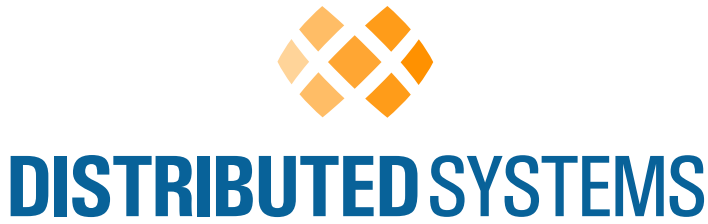
Carpe Noctem Cassel

Short Update on Work in Progress

Stephan Opfer

Distributed Systems
University of Kassel

28th November 2016



Outline

Concept of our new Goal Keeper

Detecting Flying Balls

Summary of Changes

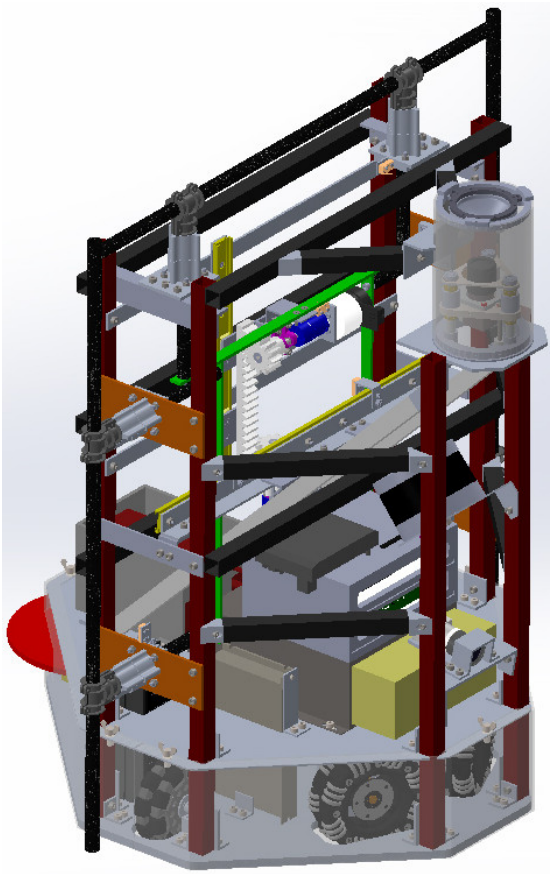
Additional Sensors:

- 2D laser scanner for detecting displaced goals.
- 3D laser scanner for flying balls.
- Directed camera for detecting objects.

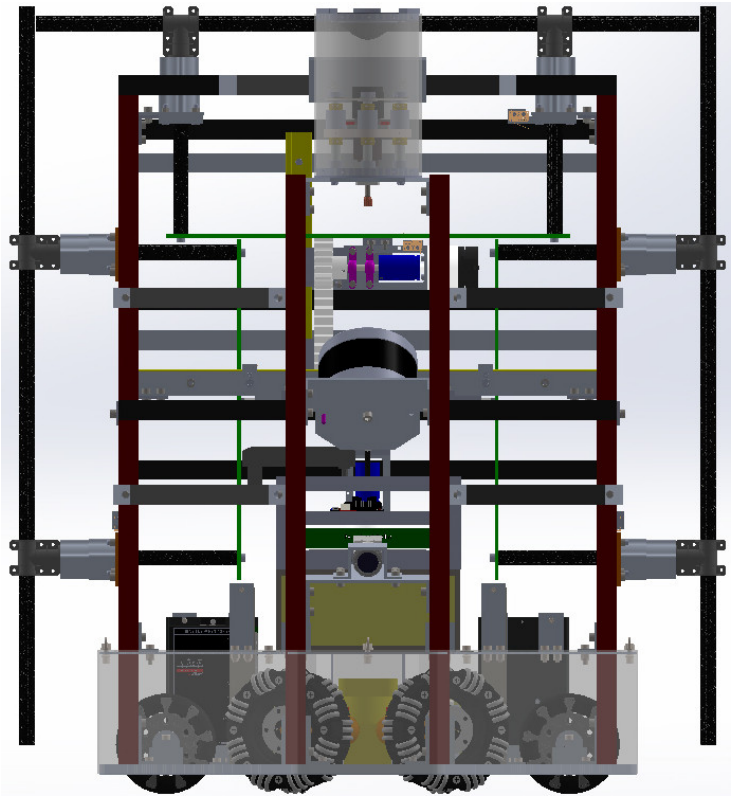
Structural Changes:

- Electric instead of pneumatic extensions.
- 4 instead of 3 wheels arranged for fast side movements.
- No kicking device.

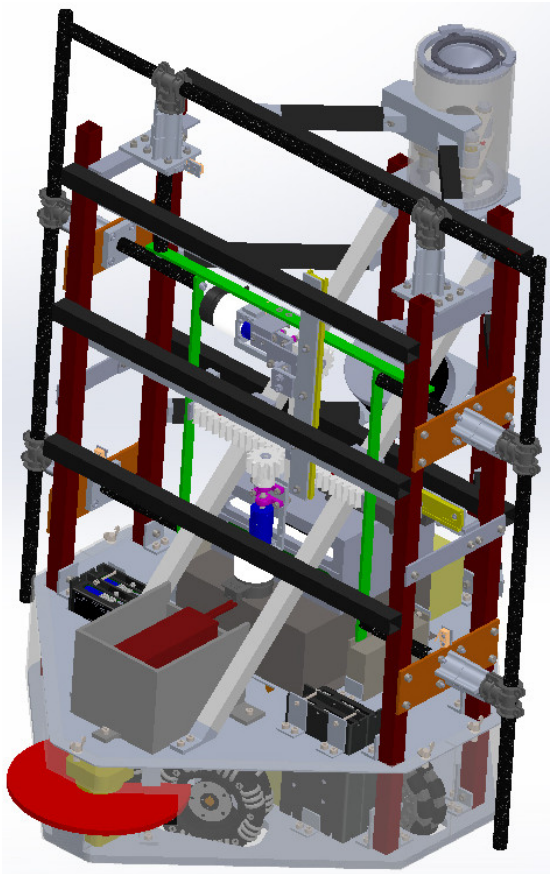
CAD Concept



(a) Front Right

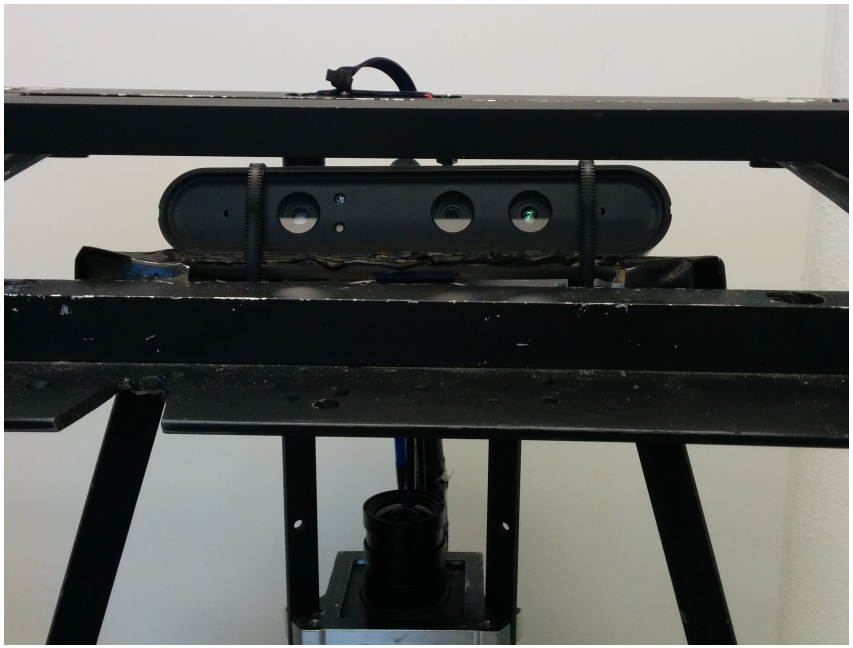


(b) Front



(c) Back Right

Sensor and Third Party Software



Orbbec3D Astra Pro

Range:	0.4 - 8 m
Depth Image:	640x480 30 FPS
RGB Image:	1280x720 30 FPS
FOV:	60° h x 49.5° v
Driver:	OpenNI2
Processing:	Point Cloud Library (PCL)

Algorithm

1. 10cm sub-sampling of Point Cloud //for data reduction
2. create KdTree via PCL //for efficient neighbour access
3. Repeat for each point P in KdTree:
   - 3.1 neighboursCount = number of points within $0.5\mathrm{m}$ radius
   - 3.2 if $(6 <$ neighboursCount $< 20)$ then P is a Ball

Source Code available:
`https://github.com/carpe-noctem-cassel/cnc-msldriver/blob/master/msl_flying_ball_detection`

Thank you for your attention.

Questions are welcome.

Supported by: