

# Haoyu Bai

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## Education

- 2009–present **Ph.D candidate in Computer Science**, *National University of Singapore*, Singapore.  
2005–2009 **BSc in Computer Science**, *Fudan University*, Shanghai.  
Thesis: *Study of Code Clone in Various Programming Languages* supervised by Dr. Xin Peng (Fudan) and A/Prof. Stan Jarzabek (NUS)

## Awards

- 2011–present **President's Graduate Fellowship**, *National University of Singapore*, Singapore.  
2011 **Research Achievement Award**, *School of Computing, NUS*, Singapore.  
2009–2011 **Research Scholarship**, *National University of Singapore*, Singapore.  
2005–2008 **People's Scholarship**, *Fudan University*, Shanghai, China.

## Experience

- August 2009 – present **Ph.D candidate**, *School of Computing, National University of Singapore*, Singapore.  
Research:  
  - Develop scalable POMDP algorithms for model based planning under uncertainty.
  - Applying POMDPs to robotics, such as aircraft collision avoidance.Teaching assistant:  
  - CS3215 Software Engineering Project: guide students to use version control and issue trackers.
  - CS3230 Design and Analysis of Algorithms: design homework and exam questionsJune 2011 – August 2011 **Research intern**, *Singapore-MIT GAMBIT Game Lab*, MIT.  
Doing research on applying AI planning techniques to computer games.  
Presented talk “Planning and Decision Making under Uncertainty in Complex Worlds” to MIT researchers.
- October 2007 – June 2009 **Chun-Tsung Scholar**, *Fudan Undergraduate Research Opportunities Program*, Shanghai, China.  
A project for robotic spatial sensing. I developed epipolar geometry based 3D space reconstruction with single camera, by using SIFT to track feature points in succeeding images.
- Jul 2006–Jul 2009 **Undergraduate research student**, *Embodied Intelligent Lab, Fudan University*, Shanghai, China.  
Developed a robot with speech recognition and visual sensing ability based on Roomba:  
  - Lead a group of 4 students to win 3rd class award in Challenge Cup.
  - Robotic hardware design, Linux device drivers, networked controller software.
  - Visual sensing algorithms for more efficient floor cleaning.Developed the control and sensing software for the Fuwa humanoid robot project:  
  - Effectively cooperated in a team of more than 20 developer and researchers.
  - The robot was exhibited in Shanghai Industrial Fair and Intel Developer Forum.
  - A succeeding version of the robot is exhibited in Shanghai World Expo.

## Open source developments

I am actively involved in developing free and open source software.

- March 2011 – **Developer**, *Cython Days 1*, Munich, Germany.  
April 2011 Discuss and sprint the development of Cython, the Python to C compiler.
- April 2008 – **Google Summer of Code Student Developer**, *Python 3 related projects*.  
August 2010 To help pushing the adoption of Python 3, I helped to port several projects, such as SWIG, Boost.Python and Cython. Those are fundamental tools and libraries to implement Python extension modules. In-depth knowledge of Python and C/C++ are required in these projects.
- March 2009 – **Developer**, *Creative Commons Monitor Project*,  
March 2010 <http://monitor.creativecommons.org>.  
Developed website to synthesize data for showing the statistics of world-wide adoption of Creative Commons licenses.

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## Skills

### Software Development

- programming Python, Scala, and C/C++ for daily work; Bash and JavaScript sometimes; learned Haskell and Erlang for fun.
- version control Subversion, Git, Mercurial.
- others GNU/Linux,  $\LaTeX$ , Vim, Emacs.

### Languages

- Mandarin **Native.**
- English **Good.** *Fluent for daily and technical communication.*

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## Research Interests

Robotics, Decision Making under Uncertainty, Machine Learning, Algorithms.

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## Publications

- [1] Haoyu Bai, David Hsu, Wee Sun Lee, and Vien Ngo. Monte carlo value iteration for Continuous-State POMDPs. In *Algorithmic Foundations of Robotics IX—Proc. Workshop on the Algorithmic Foundations of Robotics (WAFR)*, page 175–191, 2010.
- [2] Haoyu Bai, David Hsu, Wee Sun Lee, and Mykel Kochenderfer. Unmanned Aircraft Collision Avoidance using Continuous-State POMDPs. In *Proceedings of Robotics: Science and Systems*, 2011.