NRI: FND: A New Paradigm for Geometric Reasoning through Structure from Category

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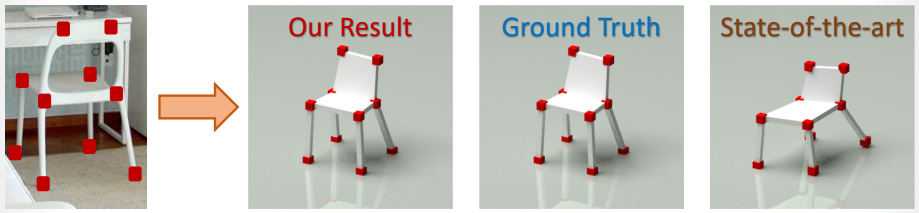
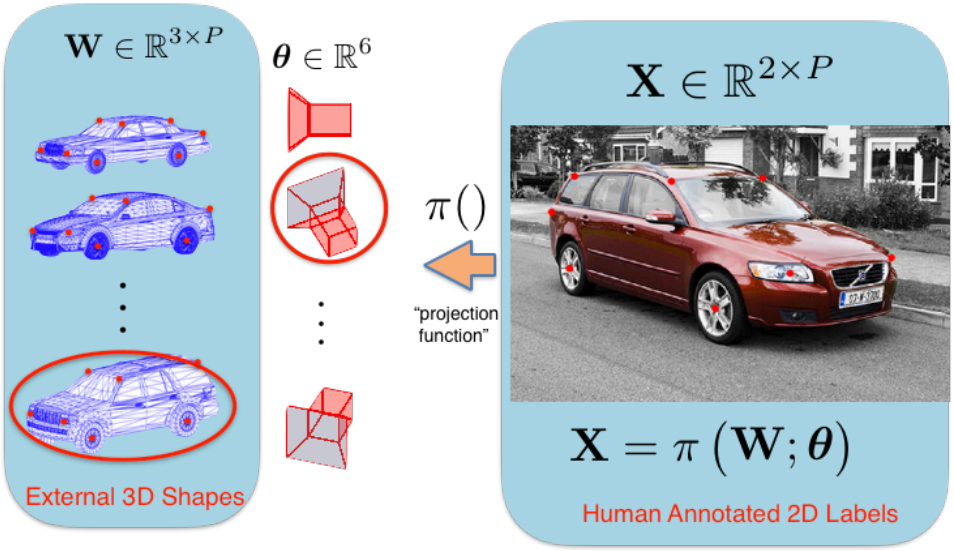


- **Our innovation:** is to recover 3D labels solely from an ensemble of 2D landmarks stemming from the same object category (e.g. “chair”).
- Problem can be expressed as a Non-Rigid Structure from Motion (NRSfM) problem.
- We are exploring new compact representations inspired from innovations in deep learning and sparse coding.
- **Broader impact:** the ability for robots to reliably reason about the geometry of objects is critical for innovations in autonomous transport, disaster relief, endangered species preservation, and space exploration.

- Much of the progress in robotic’s vision can be attributed to a plentiful number of images with corresponding labels (i.e. supervision).
- 2D labels are cheap and easy to obtain, however, 3D labels are onerous; as they require association with an external 3D shape.
- **Aim of project:** is to explore innovations in the area of “structure from category” to break this dependence on external 3D shapes.



- **Education & outreach:** Outputs of this project are planned to be integrated into a new course graduate level course on Geometry in Deep Learning for Robotics.

Award ID#: 1925281