My research

My research focuses on improving perception for robotics applications, specifically in the areas of 3D environment understanding and the use of virtual and augmented reality for human-robot interaction. The goal of my research is to develop algorithms and techniques that enable robots to better understand and navigate their surroundings, as well as to improve the way humans interact with robots. This could include the use of 3D sensing technologies such as lidar and stereo cameras, as well as the integration of virtual and augmented reality interfaces for human-robot interaction. My research also aims to explore the use of machine learning and computer vision techniques to improve the performance of robotic perception systems. By advancing the state of the art in these areas, my research aims to enable the development of more capable and versatile robots that can be used in a wide range of applications, from manufacturing and logistics.

Different software engineering tools and areas that have a conection with my research

Robotics Operating Systems (ROS)

Robotics Operating Systems (ROS) is a software framework that provides a set of tools and libraries for building robotic systems [1]. It is widely used in the robotics community and it provides an abstraction layer for managing hardware and software components of a robot. ROS allows for easy integration of different sensors, actuators and other hardware components, as well as for the development of complex robotic behaviors. In my research, ROS could be used to provide a robust and flexible software platform for building and testing perception algorithms for 3D environment understanding, as well as for human-robot interaction.

Machine Learning
Machine learning is a subfield of artificial intelligence that is concerned with the development of algorithms that enable machines to learn from data [2]. It has a wide range of applications, including image and speech recognition, natural language processing, and predictive modeling. In my research, machine learning could be used to improve the performance of robotic perception systems by enabling them to learn from data, such as 3D point cloud data or images captured by cameras.

Virtual Reality (VR) and Augmented Reality (AR)
Virtual Reality (VR) and Augmented Reality (AR) are computer-generated simulations that can be used to immerse users in a virtual environment or to enhance their perception of the real world. They have a wide range of applications, including gaming, education, and training, as well as for human-robot interaction [3]. In my research, VR and AR could be used to improve the way humans interact with robots by providing a more intuitive and natural interface for controlling and interacting with the robot.

All three of these topics in software engineering have the potential to connect with my research in the field of improving perception for robotics applications and 3D environment understanding. ROS can provide a robust and flexible software platform for building and testing perception algorithms, Machine learning can enable the perception systems to learn

from data, and VR and AR can be used to improve human-robot interaction by providing an intuitive and natural interface for controlling and interacting with robots.

Future of software engineering and how advances in software engineering can benefit my research

GitHub Copilot can help my future research by providing code suggestions and autocompletion as I type, which can speed up my development time and reduce the likelihood of errors. Additionally, it can help me discover new libraries and functions that I may not have been aware of, making it easier to build upon existing work.

GitHub, on the other hand, is a web-based platform that allows me to store and share my code with others. It also provides tools for version control, collaboration, and project management. By using GitHub to store my research code, I can easily share it with collaborators, keep track of changes, and maintain a public record of my work.

Chat GPT-3, a large language model trained by OpenAI, can help my research in several ways. One is by providing natural language generation capabilities to automatically generate reports, summaries, and documentations of my research. Additionally, It can also be used to answer questions or provide information on specific topics related to my research. Additionally, it could be used to generate code from natural language instructions, which could help in prototyping, testing, and experimentation with new ideas.

[1] Quigley, Morgan, et al. "ROS: an open-source Robot Operating System." ICRA workshop on open source software, vol. 3, no. 3.4, 2009.
[2] LeCun, Yann, Yoshua Bengio, and Geoffrey Hinton. "Deep learning." Nature 521.7553 (2015): 436-444.
[3] Makhataeva, Zhanat, and Huseyin Atakan Varol. "Augmented reality for robotics: A review." Robotics 9.2 (2020): 21.