CSCI.731 - Project Proposal

Depth-Estimation for Autonomous Driving using Neural Networks in C++

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Introduction

Autonomous driving technology is advancing at a rapid pace and has the potential to revolutionize the transportation industry. One of the crucial components of autonomous driving is the ability to accurately estimate the depth of objects in the environment. In this project, I propose to develop a depth-estimation system using neural networks in C++, with the ultimate goal of integrating it into an autonomous driving system.

Methodology

Iwill be utilizing state-of-the-art monocular depth estimation models such as MiDaS (Mixed Depth and Semantic) which leverages information from both the RGB and semantic segmentation to estimate depth. The implementation of the depth estimation model will be done in C++ to ensure high performance and real-time processing.

Implementation

The implementation will be divided into two stages:

1. Development of the depth estimation model using neural networks and integrating it with existing sources such as MonocularDepth and SimpleRecon.
2. Incorporation of the depth estimation model into an autonomous driving system.

Expected Outcomes

The successful completion of this project will result in the development of a high-performance, real-time depth estimation system that can be integrated into autonomous driving technology. The resulting system will enable autonomous vehicles to better understand the environment, improve their decision-making processes, and enhance their overall safety.

Timeline

The project is expected to take approximately 12 weeks to complete, with the following milestones:

1. Completion of the depth estimation model (6 weeks)
2. Integration with existing sources (2 weeks)
3. Integration with autonomous driving system (4 weeks)

Conclusion

In conclusion, this project has the potential to make a significant contribution to the advancement of autonomous driving technology by providing a robust and real-time depth estimation system. The project is highly relevant and timely and will provide valuable experience in working with cutting-edge computer vision and autonomous driving technologies.

References:

1. https://github.com/isl-org/MiDaS
2. https://github.com/nianticlabs/simplerecon
3. https://github.com/niconielsen32/ComputerVision/tree/master/MonocularDepth