Tracking and Control of Articulated Machines through Remote Sensing

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Purpose and goal of the project

- **Obtain reliable estimates of machine boom positioning using remote 3D/vision sensors**
- **... and use these estimates for automatic machine control.**

Motivation

- **Adoption of automation technology in drill rigs is slow.**
- **Remote/autonomous control of the booms requires accurate position estimates for the boom tool tip and joint angles.**
- **Encoders need to be placed at every joint, requiring extra cables through the arm.**
- **High maintenance and repair costs in case of cable/sensor damage.**
- **Deflections due to payload / material strain are not detectable.**

Proposed solution

- **Use a remote sensor setup inside the operator cabin (safe placement)**
- **Estimate the boom tool tip pose and boom joint angle states using the camera images.**
- **Attempt to compensate for boom deflections and provide more accurate pose estimates.**

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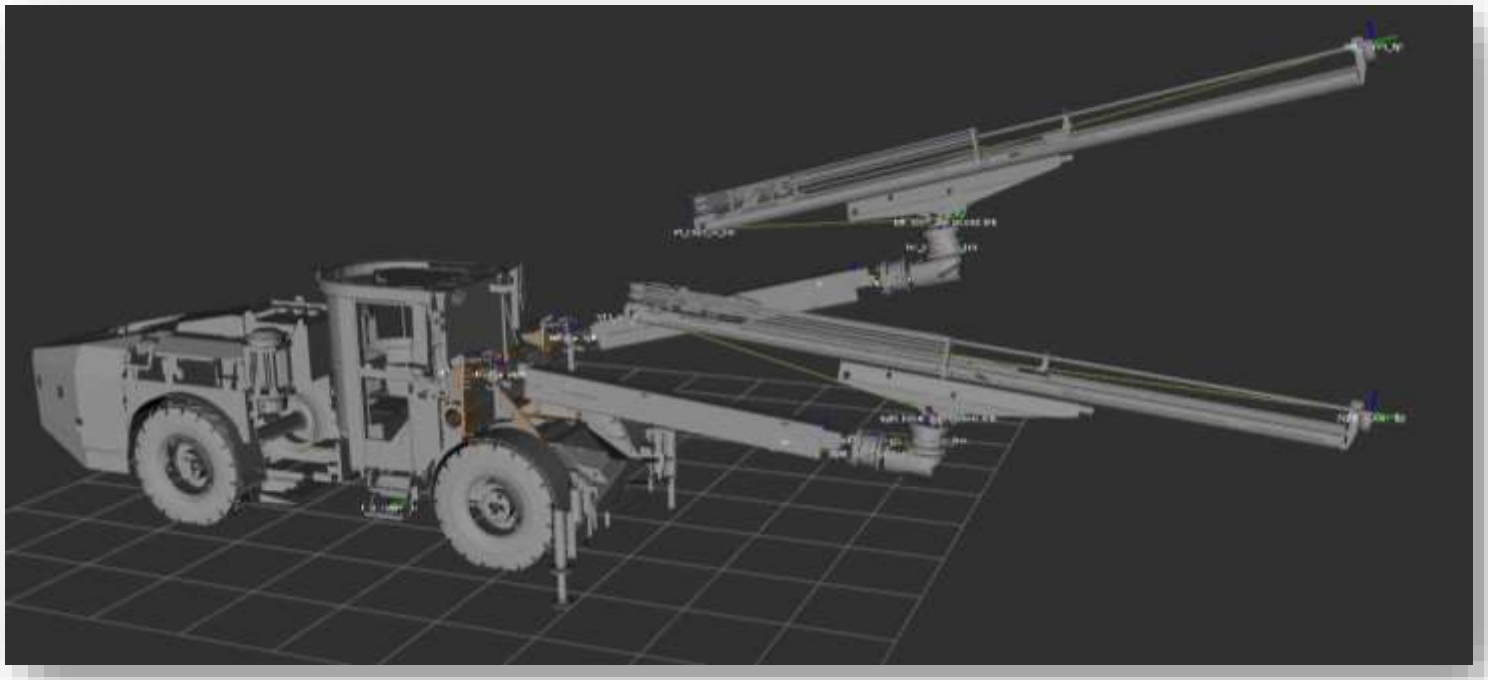
Preliminary results

- **Simulation model of a Boomer E2 rig**

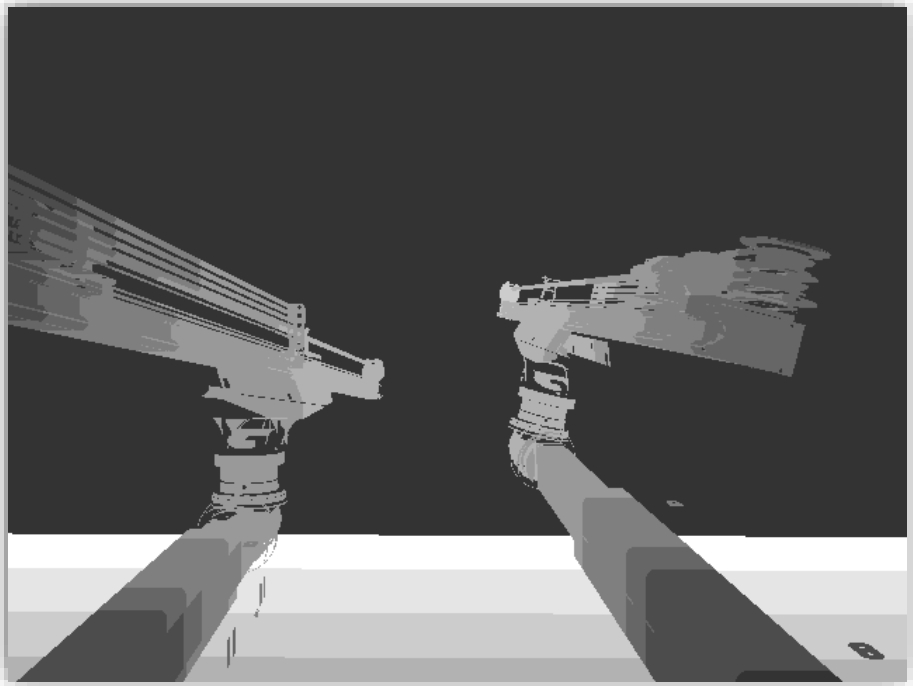


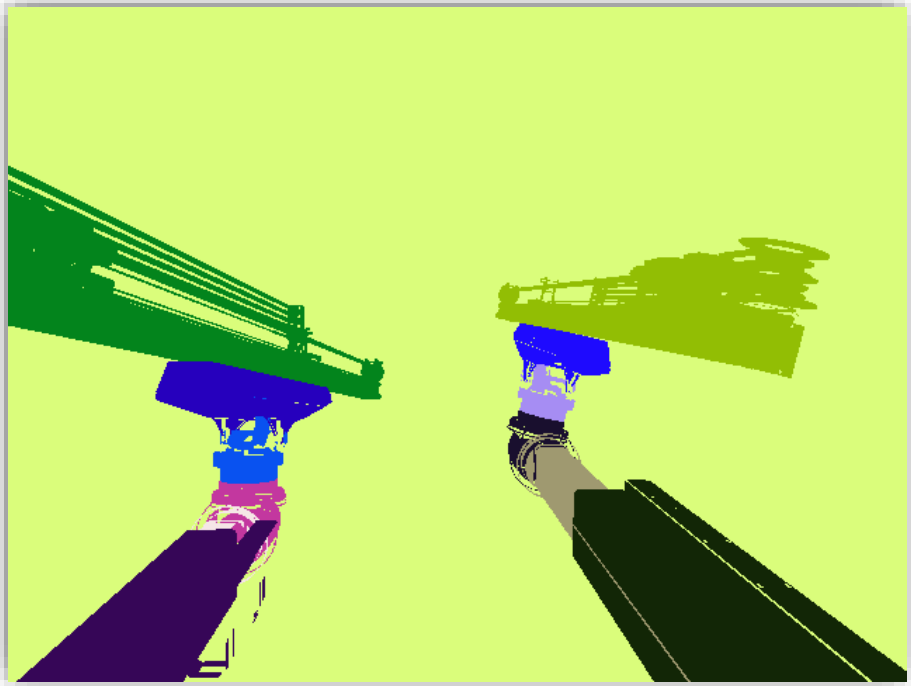
Preliminary results

- **Data collection from a boomer rig**

Preliminary results

- **Simulated images for segmentation**





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Next steps

- **Algorithm development**
- **Large-scale data collection**
- **Testing underground**