

JAESIK CHOI

CONTACT INFORMATION

Dept. of Computer Science
Univ. of Illinois at Urbana-Champaign
201 N. Goodwin Ave.
Urbana, IL 61801 USA

Telephone: (217)721-8274
E-mail: choi31@cs.uiuc.edu
Web: <http://reason.cs.uiuc.edu/jaesik>

RESEARCH INTERESTS

Common Sense Reasoning, Machine Learning, Computational Linguistics, Computer Vision, Robot Planning, Real-time stream data mining

EDUCATION

University of Illinois at Urbana-Champaign 2005 – present

Ph. D. student, Computer Science
GPA: 3.87/4.0 (as of 5/9/2008)
Advisor: Prof. Eyal Amir

Seoul National University 1997 - 2004

B.S., *Magna cum laude*, Computer Science and Engineering
GPA: 3.63/4.3

WORK EXPERIENCE

Computer Science Department, University of Illinois, Urbana, IL

Research Assistant, Teaching Assistant
(Prof. Eyal Amir)

Jan 2008 - Present
Aug 2006 – May 2007

Teaching Assistant (2007 Spring) for Introduction to Artificial Intelligence (CS440)

Yahoo Inc., Sunnyvale, CA

Technical Yahoo (Manager: Hao Zheng, Vish Ramarao)
Collaboration with Yahoo Research@Berkeley
Filter for blocking image-based spam (Patent pending)
Identifying Spammer IPs (Patent pending)

May 2007 – Aug 2007

Engineering Library at University of Illinois, Urbana, IL

Graduate Assistant, Research Programmer
(Director: Prof. William Mischo)

Aug 2005 – Dec 2007

Developed web pages for Summary Engineering Research that achieves all the research works of College of Engineering at University of Illinois.

Korea Institute Science and Technology, Seoul, Korea

Research scientist, (Advisor: Prof. Woojin Chung)

July 2004 – July 2005

Designed an algorithm for adaptive behavior of mobile robot.
Implemented navigation components for real-time operating system.

SOMANSA, Seoul, Korea

Software engineer & Product manager

January 2000 – March 2003

Developed a web traffic monitoring and analysis system for Gigabit (Gbit/sec) traffic bandwidth.

HONORS AND AWARDS

Korea Research Foundation Scholarship for Overseas Study, 2005-2006
The second prize of mathematics competition at Kyonggi province, 1993, 1994, 1995
The first prize of programming competition at Kyonggi province, 1993
The second prize of programming competition at Kyonggi province, 1992. 1994. 1995
Ministry of Science and Technology award, Korean Programming competition, 1990

PUBLICATIONS

Refereed Conference Proceeding **Jaesik Choi** and Eyal Amir, [Factor-Guided Motion Planning for a Robot Arm](#), IEEE 2007 International Conference on Intelligent Robots and Systems, 2007. (Previous workshop versions : AAAI 2006 Fall Symposium and AAAI 2006 workshop on cognitive robotics)

Refereed Workshop (Technical Papers) **Jaesik Choi** and Eyal Amir, [Factored Planning for Controlling a Robotic Arm](#), AAAI 2006 Fall Symposium on Integrating Reasoning into Everyday Applications, 2006. (Previous version: **Jaesik Choi** and Eyal Amir, [Factored Planning for Controlling a Robotic Arm: Theory](#), 5th international workshop on cognitive robotics (CogRob'06), part of AAAI'06, 2006.)

Non refereed Conference Proceeding & Others **Jaesik Choi**, Woojin Chung and Jae Bok Song, [Efficient navigation of mobile robot based on the robot's experience in human co-existing environment](#), 2005 International Conference on Control, Automation and System, June 2005

Woojin Chung, Seokgyu Kim, and **Jaesik Choi**, [High speed navigation of a mobile robot based on experiences](#), In Proc. of the 2006 JSME Annual Conference on Robotics and Mechatronics, pp. 799-802, Waseda, Japan, May 2006.

Sanheon Lee, **Jaesik Choi**, Hyukjae Lee, *A review of detecting and preventing the propagation of worm in early phase*, technical report, Korean Electronics and Telecommunications Research Institute, March 2004

COURSES (Graduate Level)

CS598DAF Spring 08: [Integrative Intelligent Information Systems](#)
MATH526 Spring 08: Algebraic Topology (Auditing)
MATH571 Spring 08: [Model Theory](#)
CS498MV Fall 07: Logical Foundation for CS (Mathematical Logic)
ECE550 Spring 07: Advanced Robot Planning
CS543 Fall 06: [Computer Vision](#)
CS476 Fall 06: [Program Verification](#)
CS446 Spring 06: [Machine Learning](#)
CS433 Spring 06: [Operating Systems Design](#)
CS498EA Fall 05: [Reasoning and Knowledge Representation](#)
CS598DNR Fall 05: [Machine Learning and Natural Language](#)

Teaching Assistant of CS440 Fall 06: [Introduction to Artificial Intelligence](#)
Mobile Robotics Spring 05(As an unofficial TA).

Methodology of Cognitive Science Spring 04 (Computational Linguistics)
[Issues of Cognitive Science](#) Fall 04 (Fodor, "The Mind-Body Problem" et al.)

PROFESSIONAL ACTIVITIES

Reviewer of Artificial Intelligence of American Association (AAAI), 2008
Reviewer of Journal of Artificial Intelligence Research (JAIR), 2007
Reviewer of IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2007

**RESEARCH
EXPERIENCE**

Factored Planning for Controlling a Robotic Arm October 2005 – present

Motion planning for robotic arms is important for real, physical world applications. Such control is hard because movement of one joint affects the position of many of the rest. In this paper we present a polytime algorithm that finds plans of motion from one arm configuration to a goal arm configuration in 2D space. Our algorithm is unique in two ways: (a) it takes time that is only polynomial in the number of joints, thus allowing scaling up to complex arms; and (b) it decomposes the planning problem to that of the separate joints, thus enabling future development of robust reactive modules.

We provide a sufficient condition for polytime motion planning of a 2D-space arm: if there is a path between two Homotopic configurations, a local planner finds the path within a constant time. Our algorithm is sound and complete given the condition: it finds a plan, if there is one, and every returned plan leads to the goal. Also, it has bounded error with respect to a path planned from a grid-based configuration space.

Adaptive behavior of mobile robot September 2004 – September 2005

The safety is one of the most important issues of indoor service robots. This research shows a safe navigation of a mobile robot in semi-static environment. Our method has two modes (exploratory mode and service mode). In exploratory mode, a robot slowly explores the environment to collect locational information including speed of traffics and locations of doors where abrupt-appeared obstacles appeared. When the robot has confidence to the safeness, the robot efficiently navigates the environment with high speed in service mode while avoiding potential obstacles. Our method is unique in two ways: (a) our robot deals with the dynamic obstacles in semi-static environments; and (b) the velocity of robot is adaptively changed based on the human behavior. In the paper, the probability of risk is defined with the probability of collision given the environmental conditions (eg. locations and velocity of obstacles). Based on the safe velocity of each location, our planning algorithm finds an efficient and safe path.

Prof. Woojin Chung was my research advisor at Korea Institute of Science and Technology.

Building platform of mobile robot September 2004 – March 2005

For handling critical tasks of mobile robot, we have designed robot architecture for real-time operating system with extensible modularity. Based on UML design of robot usage, we implemented robot functionality based on the real-time Linux, RTAI. The message communications between components is accomplished by real-time CORBA, ACE-TAO. I was in charge of designing basic navigation functionalities which include the sensing from laser-range sensor, planning path with gradient method in potential field, and controlling two wheel differential mobile base.

The real-time detection model of rampant worms February 2004 – April 2004

We proposed the fast detection model of rampant worms after reviewing current worm-propagation models and researches. We reviewed widespread propagation mechanisms of Internet worms and focused on the special network pattern on each phase: susceptible phase, infection phase, and propagation phase. Due to randomly selecting of target hosts, the rampant worms repetitively attack the infected host over the time. Thus, we devised the model, which could dynamically quarantine and prevent the network propagation of worms, with the number of repetitive attacks.

We mathematically compared the concurrent infected maximum of our model with that of normal propagation model. Furthermore, our model was proven in the simulated network environment. The result was published as a technical

report.

Design and develop of dependable robot simulator October 2003 – February 2004

I developed the dependable software simulator for semiconductor wafer transfer robot, as a volunteer student to experience industrial robots. With the UML state-diagram, I designed component based simulator architecture that covers all the real wafer transfer robot commands on both TCP/IP and RS232C protocol. My software, which consummated exact requirement of the robot protocol specification, has been used as a reliable verification tool in the industrial robot operation environment.

I finished this project as a summer intern at the research institute of Samsung Electronics Mechatronics.