



NUS-Tsinghua Centre for Extreme Search
A Joint Research Collaboration Between NUS & Tsinghua University

Joint 3D Pose and Shape Estimation

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OUTLINE

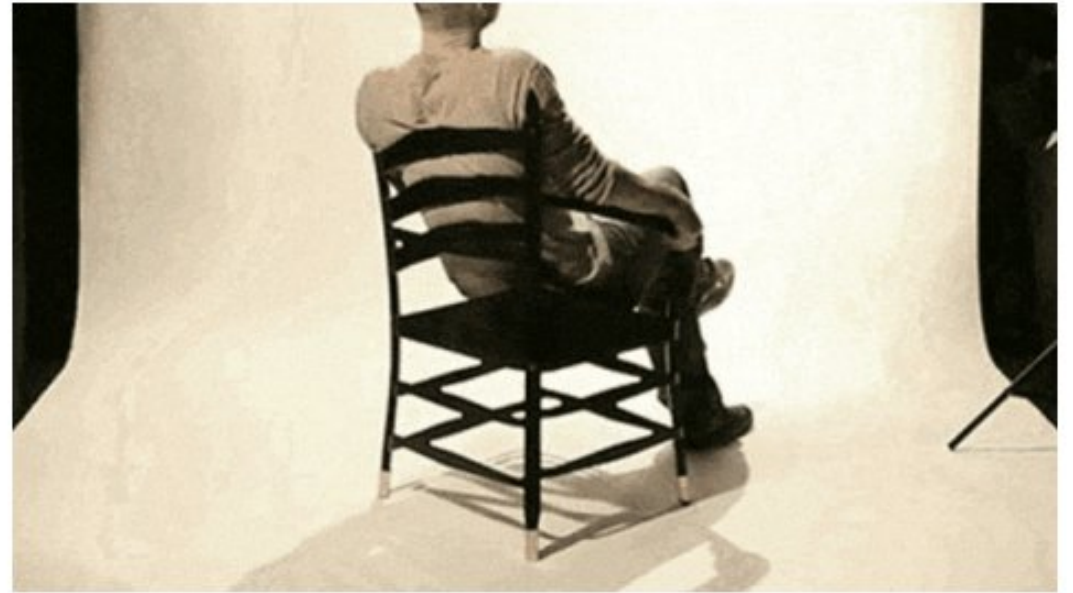
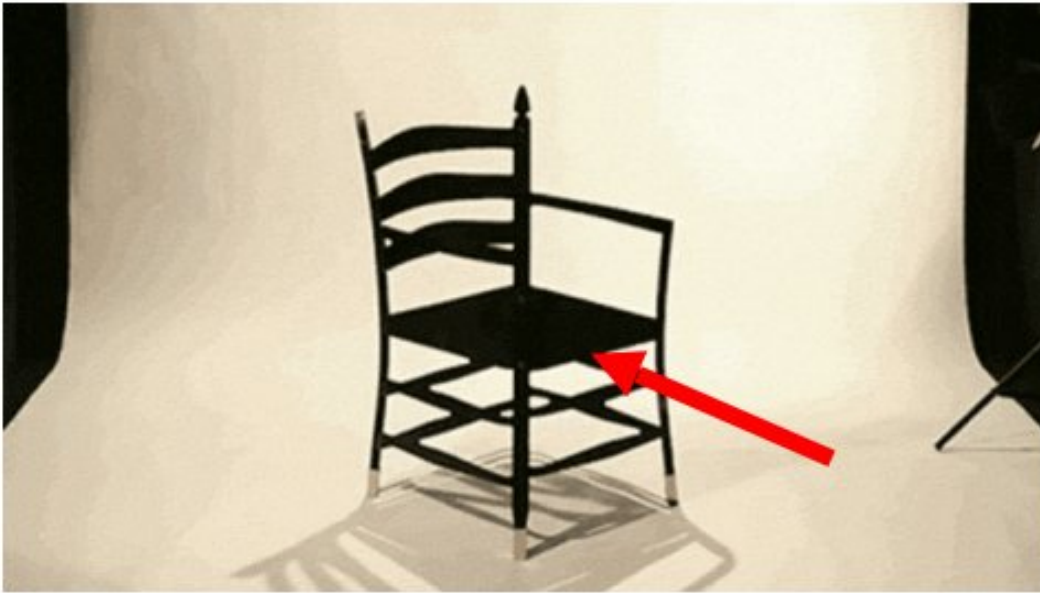
- Motivation and problem definition
- Applications
- Our Approach



Motivation

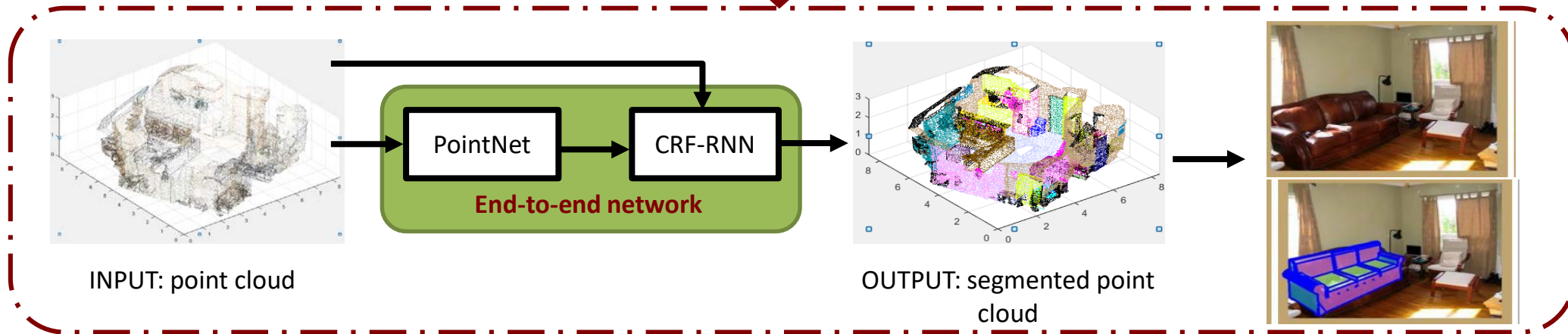
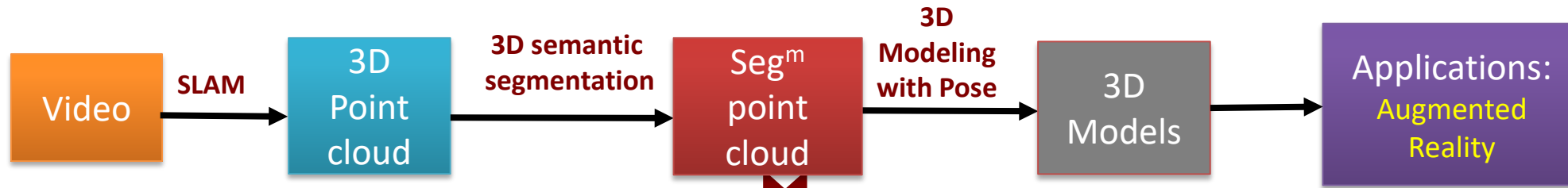
- Our world is inherently three dimensional
- Insufficient use of 3d information in current visual analysis approaches

- Extracting 3d information from 2d projections is ambiguous
- Require Learning prior knowledge of existing 3d world



- Sometimes, the entire object is not visible, requiring estimation of not only pose but what shape it's likely to be in





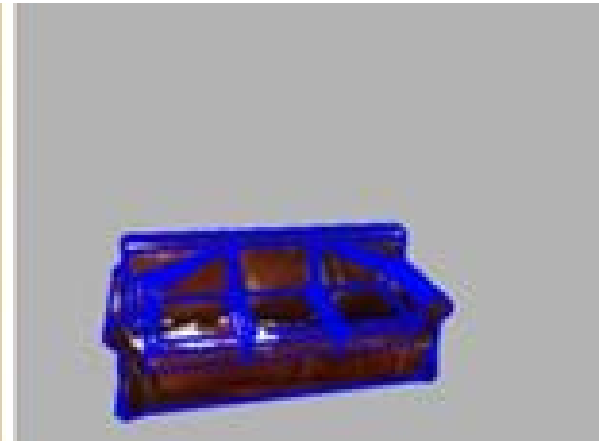
□ **Dataset:** S3DIS Dataset (CVPR2016) [<http://buildingparser.stanford.edu/index.html>]
 ScanNet Dataset (CVPR2017) [<http://www.scan-net.org/>]

- Towards 3D model matching with poses, for AR Applications (Zhao Na & Zawlin)

- 3D Object Manipulation in a Single Photograph using Stock 3D Models(Natasha Kholgade and Tomas Simon and Alexei Efros and Yaser Sheikh)



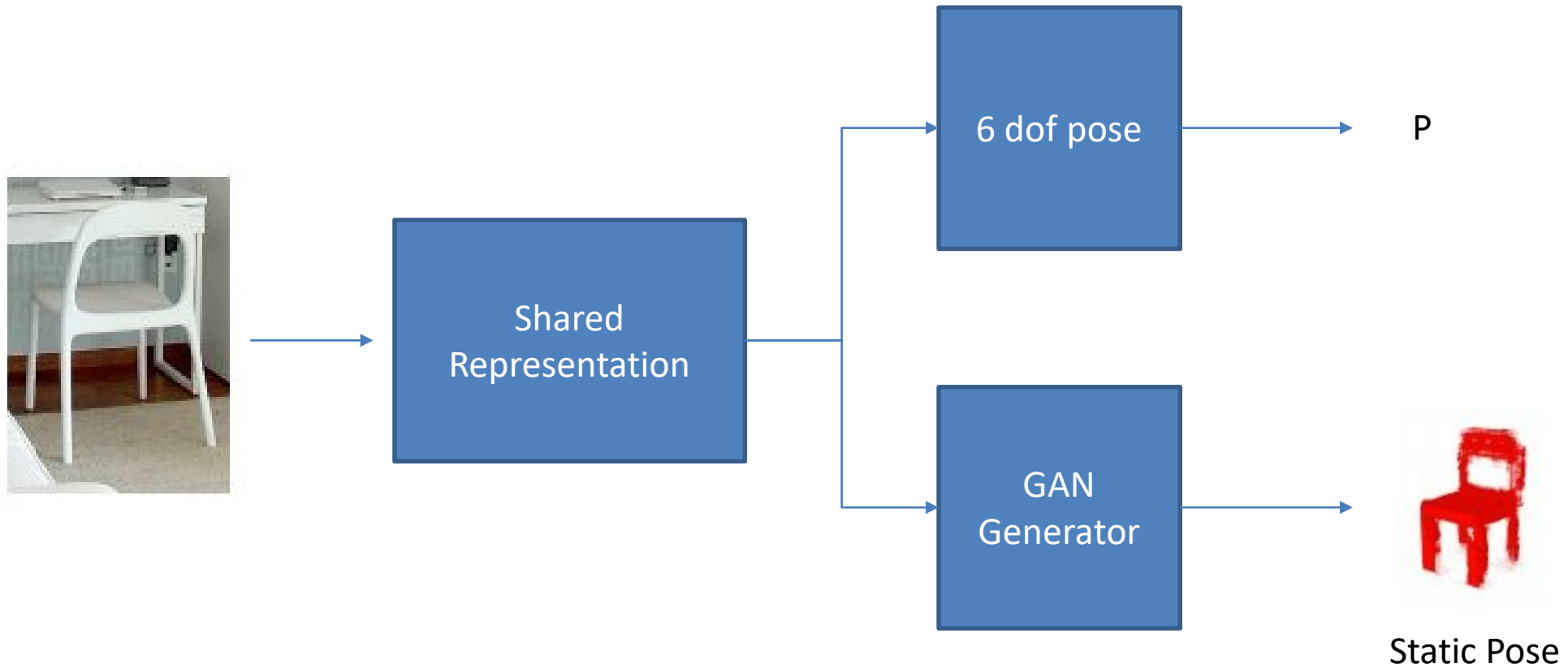
- View Objects in different poses to augment training data for object detectors



- Improve retrieval results of objects in different poses



- Pose estimation and generation are treated as two separate problems
- In reality, the model almost never fit the image exactly, requiring small adjustments in shape for a better fit
- Solution?
 - Model pose estimation and generation in a joint network allowing the model to benefit from shared representation



- Apply P on generated pose to obtain final pose fitted onto the image



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THANK YOU

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