aug. 2019
- Semester thesis on learning multi-view descriptor for registration of point clouds

Youibot Robotics, China   Jun. 2018 – Aug. 2018

- Robotics Software Engineer Intern, on designing a vision-based grasping system for UR5 on the mobile robot

Robotics, Perception & AI Lab, CUHK, Hong Kong   Feb. 2017 – Jun. 2018

- Research Assistant, on developing a robot system which could autonomously operate the elevators