

Jingwen Wang

Curriculum Vitae

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🌐 [jingwenwang95.github.io](https://github.com/jingwenwang95)

👤 [JingwenWang95](#)

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Education

- 09/19–Now **PhD in 3D Computer Vision**, *University College London*
Supervisor: Prof. Lourdes Agapito and Prof. Niloy Mitra.
Research covers object SLAM, neural surface reconstruction/SLAM, semantic scene understanding.
- 09/17–09/18 **MRes in Robotics**, *University College London*
Advisor: Prof. Danail Stoyanov. Graduated with Distinction: courses 82.2, thesis 78. Courses cover robotics fundamentals, robotics control, simultaneous localisation and mapping (SLAM) and machine learning.
- 09/13–06/17 **BEng in Electrical Engineering**, *University of Liverpool & XJTLU*
Graduated with First Class Honours: Year 3 average 79.2, Year 2 average 89.3. First 2 years at Xi'an Jiaotong-Liverpool University (XJTLU) and last 2 years at Univeristy of Liverpool.

Work

- 07/22–06/23 **Research Intern**, *Slamcore LTD*, London
Working on developing a real-time online semantic mapping algorithm that leverages prior information from previous frames and an efficient joint 2D-3D inference pipeline. Research paper has been accepted by IEEE Robotics and Automation Letters (RA-L) and integrated to Slamcore's next generation semantic mapping system.
- 10/18–02/19 **Research Intern**, *Emotech LTD*, London
Worked on a project focusing on improving sound source localization and beam-forming using Deep Learning and multi-modal input data.

Publications

- RA-L'23 **Jingwen Wang**, Juan Tarrio, Lourdes Agapito, Pablo F. Alcantarilla, Alexander Vakhitov. SeMLaPS: Real-time Semantic Mapping with Latent Prior Networks and Quasi-Planar Segmentation.
- CVPR'23 Hengyi Wang[†], **Jingwen Wang**[†], Lourdes Agapito ([†]joint first authorship). Co-SLAM: Joint Coordinate and Sparse Parametric Encodings for Neural Real-Time SLAM.
- 3DV'22(Oral) **Jingwen Wang**[†], Tymoteusz Bleja[†], Lourdes Agapito ([†]joint first authorship). GO-Surf: Neural Feature Grid Optimization for Fast, High-Fidelity RGB-D Surface Reconstruction.
- 3DV'21 **Jingwen Wang**, Martin Rünz and Lourdes Agapito. DSP-SLAM: Object oriented SLAM with Deep Shape Priors.

Project Experiences

- SeMLaPS **Summary:** We propose a 2D-3D network-based real-time online semantic mapping system. A 2D network outputs 2D semantic label, which is lifted to 3D via Bayesian-fusion. Bayesian-fused 3D labels are further refined by 3D-CNN at segment-level, which achieves SOTA results while maintaining low computation overhead. Our method also shows better cross-sensor generalisation ability than 3D methods. Work done while interning at Slamcore, accepted by RA-L.
Keywords: semantic scene understanding, semantic SLAM
- Co-SLAM **Summary:** We propose a neural SLAM method that perform real-time camera tracking and dense reconstruction based on a joint coordinate (OneBlob) and sparse parametric (Hash-grid) encoding. We also show, for the first time, a neural SLAM system running close to real-time (10-17Hz) on real-world sequences, and achieve SOTA tracking and better reconstruction results. Work presented at CVPR'23.
Keywords: neural implicit SLAM, NeRF-SLAM
- GO-Surf **Summary:** We propose a fast and high-fidelity surface reconstruction algorithm based on direct feature-grid optimisation from a sequence of posed RGB-D images. GO-Surf converges order-of-magnitude faster than previous method based on MLP, reducing training time from 20 hours to 20 min, while achieving similar reconstruction quality. Work presented at 3DV'22 as an oral presentation.
Keywords: neural radiance field (NeRF), RGB-D surface reconstruction
- DSP-SLAM **Summary:** We propose a real-time object SLAM system leveraging learnt shape priors that is able to build a rich map of complete and detailed objects (like cars, chairs) as fore-ground and sparse point clouds as background. Our object reconstruction process fit our pre-learnt shape priors and current estimate of the object pose to the observation. Reconstructed objects are then added to our joint map to perform joint BA. Work presented at 3DV'21.
Keywords: object-SLAM, neural shape priors, Gauss-Newton, Bundle Adjustment

Code

I have open-sourced and actively maintained all my research projects on my personal GitHub (220+ followers, 1k+ stars). * denotes repositories that I don't own but contributed significantly to.

- DSP-SLAM <https://github.com/JingwenWang95/DSP-SLAM>
Source code for my 3DV'21 paper DSP-SLAM [450+ stars]
- GO-Surf <https://github.com/JingwenWang95/go-surf>
Source code for my 3DV'22 paper GO-Surf [140+ stars]
- KinectFusion <https://github.com/JingwenWang95/KinectFusion>
My own implementation of the famous KinectFusion algorithm in Python with PyTorch [130+ stars]
- Neural-SLAM Benchmark https://github.com/JingwenWang95/neural_slam_eval
An evaluation benchmark for neural SLAM methods [60+ stars]
- Co-SLAM* <https://github.com/HengyiWang/Co-SLAM>
Source code of our CVPR'23 paper Co-SLAM [290+ stars]

Awards

- 2019-2023 UCL Foundational AI CDT PhD studentship.
- 2015-2017 University of Liverpool scholarship (Half-tuition).

Extra-curricular Services

- Reviewer Conference: ICRA 2022, 2024; IROS 2022, 2023; NeurIPS 2023; ICLR 2024
Journal: RA-L, IJRR
- Teaching Image Processing (2019, 2021 and 2023)
Robot Vision and Navigation (2020 and 2021)

Talks

- 2023-07 **Online talk (Chinese)**, cvlife link and ShenLanXueYuan link
The Application of Neural Scene Representations in SLAM. slides
- 2022-09 **3DV'22 Oral presentation**
GO-Surf: Neural Feature Grid Optimization for Fast, High-Fidelity RGB-D Surface Reconstruction. slides