# WrightEagle
## Soccer Simulation 2D

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## Introduction

WrightEagle 2D Soccer Simulation Team, developed by Multi-Agent Systems Lab. of USTC, has been participating in annual competition of RoboCup since 1999. Recent years, we have won the Champion of RoboCup 2009 and 2006, the runner-up of RoboCup 2010, 2008, 2007 and 2005.

We have released the newest version (2.1.0) of our team's base code WrightEagleBASE to the public as an open source software which can be freely accessed from our website: http://wrighteagle.org/2d. We hope that our released software will be helpful to a new team who wants to participate in the RoboCup event and/or start a research of multi-agent systems.

## Methodology

We take RoboCup soccer simulation 2D as a typical problem of multi-agent systems, and our long-term goal is to do research in decision-making and other challenging projects in artificial intelligence [1].

The key challenges in the robot soccer domains are the huge state and policy space, the limited resource for computation and communication channel, and the requirement of tightly coupled cooperation and coordination. Our theoretical research work formally addressed these challenges and proposed several novel solutions with both theoretical and practical significances [2, 3, 4, 5, 6, 7].

## Progress

This year, we have developed some new techniques for both the low level skills and the high level decision-making model in our new team WrightEagle 2011, based on our research effort.

A Monte Carlo Localization based method is adapted to solve the self localization problem, and has significantly improved the precision of our agent's state information.

We developed a dynamic formation system allowing more flexible formations to be used by the team.

We also developed an online role changing mechanism to improve the predefined formations.

## Publications

[1]. Xiaoping Chen, et al, Challenges in Research on Autonomous Robots. Communications of CCF, Vol. 3, No. 12, December 2007.
[2]. Changjie Fan and Xiaoping Chen. Bounded Incremental Real-Time Dynamic Programming. IEEE Proceedings of FBIT 2007. Jeju Island, Korea, 2007.
[3]. Feng Wu and Xiaoping Chen. Solving Large-Scale and Sparse-Reward DEC-POMDPs with Correlation-MDPs, Proceedings of RoboCup Symposium 2007, Atlanta, America, July 2007.
[4]. Feng Wu, Shlomo Zilberstein, and Xiaoping Chen. Multi-Agent Online Planning with Communication. Proceedings of ICAPS-09. Thessaloniki, Greece. Sep. 2009.
[5]. Feng Wu, Shlomo Zilberstein and Xiaoping Chen. Online Planning for Multi-Agent Systems with Bounded Communication. Artificial Intelligence (AIJ), Volume 175, Issue 2, Page 487-511, February 2011.
[6]. Feng Wu, Shlomo Zilberstein and Xiaoping Chen. Point-Based Policy Generation for Decentralized POMDPs. In: Proc. Of 9th Int. Conf. on Autonomous Agents and Multi-agent Systems (AAMAS 2010). Toronto, Canada, May 2010.
[7]. Ke Shi and Xiaoping Chen, Action-Driven Markov Decision Process and the Application in RoboCup, Journal of Chinese Computer Systems, 2009.