

A New Paradigm for Geometric Reasoning through Structure from Category (NRI & FRR Award #1925281, Date: 9/1/2019)

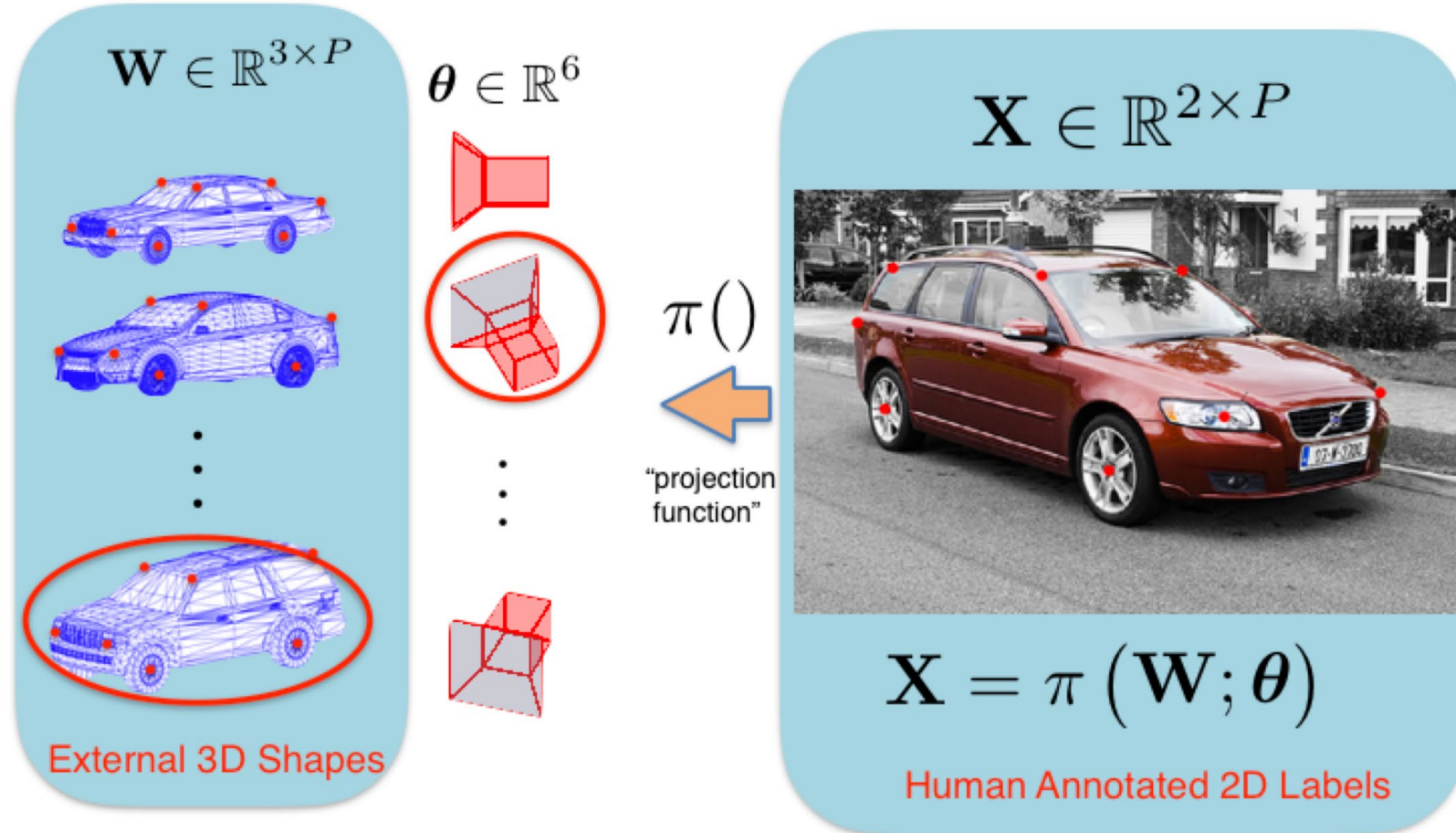
Laszlo A. Jeni, Simon Lucey (Carnegie Mellon University)

Challenge

- 2D labels are cheap and easy to obtain, however, 3D labels are onerous; as they require association with an external 3D shape.

Broader Impact

- Simplifying how 3D labels can be obtained will dramatically improve how robots and AIs can geometrically reason about the world.
- Outputs to be integrated into a new course graduate level course on Geometry in Deep Learning for Robotics.

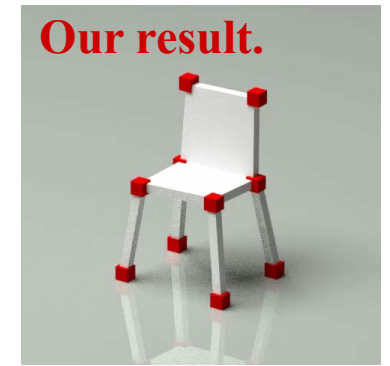
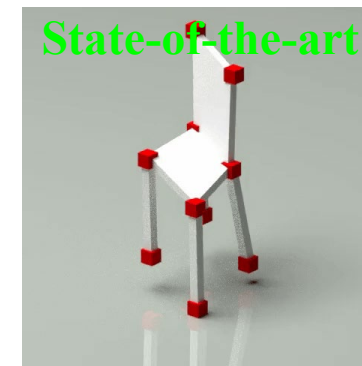
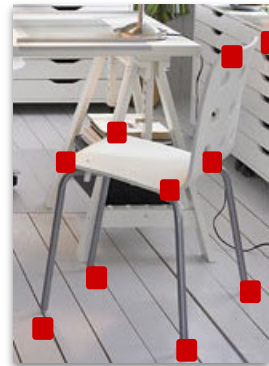


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Solution

- To recover 3D labels solely from an ensemble of 2D landmarks stemming from the same object category (e.g. “chair”).
- We propose to use something called “structure from category”; leveraging recent theoretical insights connecting deep learning to compressed sensing.



Scientific Impact

- Critical for innovations in autonomous transport, disaster relief, endangered species preservation, and space exploration.

