ADVAIT JAIN

Citizenship: Indian
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EDUCATION

Georgia Institute of Technology — Atlanta, GA, USA
PhD in Robotics. GPA: 3.93/4.0 — Fall 2007 – present
Advisor – Prof. Charles C. Kemp

Indian Institute of Technology (IIT) — New Delhi, India
Bachelor of Technology, Computer Science and Engineering — 2003 – 2007
GPA: 9.28/10.0
B.Tech Project - "FPGA accelerators for protein structure prediction." Awarded the best undergraduate research project in Computer Science and Engineering at IIT Delhi.

SELECTED PUBLICATIONS

Journals

"EL-E: An Assistive Mobile Manipulator that Autonomously Fetches Objects from Flat Surfaces." Advait Jain and Charles C. Kemp, *Autonomous Robots, 2009.*

Conferences and Workshops

"Pulling Open Novel Doors and Drawers with Equilibrium Point Control." Advait Jain and Charles C. Kemp, *Humanoids, 2009.* (To Appear)

"Behavior-Based Door Opening with Equilibrium Point Control." Advait Jain and Charles C. Kemp, *RSS Workshop: Mobile Manipulation in Human Environments, 2009.*

"A Clickable World: Behavior Selection Through Pointing and Context for Mobile Manipulation." Hai Nguyen, Advait Jain, Cressel Anderson and Charles C. Kemp, *IROS 2008*

"Behaviors for Robust Door Opening and Doorway Traversal with a Force-Sensing Mobile Manipulator." Advait Jain and Charles C. Kemp, *RSS Workshop on Robot Manipulation: Intelligence in Human Environments, 2008.*

ACADEMIC HONOURS

Best undergraduate research project in Computer Science and Engineering, IIT Delhi (2007)

All India Rank 24 (out of 2,00,000 students), IIT Joint Entrance Examination (2003)

8^{th} position, Regional Mathematics Olympiad (Delhi Region), India (2002).

National Talent Search Scholar (2001 to 2007). Awarded to 1000 students selected from all over India.

ROBOTS

EL-E – Healthcare Robotics Lab, Georgia Tech — Sept '07 – Present
EL-E is a mobile manipulator consisting of a Neuronics Katana manipulator, Videre Erratic mobile base, a linear actuator from Festo, cameras, Force/Torque sensors, laser range finders.

In addition to the research using EL-E, I also played an important role in assembling the robot using off-the-shelf components and some custom parts. I have built the carriage on which the

Katana manipulator and sensors are mounted. I built custom fingers for the Katana with 6 axis force/torque sensors at the base of the fingers.

Robots built as an undergraduate

Vision Based Self-Localisation August '05 – December '05
We (team of 2) built a mobile robot from scratch that had a camera looking down at the floor and could localize by tracking the corners of the tiled lab floor.

Micromouse - autonomous maze-solving robot, Techfest 2005 January '05
Inter-college robotics competition at IIT Bombay. We (team of 2) got a special mention from the judges.

Cliffhanger - rope climbing robot, Techfest 2004 January '04
Inter-college robotics competition at IIT Bombay. I secured 4^{th} position out of 20 teams and won a prize for the best design.

EXPERIENCE

Willow Garage Inc, Menlo Park, CA, USA June '08 – Aug '08
I experimented with possible kinematics libraries for the PR2 Personal Robot, assisted in defining a description format for different kinds of robots, helped in the development of an ODE and gazebo based simulator. I also added functionality to do inverse dynamics for a serial chain manipulator to KDL, an open source kinematics library. Finally, I developed a demo of the robot grasping a cuboidal object from a table (in simulation). This was one of the first demos using the simulator being developed at Willow Garage.

FPGA accelerators for Protein Structure Prediction August '06 – May '07
Advisors: Profs. M. Balakrishnan and Kolin Paul (IIT Delhi)
We (a team of 3 undergraduates) showed that FPGA accelerators can be effective for protein structure prediction as this problem has a lot of inherent parallelism. We demonstrated this by designing FPGA accelerators which gave a speed-up of 5 over Bhageerath (a protein structure prediction software developed by the Supercomputing Facility for Bioinformatics & Computational Biology at IIT Delhi).
Our project was awarded the *best undergraduate research project* in Computer Science and Engineering at IIT Delhi for 2006-07.

Schlumberger Asia, Oil Field Services June '06 – July '06
As a vacation trainee, I got the opportunity to experience the job of a field engineer, went to an oil rig in Rajahmundry, India and assisted in deploying sensors in oil-wells to a depth of around 2Kms (1.25 miles).

Pravak Cybernetics (P) Ltd., New Delhi, India January '06 – May '06
I worked on a Thermal Conductivity Measuring Apparatus to measure thermal conductivity of poor thermal conductors. The machine was built in compliance with an ASTM standard. I was involved with analog design (interfacing thermocouples to instrumentation amplifiers), control system (PID controllers to maintain temperatures of the heat sources) and the software that enables users to use the apparatus. This is work that I did during the evenings and weekends while studying at IIT.

Visesh Infotech, New Delhi, India March '05 – July '05
I implemented a dialer to negotiate a PPP connection and a UDP/IP stack on an AVR microcontroller(ATMega16). The microcontroller read data from a U-Blox GPS module and transmitted it over the GPRS network to a base station (server with a static IP). The complete product was a low cost Vehicle Tracking System. This is work that I did during the evenings/night and weekends while studying at IIT.

Pravak Cybernetics (P) Ltd., New Delhi, India December '04
I worked on an 8051-based robotics kit. I designed hardware to program the micro-controllers and libraries to use the RS232 interface, read encoders, control DC and stepper motors. This robotics kit is being used in many universities in India including IIT Kanpur.

COURSES

At Georgia Tech:

Algorithmic Mechanics, Dynamics of Mechanical Systems

Computer Vision, Machine Learning, Pattern Recognition

Robot Intelligence: Planning in Action, Artificial Intelligence

Robotics Research Fundamentals

Relevant courses at IIT:

Control Engineering, Robotics, Digital Image Processing

Linear Algebra, Probability and Stochastic Processes

Data Structures, Analysis & Design of Algorithms, Discrete Mathematical Structures

Operating Systems, Computer Architecture, Analog Electronic Circuits

SKILLS

Programming:

Proficient in python, C, C++, LaTeX, OpenCV, OpenGL, PyGTK, Pygame, gcc/g++, make, subversion

Familiar with java, perl, bash, assembly(AVR, 8051), sml, VHDL

Embedded Systems:

Microcontrollers: Atmel AVR family (ATMega128, ATMega16), 89 family (89C52, 2051 etc.), PIC microcontrollers (PIC16F876A)

FPGAs: Xilinx, Altera

Engineering:

Familiar with PCB design tools (Eagle), CAD (Solidworks), Rapid Prototyping (Laser Cutting, 3D Printing), soldering, drilling and machining.

System Administrator:

Part of a team of 4 undergraduate student system administrators at IIT Delhi. Clients ran Linux.