Initial Ideas

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Used data

- Use all available data
- Calibration data
  - undistortion
- RGB and thermal
  - improve detection by overlays
- Bottom and top
  - Some peaches might not be visible from either side
- Structure from motion (SfM) data
  - tracking and duplicate elimination

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Preprocessing

- Undistort all images
- Convert RGB images to grayscale image
  - Reduce noise: convert to HSI color space and apply Wiener filter
  - Reduce shadows: convert to L*a*b color space and increase luminosity
  - Convert to grayscale: subtract green and blue from red channel
- Transform thermal images to match RGB images

Fruit detection

- Thresholding techniques
  - Create binary image from converted RGB image
  - Create binary image from transformed thermal image
- Create mask for fruit pixels
  - Apply bitwise AND operation to both binary images
  - Filter out small objects
- Edge detection
  - Canny method

Fruit counting

- Circular Hough Transform (CHT)
  - Will miss occlusions
  - Second method for double checking
- Blob analysis with clustering algorithm based on Euclidian distance

Fruit tracking

- Compute 3D positions by Structure from motion (SfM)
  - Use RGB images
  - Separately for bottom and top
- Remove duplicates
- Combine bottom and top and remove duplicates again