

Detection(Partial)/Kicking the Ball with Aldebran Nao

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Artificial Intelligence

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Motivation

- RoboSoccer SPL
 - ▶ To beat the best Human Soccer Team by 2050
- Balancing(key factor)
 - ▶ Static (Czarnetzki et al,2010)
 - ★ support polygon
 - ▶ Dynamic (Laue et al,2011)

Steps

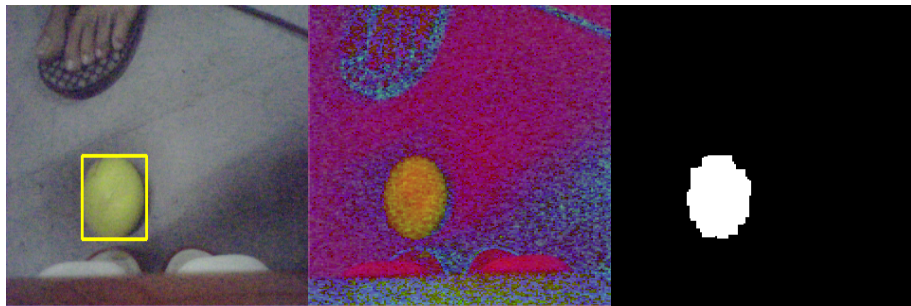
- Go towards the Ball
 - ▶ Visible in initial frame!
- Kick the ball
 - ▶ **Statically** Stable in and across every keyframe

Motion

- KeyFrame Based
- Beizier Curves
 - ▶ Each keyframe stable
 - ▶ Smooth Interpolation

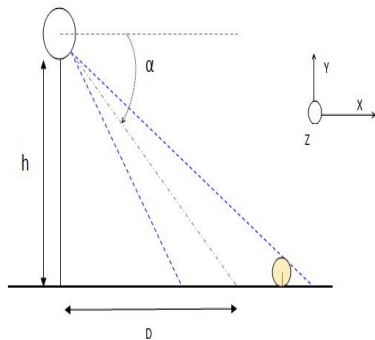
Vision

- Ball Detection
 - ▶ HSV space
 - ▶ Conversion to binary
 - ▶ Erosion
 - ▶ Dilation



Vision

- Pinhole Camera Model
 - ▶ Estimating the distance



References

- Xu, Yuan, and Heinrich Mellmann. “Adaptive motion control: Dynamic kick for a humanoid robot.” In *KI 2010: Advances in Artificial Intelligence*, pp. 392-399. Springer Berlin Heidelberg, 2010.
- Müller, Judith, Tim Laue, and Thomas Röfer. “Kicking a ball—modeling complex dynamic motions for humanoid robots.” In *RoboCup 2010: Robot Soccer World Cup XIV*, pp. 109-120. Springer Berlin Heidelberg, 2011.

References

- Czarnetzki, Stefan, Sören Kerner, and Daniel Klagges. “Combining key frame based motion design with controlled movement execution.” In RoboCup 2009: Robot Soccer World Cup XIII, pp. 58-68. Springer Berlin Heidelberg, 2010.
- NAOqi API guide ,Link
- Master’s Thesis of Tomàs Gonzàlez Sànchez, Department of Computer Science and Mathematics, Universitat Rovira I Virgili, September 2009, 64-82