

Single Image Depth Prediction using Deep Neural Networks for Aerial Robots in Underground Environments

Project goal: This research aims to investigate methods for reliable depth estimation from single images. Traditionally, methods in computer vision estimate depth via usage of multiple cameras or by tracking motion of a camera through space over multiple frames. Modern machine learning techniques such as Deep Neural Networks can be employed to estimate depth from a monocular single image. Such methods are particularly useful in texture-less conditions where traditional methods fail and can be extremely valuable for other robotic tasks such as motion estimation and path planning even in visually degraded conditions such as is often the case in underground settings.



Research Tasks:

- Literature review on depth estimation and machine learning techniques.
- Implementation and evaluation of available network architectures.
- Testing and Retraining/Transfer learning with real world data.
- Network modification and performance tuning.
- Experimental Evaluation in the lab and the field.
- Extension to different imaging modalities.

Required Skills:

- Good understanding of Statistics.
- Basic understanding of Computer Vision.
- Experience in Python programming.
- Familiarity with machine learning frameworks e.g. Tesnorflow, Keras.

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