Pellet Picking

Position and Pose Estimation of Textureless Object

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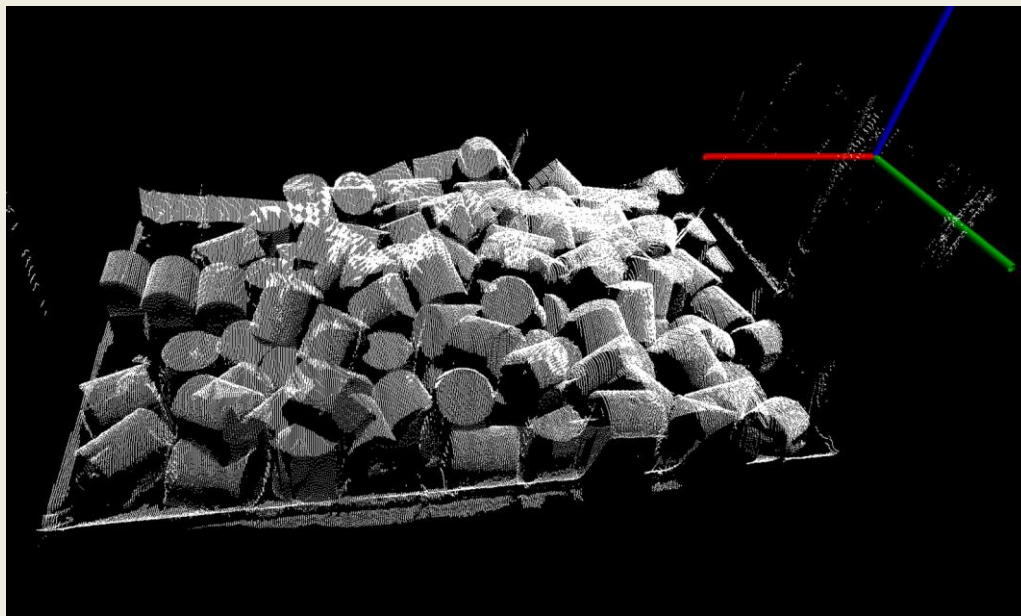PAR Lab
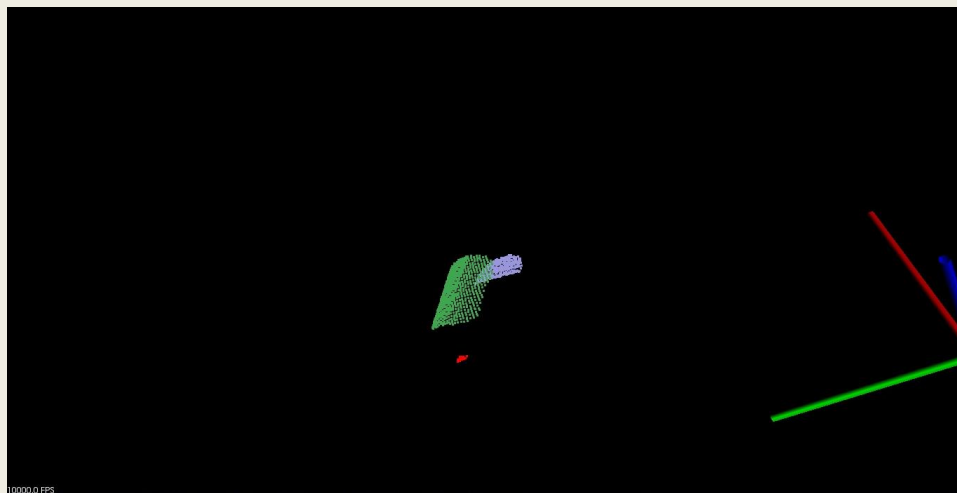Vision Guided Control of Robotic Manipulator
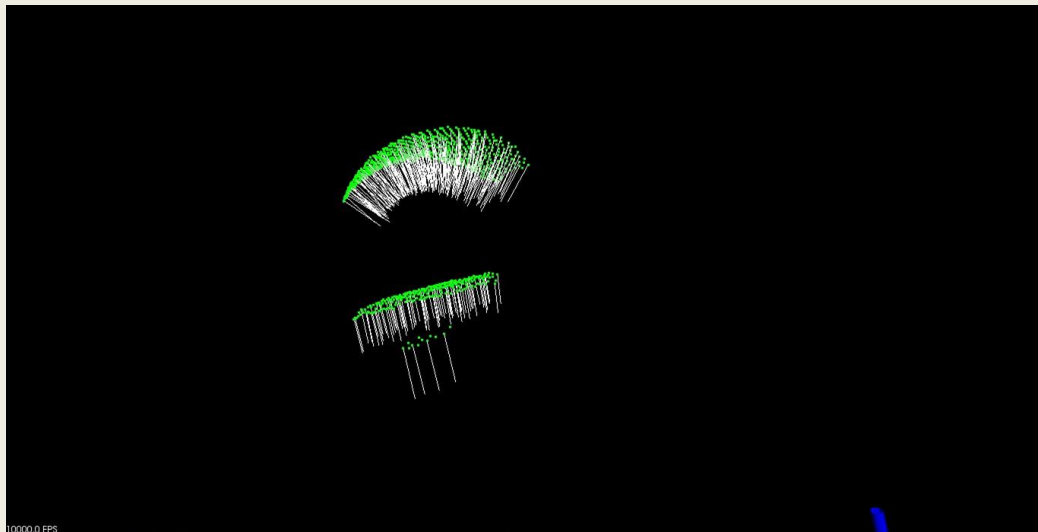
Image Grab

Laser Scan
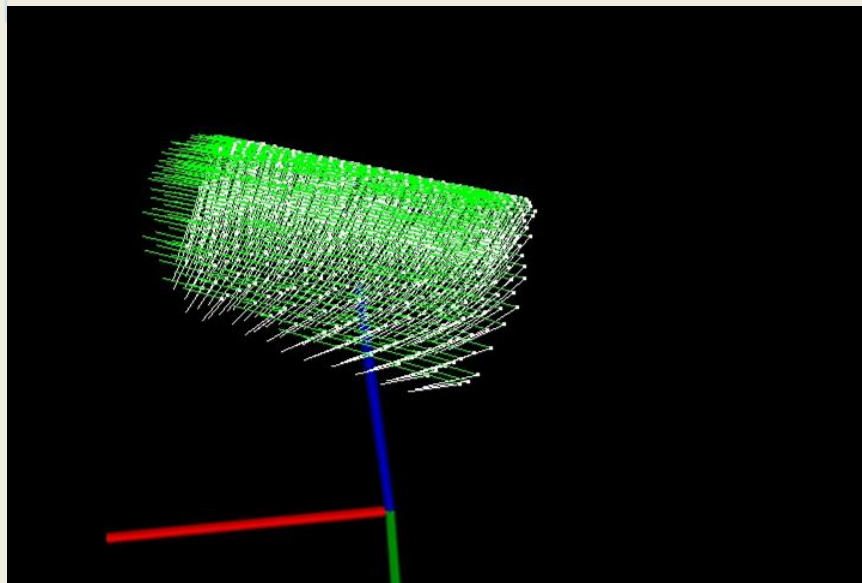
Voxelization & Patch Growing

- Voxel Grid : Creating parametric restriction

- Normal Estimation

- Patch Growing : Based on Roundness and Shape Index.
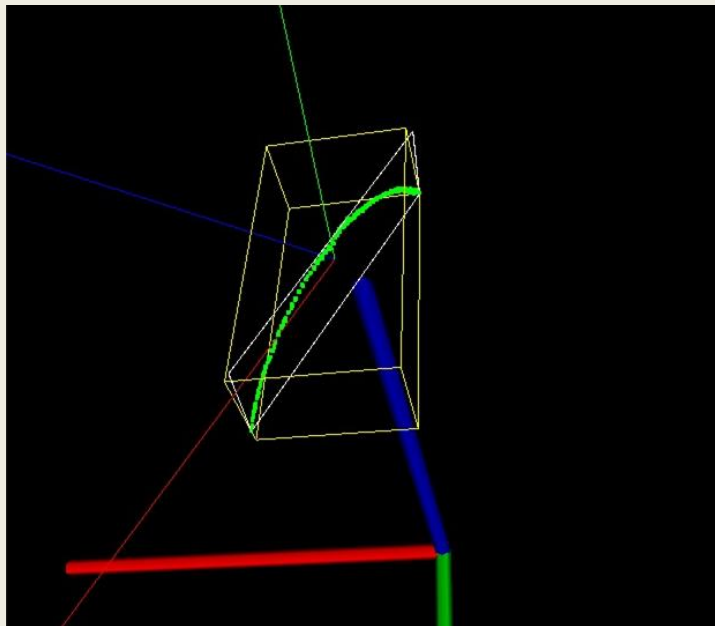
Normal Estimation

- Cluster Segregation

- Principal Curvature Estimation

Axis Estimation

- Cross Product .

- Reorient all the axis in same direction.

- Average out the axis value.

- Find dot product of all points with the axis for creation of local reference frame.

- Find mean & min, max deviation.
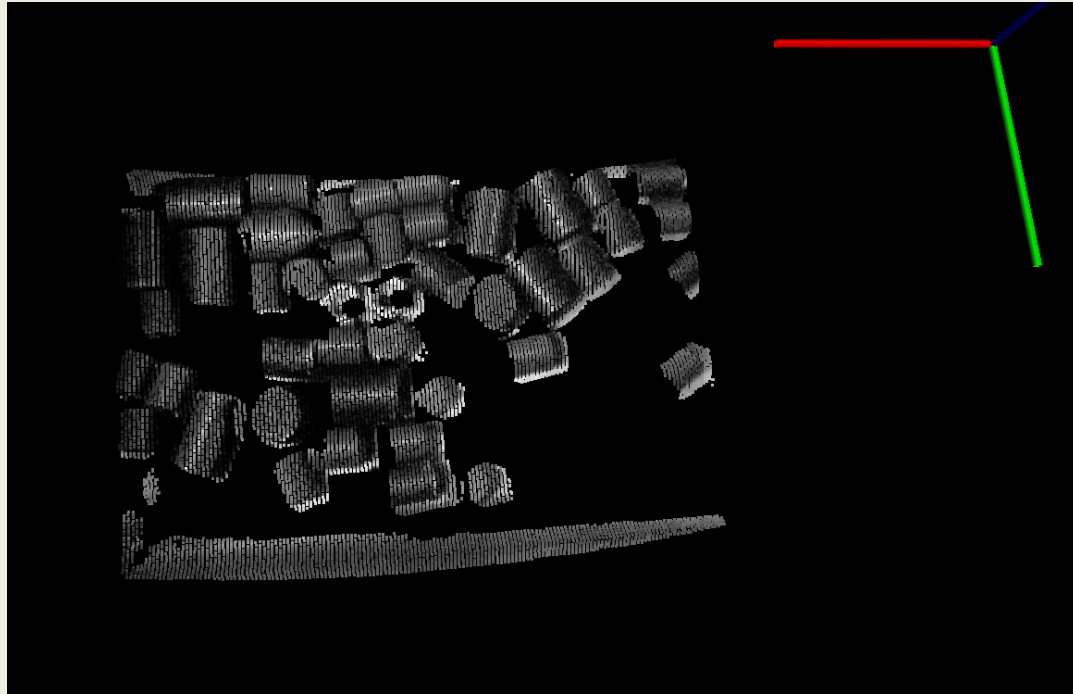
Position and Orientation

- Reduce centred patch by making axis component zero.

- Find PCA of these points.

- Find mean and deviation in the direction of axis 2.

- Mean is the centre of the cylinder , find min and max deviation.

- Again cross verify pellet dia and filter results.

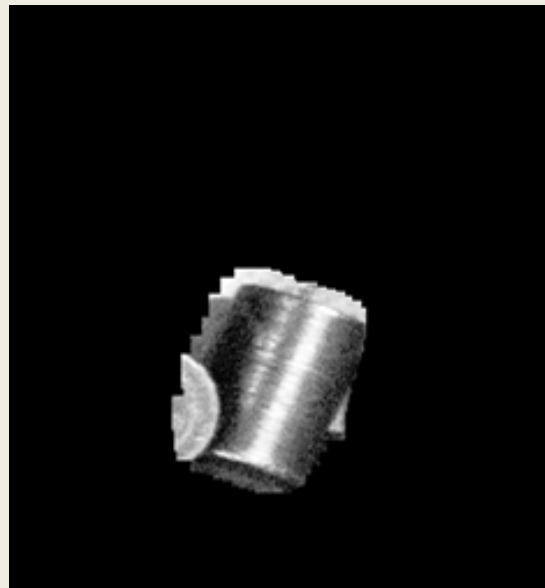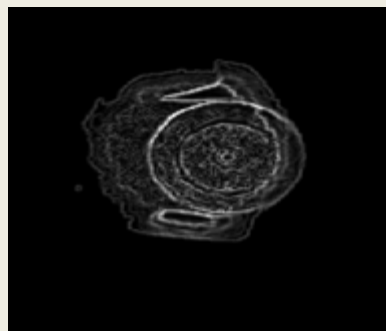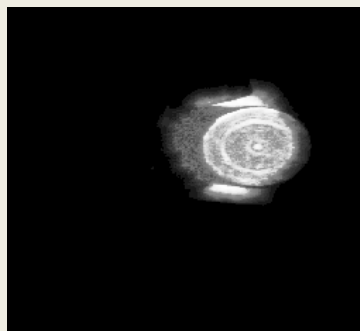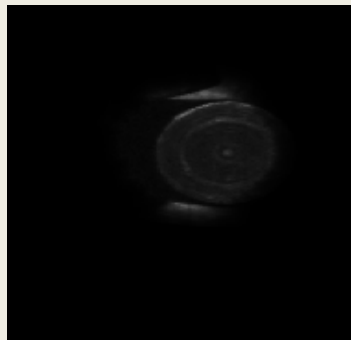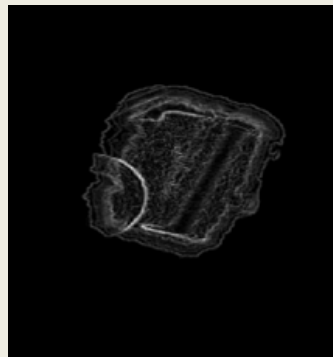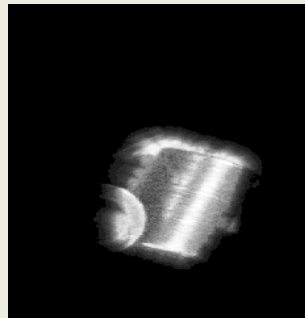- Orientation of pick up is given by the cross
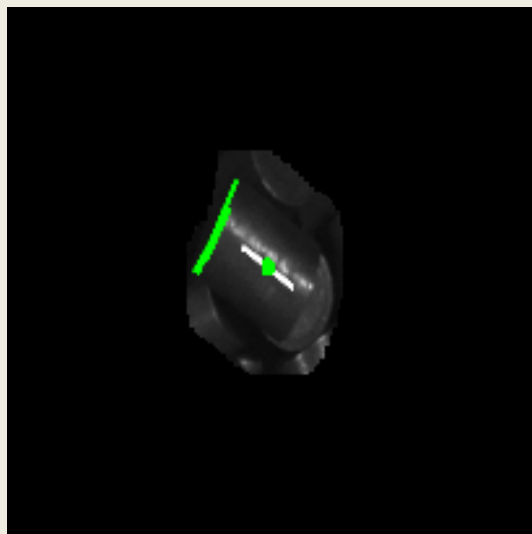
Projection
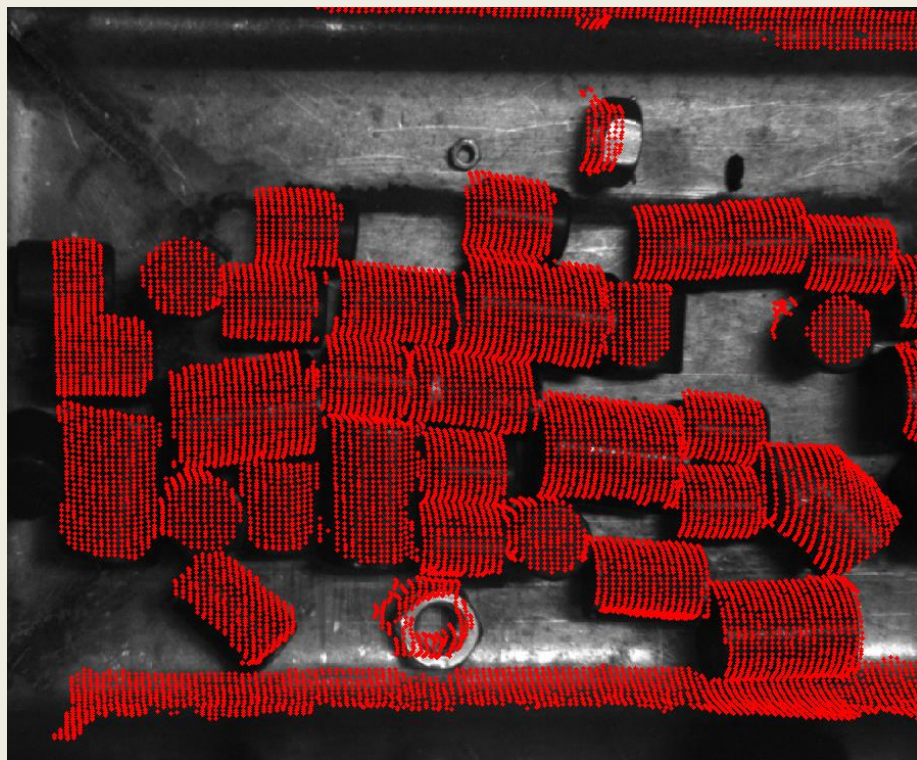
2d imposed on 3d data
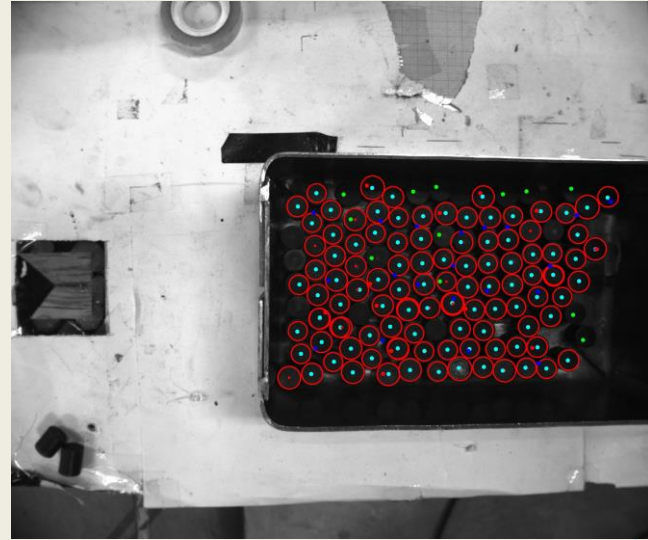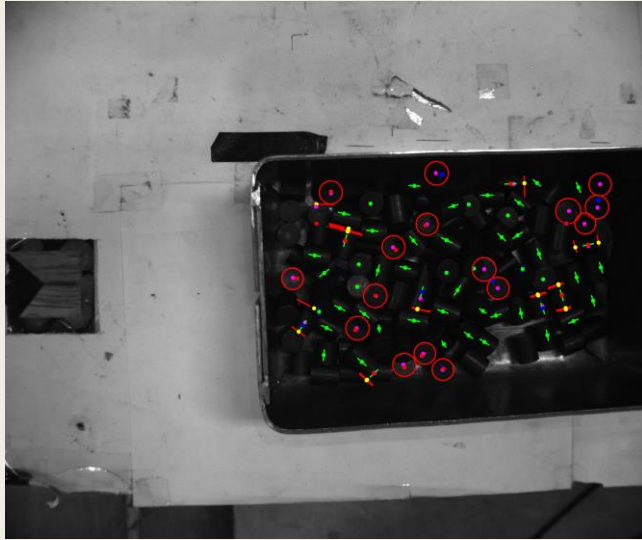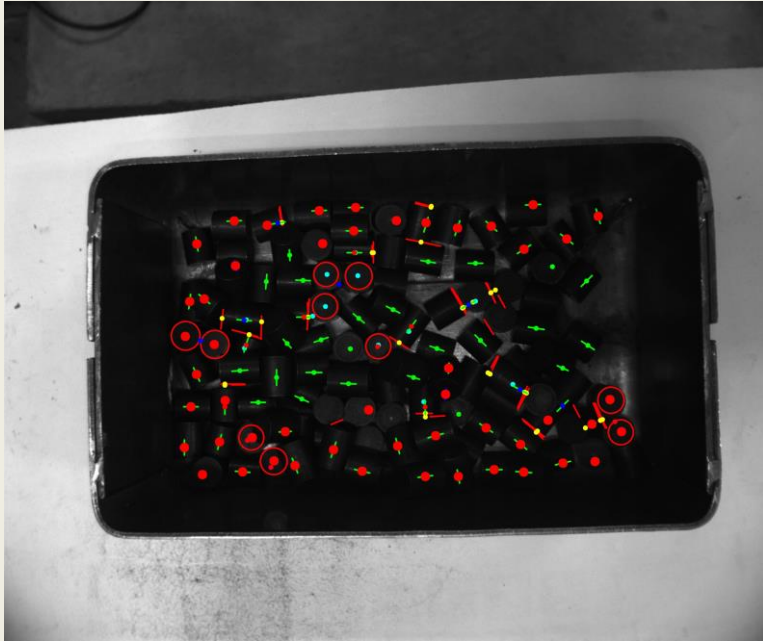
Masking and Equalisation

Segmentation

Detection

Position & Pose Estimation

Collision Detection

Has been automated - with assuming the rod as cylinder and walls as plane.

PickUp

Completely autonomous pickup.

With completion.

Disturbance Detection

Disturbance Big

Cycle till

All available pellets are picked up.

OR

The Box is empty

IF Box is not empty.
THEN Shake.
AND Cycle.

Please find Attached Video.