

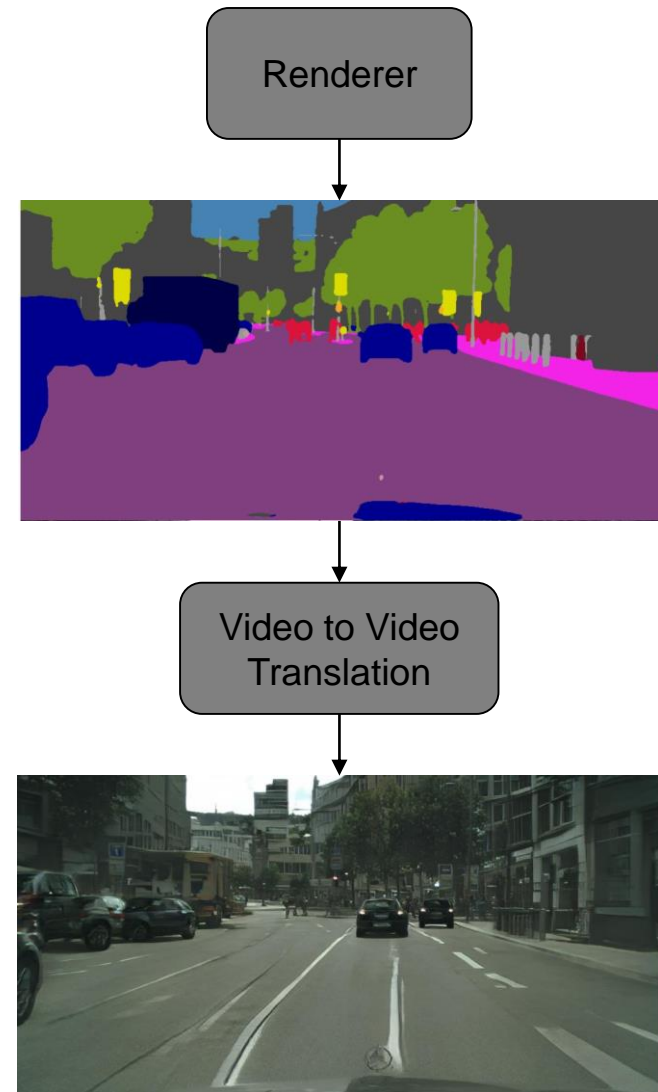
# Projects / Applied Subjects

## Visual Computing

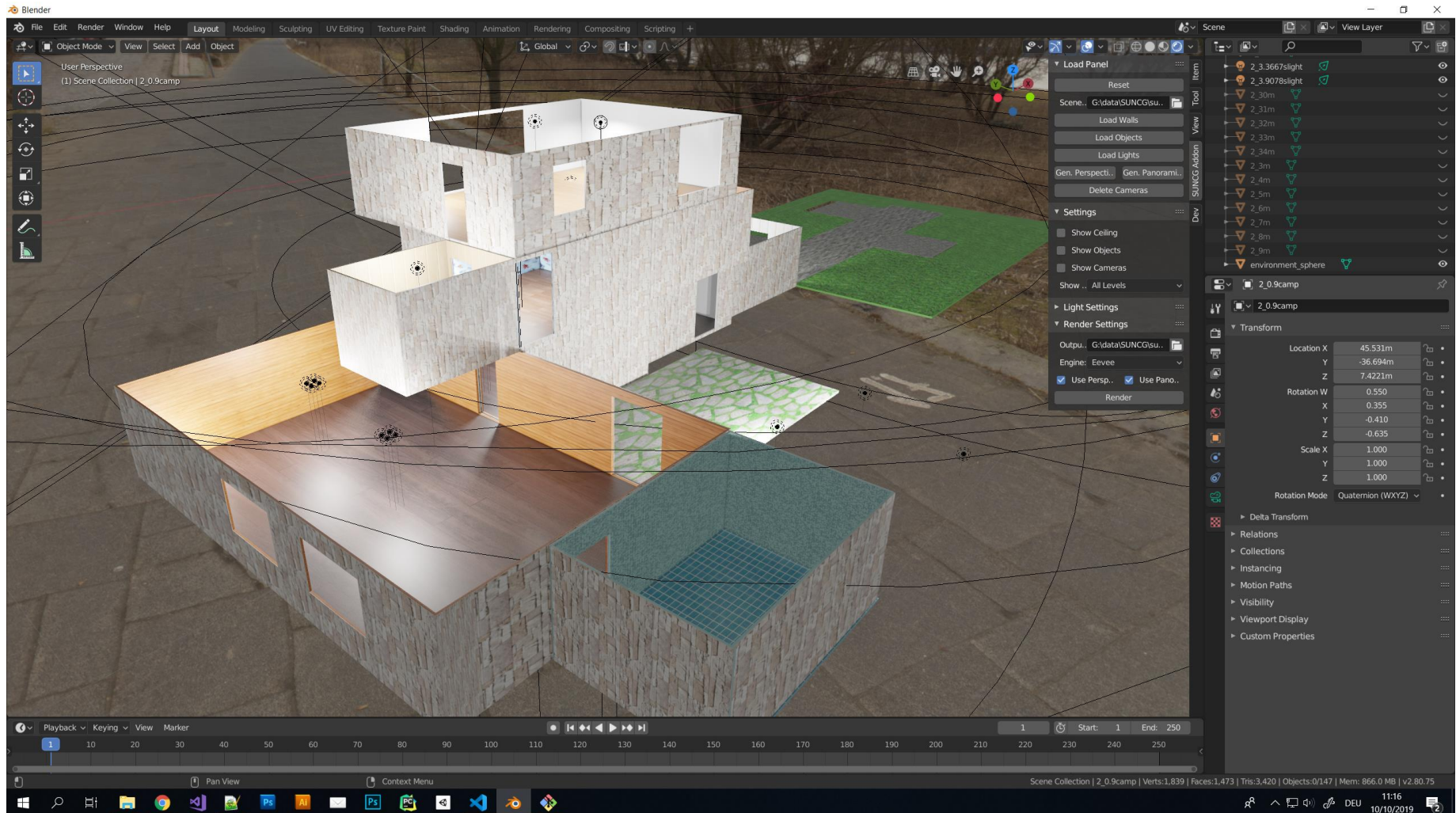


# Neural Renderer

- Build Renderer
  - Access to deferred shading stages
  - Fast CUDA interface to DL models
  - Open playground to test DL algorithms with realtime graphics
- Train Neural Nets
  - Image-to-Image translation
  - Spatio-temporal coherence
  - Neural Textures
- Useful to know:
  - Basic Computer Graphics
  - Existing Renderer (Unity, UE4, ...)
  - Deep Learning (CNNs, GAN, AutoEncoder)

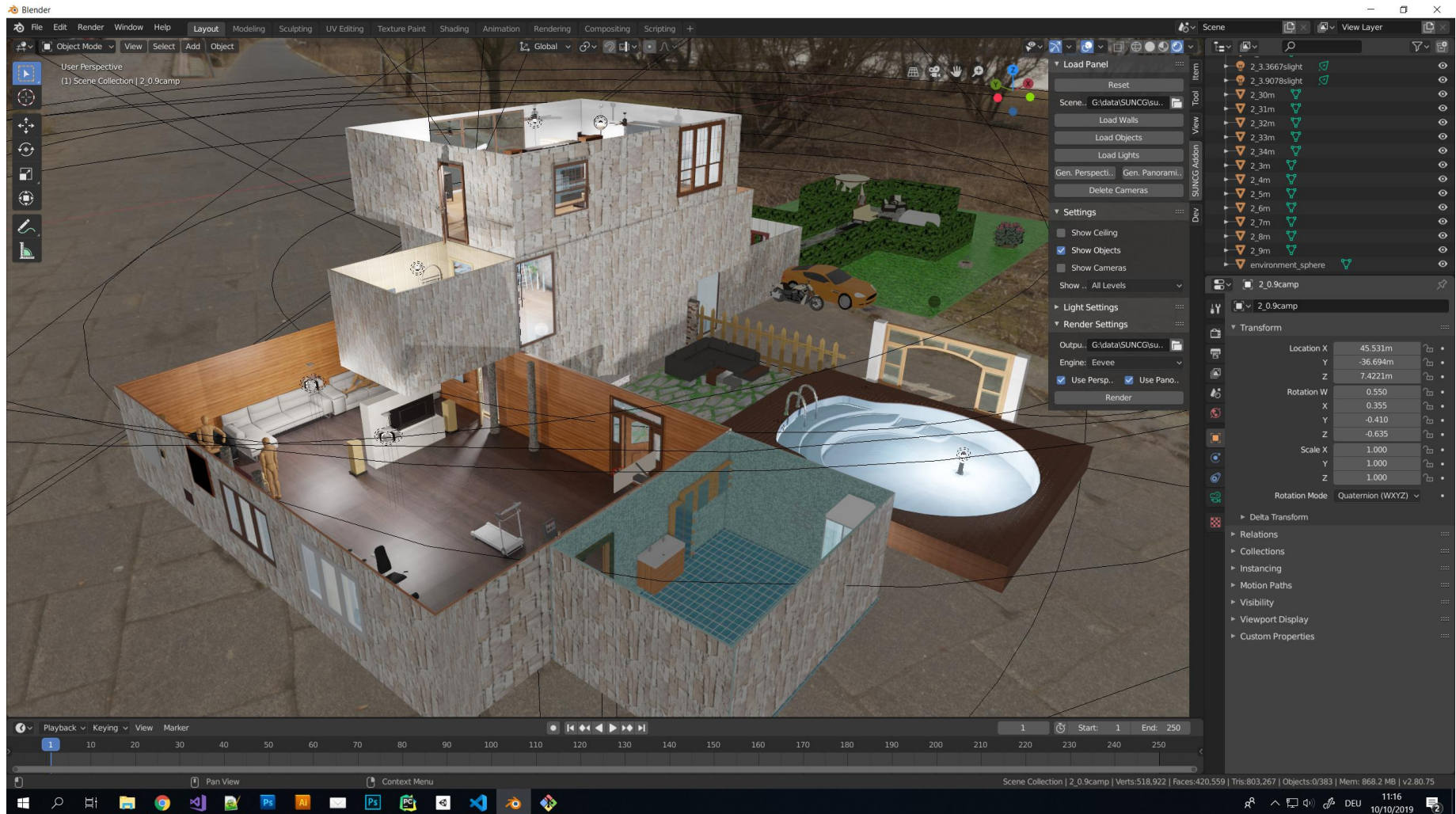


# Blender Addon for Data Synthesis





# Blender Addon for Data Synthesis

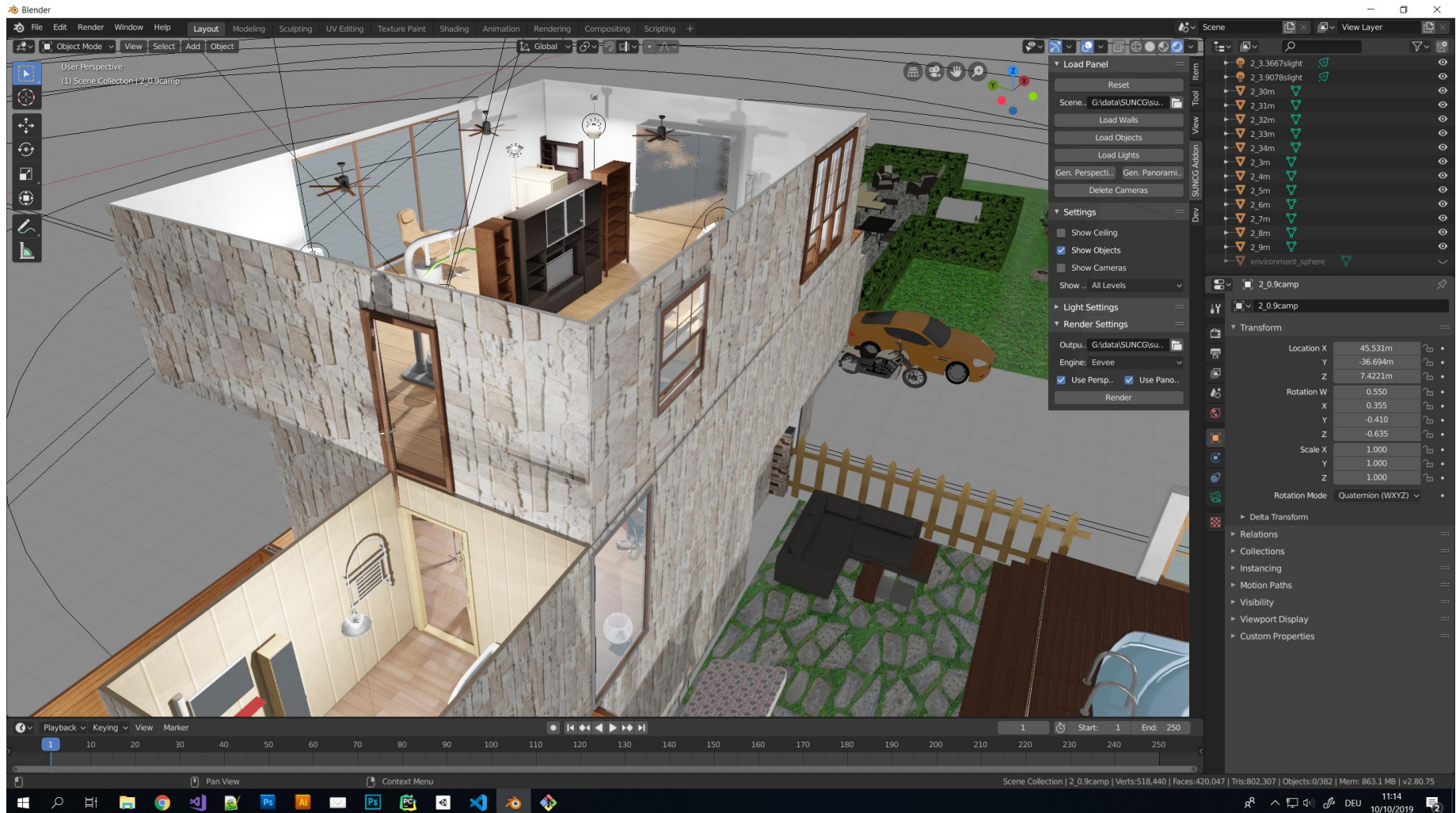


# Blender Addon for Data Synthesis





# Blender Addon for Data Synthesis



# Blender Addon for Data Synthesis

## Our tool

- Blender addon for automated rendering.
- Based on SUNCG data set. (3D indoor scenes ~45K)
- Using Blender Python API

## Topics

1. Detailing Indoor Scenes.
2. Point Cloud Generation (extend existing project).

## Technologies

- Blender 2.8
- Python
- Blender Python API



# Detailing Indoor Scenes

- Detailing Indoor Scenes by adding stuff to the scene
- Precomputation of priors (Indoor Scene Statistics).

Indoor Scene Statistics



3D Objects  
(from ShapeNet)



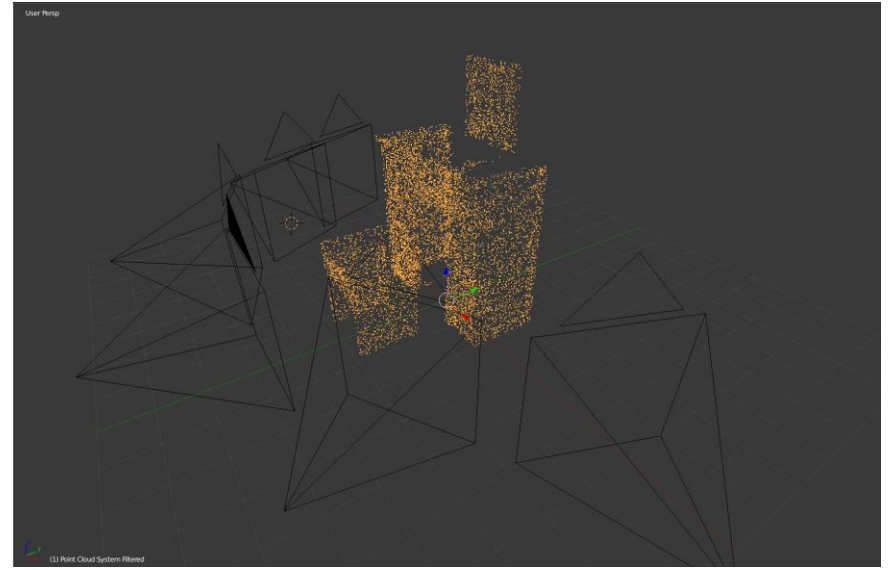
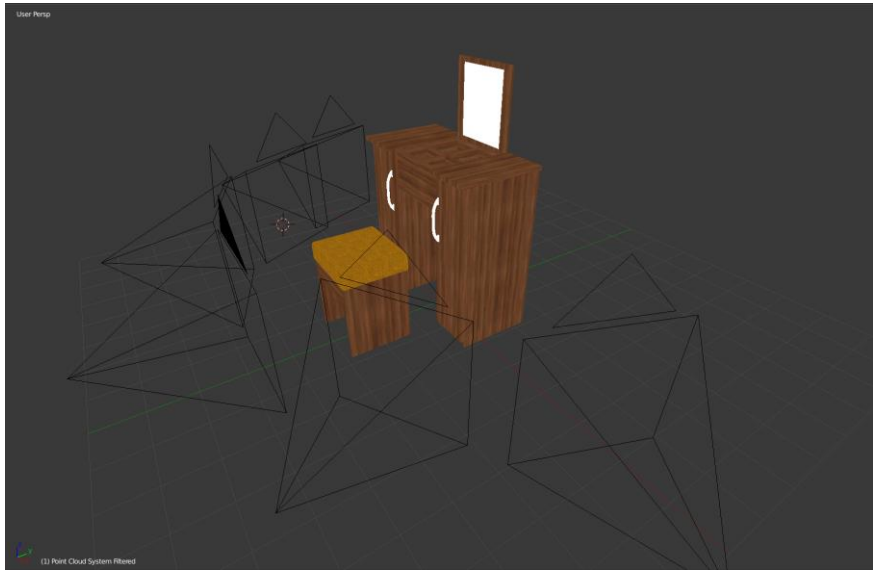
3D Indoor Scene  
(from SUNCG)



Detailed Indoor Scene



# Point clouds by Photogrammetry simulation



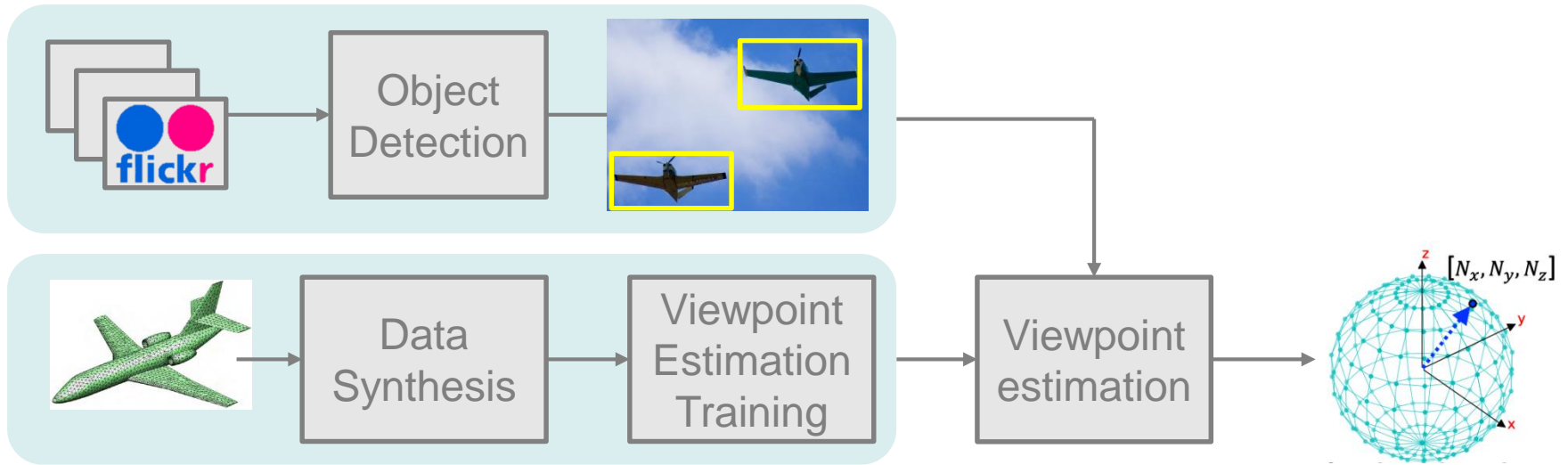
Based on existing project.

- convert Mesh to point cloud (sampling random points)
- Filtering by camera test.

Simulation of Photogrammetry

- Extend filters to material properties, etc.
- Add noise and distortion.

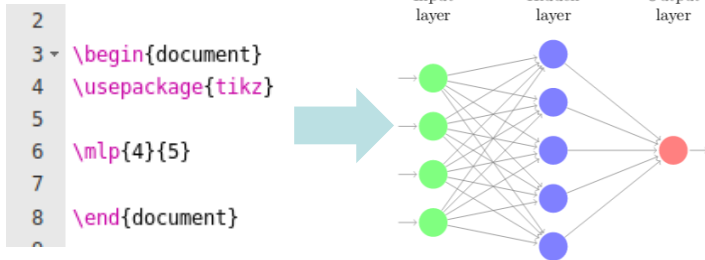
# Visual Preference Analysis



- Idea: Use neural nets to extract viewpoints from highly rated images
- Goal: A pipeline to load images, preprocess them and derive viewpoint statistics
- Technologies:
  - Possibly Tensorflow, PyTorch, MATLAB (depending on the backend networks)

# LaTeX Library for Neural Networks

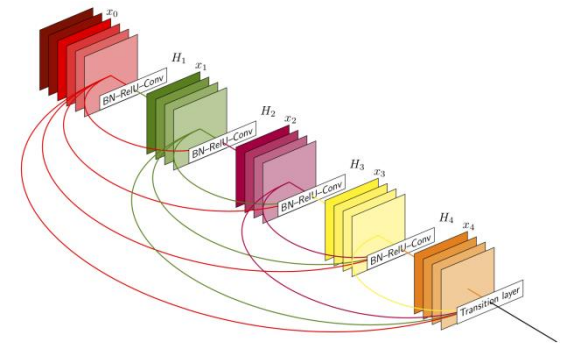
MLP



MCCNN



CNN



- Idea: Extend the graph visualization library to draw neural networks
- Goal: A small library for LaTeX, for fast and easy visualizations
- Technologies:
  - LaTeX, Overleaf
  - TikZ/PGF
  - Python(PythonTeX)



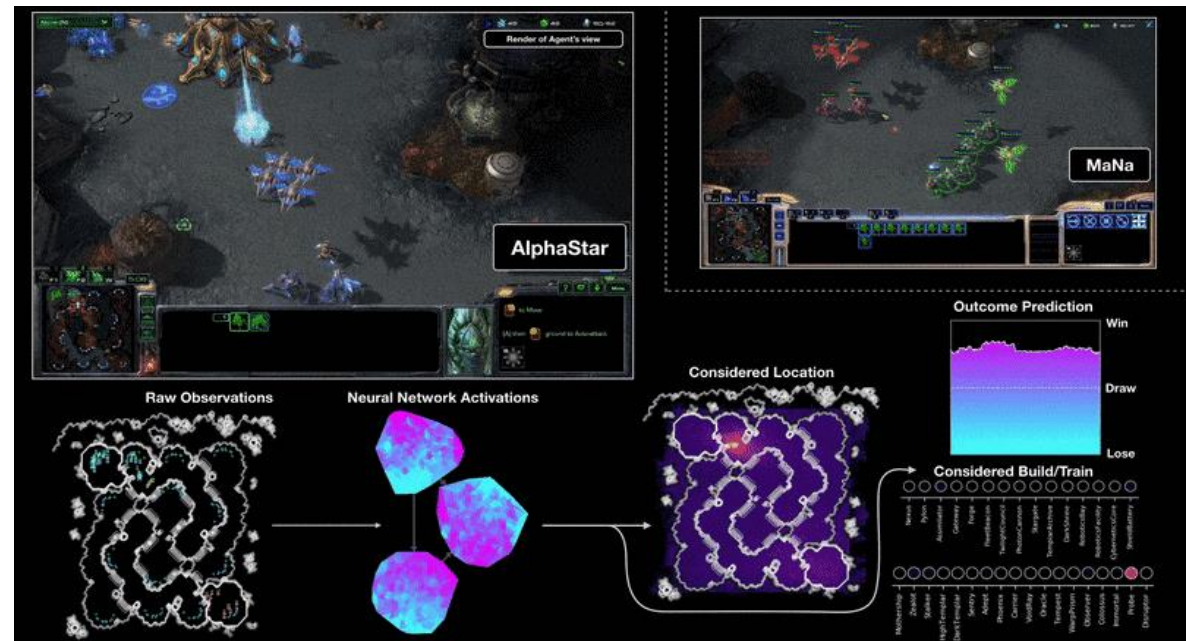
# Reinforcement Learning Interface (alex.baeuerle@)

## Idea

- Visualization for Reinforcement Learning
- General approach for different tasks

## Technologies

- Tensorflow
- Some Visualization Technology



<https://deepmind.com/blog/article/alphastar-mastering-real-time-strategy-game-starcraft-ii>

# Thank you for your interest!

