

Eagle Knights 2009: Standard Platform League

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1 Team

The Eagle Knights team from ITAM in Mexico is composed of

- Project Directors: Alfredo Weitzenfeld, PhD and Marco Morales, PhD
- Team Leader: Carlos Ramos
- Team Members: Carlos Rivera, Gibran Rios, Emir Herrera

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2 Statement of Commitment

The Eagle Knights Two-Legged (NAOs) Standard Platform team is committed to participate in RoboCup 2009 to be held June 29th-July 5th in Austria.

3 Statement of Research Interests

Our research has extensively exploited the standard platform robotic platform, both in terms of AIBOs and soon NAOs. The following are research areas where we employ robots and technology developed as part of our standard platform soccer league participation:

- Spatial cognition in rats and robots (see [1-5]).
- Visual saccades in monkeys and robots (see [6]).
- Localization in standard platform league (see [7]).
- Prey catching and predator avoidance in frogs and robots (see [8]).
- Robot soccer coaching in standard platform league (see [9-10]).
- Wolf pack hunting in robots (see [11]).

4 Summary of Past Relevant Work

The Eagle Knights (EK) standard platform two-legged system architecture is shown in Figure 1. The architecture has been extended from the four-legged system architecture developed by our group in previous years.

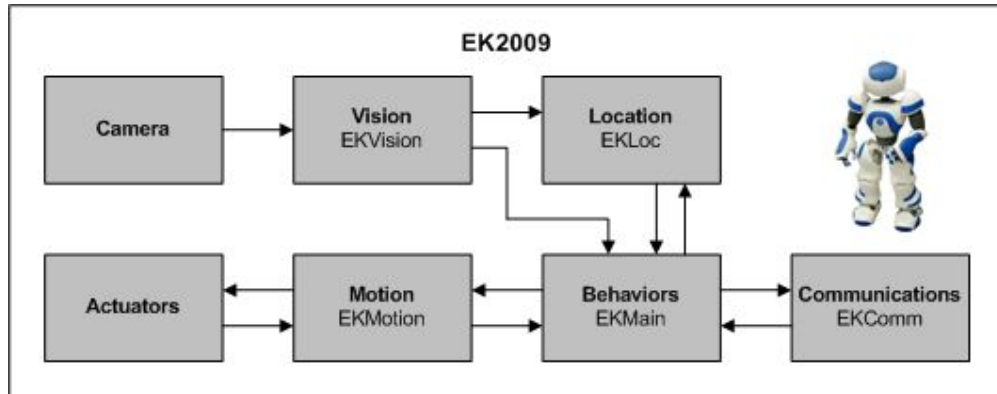


Figure 1: Eagle Knights (EK) standard platform league system architecture.

The Eagle Knights (EK) system architecture is composed of five modules:

- EKVision – Visual image processing (see section 4.1)
- EKMotion – Control of robot actions
- EKMain – Coordinates all modules and defines high level actions
- EKLoc – Field localization
- EKComm – Communication among robots

We will briefly overview the EKVision module where most of our work concentrated for 2008.

4.1 EKVision

The EKVision module is shown in Figure 2.

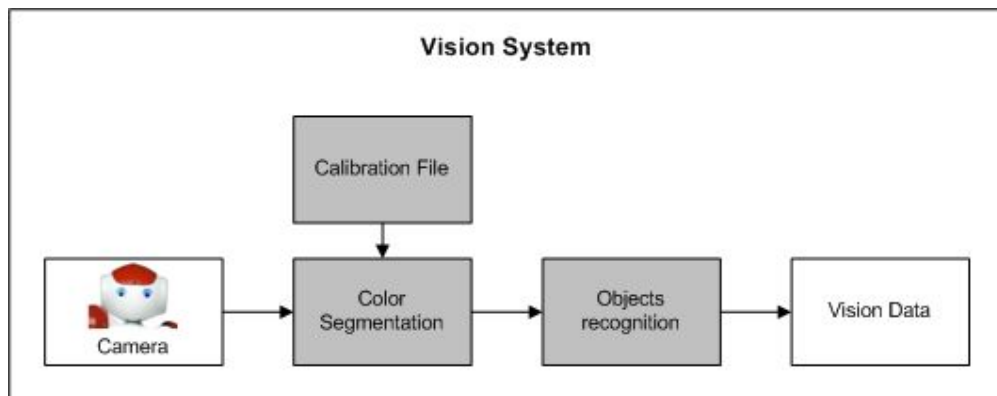


Figure 2: Eagle Knights (EK) standard platform league vision system.

The vision calibration system interface developed for the NAOs is shown in Figure 3. We calibrate in HSV color space and translate to then compare with YUV color space obtained from the NAO camera.

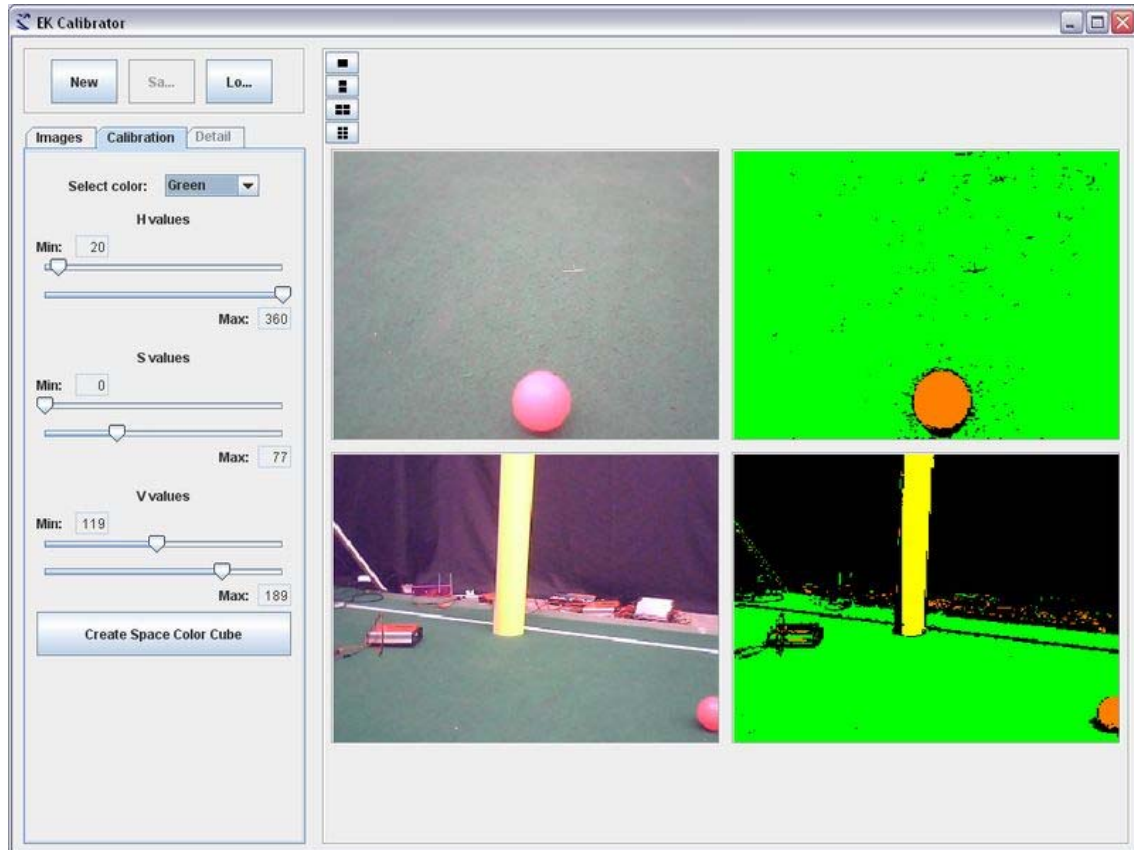


Figure 3: Eagle Knights (EK) standard platform league vision calibration system interface for NAOs.

Examples of the color segmentation process are shown in Figure 4: (a) individual pixels, and (b) blob regions.

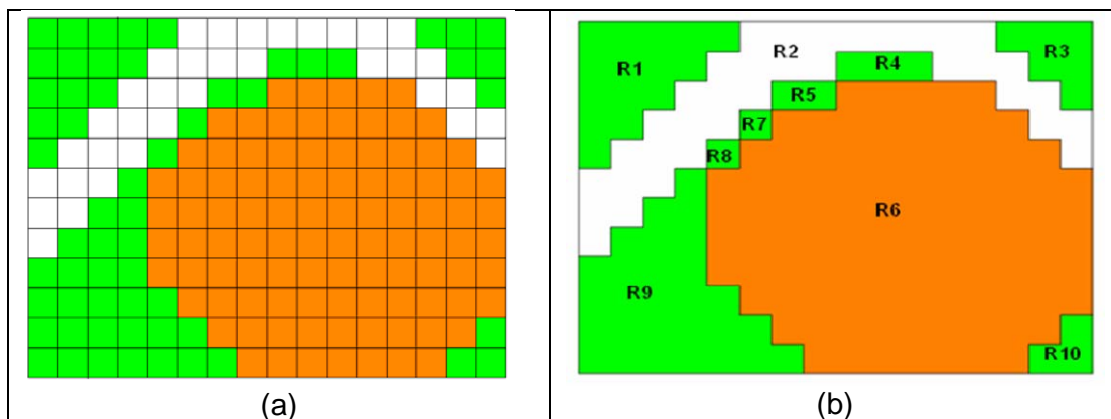


Figure 4: Color segmentation process: (a) individual pixels, and (b) blob regions.

5 Summary of Past Participations

Our team competes in the Standard Platform League since 2004.

Four-Legged Platform Competitions (2004-2007)

- World Cup 2007 – Atlanta, GA (2nd Round)
- Latin American Open 2006 – Santiago, Chile (1st Place)
- Latin American Open 2005 – Sao Luis Maranhao, Brasil (3rd Place)
- World Cup 2005 – Osaka, Japan (2nd Round)
- US Open 2004 – New Orleans, LA (1st Round)

Two Legged Platform Competitions (2008)

- World Cup 2008 – Suzhou, China (1st Round)

Four-Legged Platform Exhibitions (2004-2007)

- Latin American Open / Mexican Open 2007 - Monterrey, Mexico
- Mexican Open 2006 - Puebla, Mexico
- Mexican Open 2005 – Mexico City, Mexico
- Latin American Open 2004 – Mexico City, Mexico
- Mexican Open 2004 – Cuernavaca, Mexico

6 Summary of Publications

1. Barrera, A., and Weitzenfeld A., 2006, Return of the Rat: Biologically-Inspired Robotic Exploration and Navigation, BioRob 2006, Feb 20-22, Pisa, Italy.
2. Barrera, A., and Weitzenfeld A., 2006, Biologically Inspired Neural Controller for Robot Learning and Mapping, IJCNN – International Joint Conference on Neural Networks, Vancouver, Canada, July 16-21.
3. Barrera, A., and Weitzenfeld A., 2007, Rat-inspired Robot Spatial Cognition and Goal-oriented Navigation, MED 2007, Athens, Greece, June 26-29.
4. Barrera, A., and Weitzenfeld, A., 2008, Computational Modeling of Spatial Cognition in Rats and Robotic Experimentation: Goal-Oriented Navigation and Place Recognition in Multiple Directions, BioRob 2008, Oct 19-22, Scottsdale, AZ, USA.
5. Barrera, A., and Weitzenfeld, A., 2008, Biologically-inspired Robot Spatial Cognition based on Rat Neurophysiological Studies, Journal of Autonomous Robots, Springer, ISSN 0929-5593.
6. Flores Ando, F., and Weitzenfeld, A., 2005, Visual Input Compensation using the Crowley-Arbib Saccade Model, Proc. International Conference on Advanced Robotics ICAR, Seattle, USA, July 17-20.

7. Martínez-Gómez, J.A., Weitzenfeld, A., 2005, Real Time Localization in Four Legged RoboCup Soccer, Proc. 2nd IEEE-RAS Latin American Robotics Symposium, Sao Luis, Brasil, Sept 20-23.
8. Weitzenfeld, A., 2008, A Prey Catching and Predator Avoidance Neural-Schema Architecture for Single and Multiple Robots, Journal of Intelligent and Robotics Systems, Springer, Vol. 51, No. 2, pp 203-233, Feb, ISSN 0921-0296.
9. Weitzenfeld, A., and Dominey, P., 2007, Cognitive Robotics: Command, Interrogation and Teaching in Robot Coaching, RoboCup 2006: Robot Soccer World Cup X, G. Lakemeyer et al. (Eds.), LNCS 4434, pp. 379–386, Springer-Verlag, ISSN 0302-9743.
10. Weitzenfeld, A, Ramos, C, Dominey, P, 2008, Coaching Robots to Play Soccer via Spoken-Language, RoboCup Symposium 2008, July 14-20, Suzhou, China.
11. Weitzenfeld A., Vallesa, A., and Flores, H., 2006, A Biologically-Inspired Wolf Pack Multiple Robot Hunting Model, LARS 2006, Santiago Chile, Oct 26-27.