

Student Research Assistant (HiWi)



Latent Diffusion Model (left), Generated Images (right)

Literature Research and Support in Research Projects on Generative Models in Autonomous Driving

In recent years, generative models have seen significant advancements, revolutionizing fields such as image synthesis, natural language generation, and unsupervised learning. Techniques like Generative Adversarial Networks (GANs), Variational Autoencoders (VAEs), and Denoising Diffusion Probabilistic Models (DDPMs) [1] have enabled machines to create highly realistic and complex data, opening new possibilities in Al-driven creativity, data augmentation, and scientific discovery. In the context of autonomous driving, generative models are becoming increasingly important for image [2,3], video [4,5], point clound [6], 3D scene [7] generation, among other applications.

We are seeking a motivated student assistant (HiWi) to contribute to literature research and support ongoing projects in this exciting and evolving field.

The proposed position consists of the following parts:

- + Conduct literature research about diffusion models in autonomous driving.
- + Summarize academic papers and relevant publications.
- + Assist with organizing and preparing research materials.
- + Provide support in ongoing research projects on generative models for autonomous driving applications.

I am happy to answer any questions you might have. Feel free to ask for an appointment or directly ask at my office!

[1] Ho, Jonathan, Ajay Jain, and Pieter Abbeel. "Denoising diffusion probabilistic models." Advances in neural information processing systems 33 (2020): 6840-6851.

[2] Yang, Kairui, et al. "Bevcontrol: Accurately controlling street-view elements with multi-perspective consistency via bev sketch layout." arXiv preprint arXiv:2308.01661 (2023).

[3] Swerdlow, Alexander, Runsheng Xu, and Bolei Zhou. "Street-view image generation from a bird'seye view layout." IEEE Robotics and Automation Letters (2024).

[4] Wen, Yuqing, et al. "Panacea: Panoramic and controllable video generation for autonomous driving." Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition. 2024.
[5] Gao, Ruiyuan, et al. "Magicdrive: Street view generation with diverse 3d geometry control." arXiv preprint arXiv:2310.02601 (2023).

[6] Ran, Haoxi, Vitor Guizilini, and Yue Wang. "Towards Realistic Scene Generation with LiDAR Diffusion Models." Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition. 2024. [7] Gao, Ruiyuan, et al. "MagicDrive3D: Controllable 3D Generation for Any-View Rendering in Street Scenes." arXiv preprint arXiv:2405.14475 (2024).



Institute of Measurement and Control Systems (MRT) Prof. Dr.-Ing. Christoph Stiller

Supervisor:

Kaiwen Wang, M.Sc.

Requirements:

- Prior knowledge of diffusion models [1].
- Strong interest in cutting-edge artificial intelligence technologies.
- Ability to work independently and efficiently.

Language(s): English

For more information please contact:

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Or directly send in your application including your current grades as well as your CV!