Autobots VIP Spring 2023

VisMan Progress Presentation 3

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Outline

Pick and Place Simulation

- GKNet ROS Module
- Current/Future Work

Handy and D435 in the Lab

Presented by Ashlynn and Calvin.

GKNet ROS Module

GKNet model will be integrated into a ROS node that can be used in the pick and place simulation. Visual demo runs from a Docker container.

Inputs

- `/camera/color/image_raw`
- `/camera/aligned_depth_to_color/image_raw`
- `/gknet/object_filter`
  - A list of bounding boxes to perform per-object grasp ranking

Outputs

- `/gknet/keypoints`
  - ranked list of keypoint pairs in camera coordinates
- `/gknet/annodated_image`
  - image with keypoints and bounding boxes drawn on it

GKNet ROS Module Demo

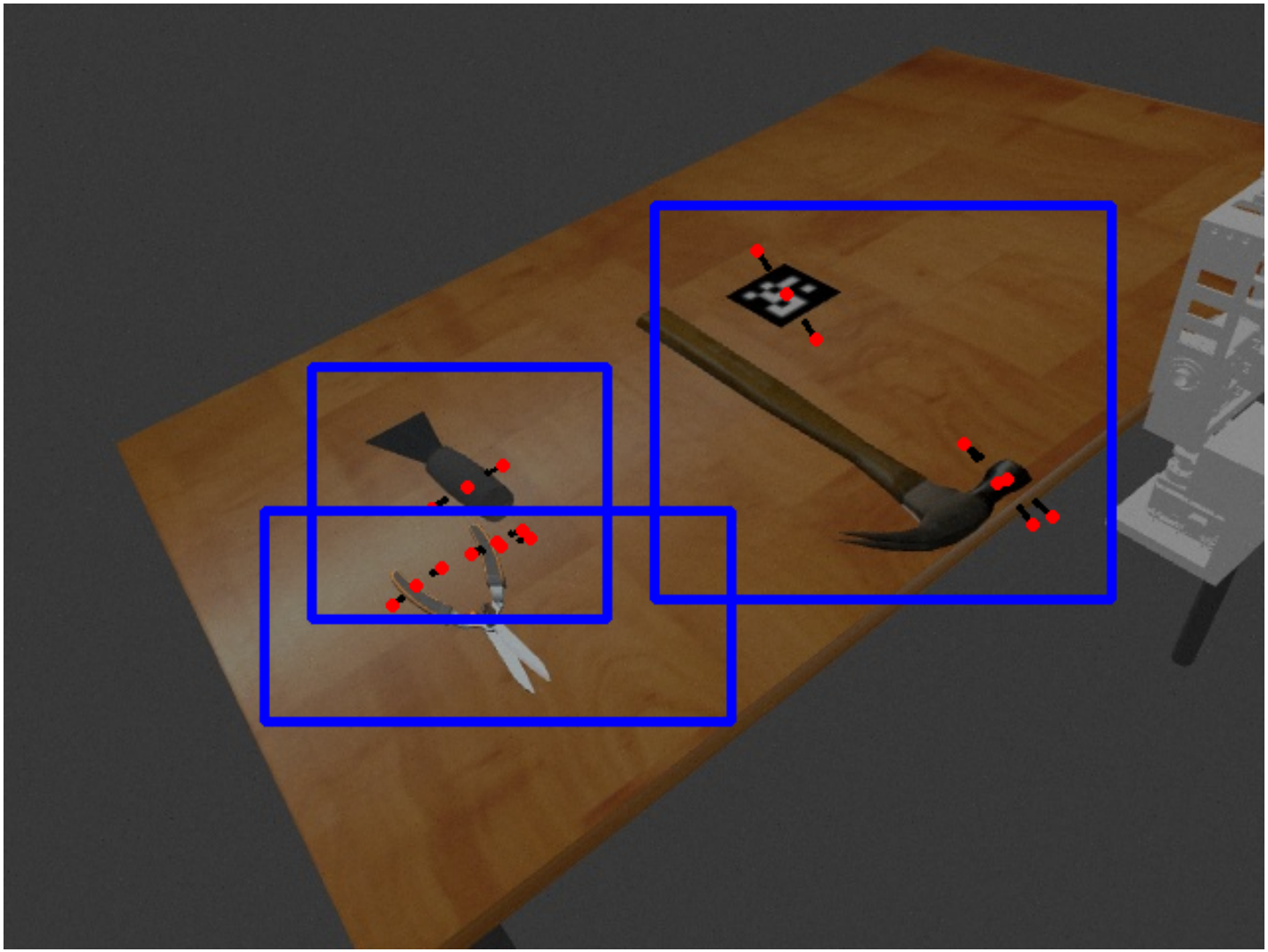

Figure 1: GKNet ranking grasping keypoints per bounding box

Integration: Architecture Overview

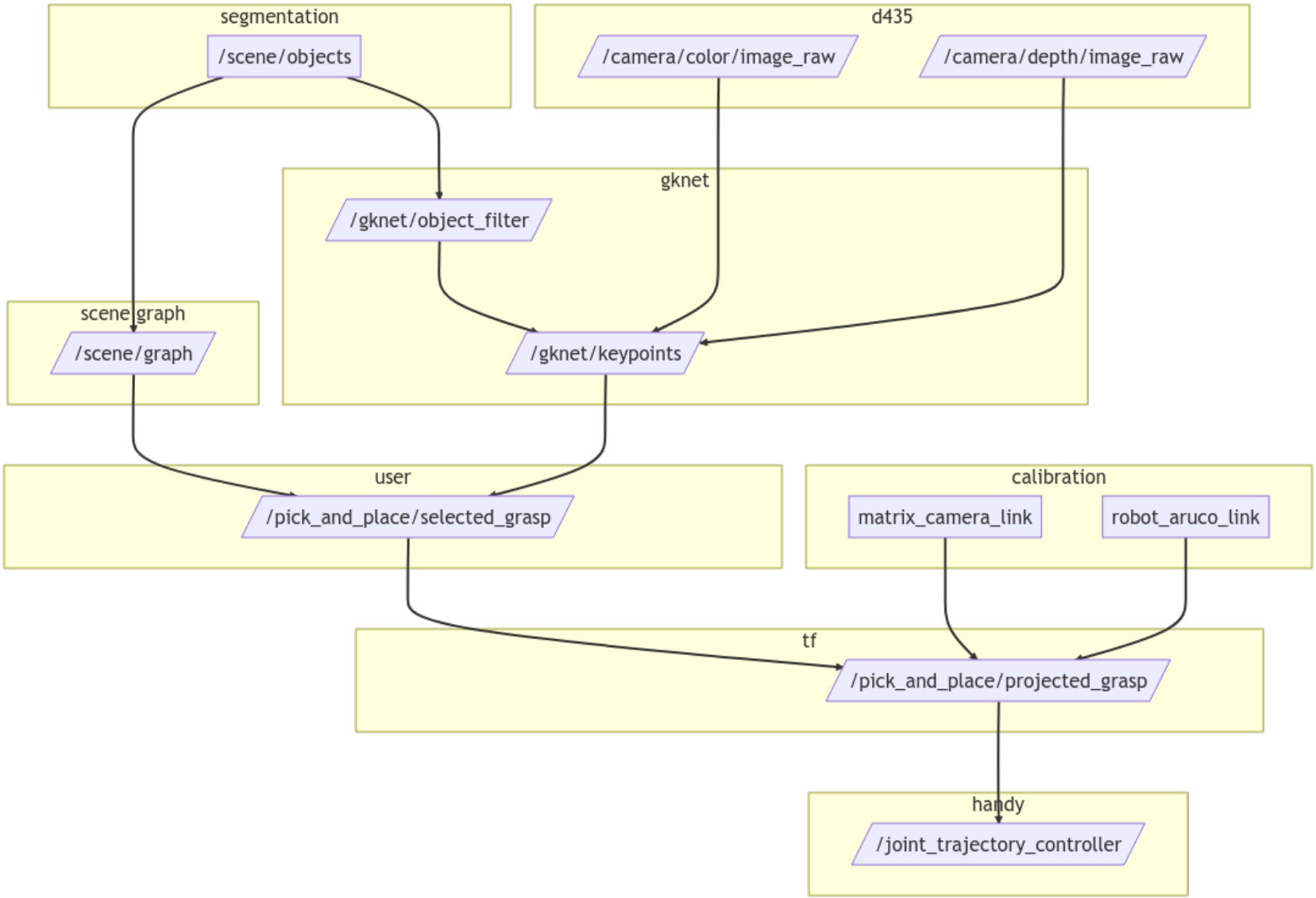

Figure 2: Architecture overview of pick and place topics.

Current/Future Work

Integration across all the components is still required, but the perception side is mostly complete.

TODO for pick-and-place demo

- Bug with ApproximateTimeSynchronizer in GKNet module
- SimData models lack mass/physics properties needed for grasping
- TF transform nodes for grasping poses from camera to world frame
- Implementation of segmentation/YOLO bounding boxes into GKNet
- Implementation of MoveIt planning and execution on selected grasps
- Verification of YOLO/GKNet on a real D435 camera
- Verification of calibration code on a real D435 camera