AMMAR HUSAIN

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EDUCATION

CARNEGIE MELLON UNIVERSITY – ROBOTICS INSTITUTE **PITTSBURGH, PA**
M.S., Robotic Systems Development, December 2012

UNIVERSITY OF ILLINOIS **URBANA-CHAMPAIGN, IL**
B.S., General Engineering - Robotics *(Honors),* May 2011 **GPA: 3.64/4.0**
Dean's List of Students: 2007-2010

PRINCESS SUMAYA UNIVERSITY OF TECHNOLOGY **AMMAN, JORDAN**
Study Abroad, Summer 2008
- Courses in Arabic, Islamic History and Middle Eastern Culture

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RESEARCH – EXPERIENCE

COMPUTER VISION
***ESTIMATE MISSING DEPTH VALUES IN KINECT:* 2 Members advised by Prof. Derek Hoiem**
- Microsoft Kinect is an inexpensive tool to capture 3D world information with inherent limitations in depth sensing technology such as several missing depth data points
- Converted raw Kinect data to create a point cloud representation. Used an iterative diffusion method that accounts for both the known depth values and RGBD segmentation results to recover missing depth information
- Derived a version of the Hough voting scheme in order for the existing depth values to vote for missing depth pixels
- Incorporated MonteCarlo inspired sampling method to speed algorithm for implementation on a GPU
- Nominated by Prof. Derek Hoiem, to submit paper to IJCV 2011, Spain.

NON-HOLONOMIC MANIPULATION AND PLANNING
***MOBIPULATOR ROBOT BUILD:* 2 Members advised by Prof. Seth Hutchinson and Prof. Tim Bretl**
- Project inspired by the robot 'Mobipulator' study at the Manipulation lab at Carnegie Mellon
- Built a dual differential drive concept car that uses its wheels for locomotion and manipulating desktop objects
- Derived a Kinematic model that governed the motion of the robot and desktop objects (sheet of paper)
- Devised control policies under two separate system constraints that achieve the most optimized mobile manipulation
- Proposed a Reeds-Shepp based planning scheme to move paper from user specified initial to final configuration

ARTIFICIAL INTELLIGENCE PROJECT *Fall 2010*
***SYNERGY FS, HYBRID HARD DRIVE OPTIMIZATION:* 2 Members advised by Prof. Gerald Dejong**
- Goal of the research was to incorporate learning algorithms to dynamically place actively seeked files on the SSD portion of a hybrid disk in order to optimize speed and energy consumption
- Collected operating system level data on file usage such as frequency, time, location and size of file. Existing technologies incorporated low level disk seek data that overlooked certain relevant factors
- Created hierarchical Bayesian networks with multiple parameters to predict future use of a file
- Ran simulations for 7 years of OS data and achieved up to 39.8% time savings compared with regular drives

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WORK – EXPERIENCE

BANK OF AMERICA - MERILL LYNCH *Summer 2010*
Technology Analyst, Chicago, IL
- Created and optimized process plans & system architecture diagrams of the software used for SPE trading
- Developed a new Web-application based Project Management tool and integrated it with existing bank applications
- Analyzed and produced data flow and software system designs for Middle Office in Capital Markets

GENERAL ELECTRIC – HEALTHCARE *Summer 2009*

Lean Manufacturing Intern, Barrington, IL

- Programmed automated systems in Visual Studio for production planning & triggering, thereby saving time & waste
- Strategized manufacturing activities conforming to Kaizen, 5S, Six-sigma & poka-yoke

CATERPILLAR INC.

Machine Designer - Champaign Simulation Center, U of I Research Park ***2008-2010 (Part-time)***

- Design, analyze and update models of CAT parts and assemblies using Pro-Engineer

Test Engineer - Motor Grader Development, Peoria Proving Grounds ***Spring 2008 (Full-time)***

- Conducted tests on motor graders and its components to assess design efficiency and performance analysis.
- Possessed complete ownership of a transmission installation project, leading a team of mechanics and operators.

AMERICA READS PROGRAM

Tutor - Leal Elementary School, Urbana, IL ***Spring 2007 (Part-time)***

PROJECT – EXPERIENCE

ARDUCOPTER UAV: Personal Project

- Built the quadrotor drone kit from scratch with an ArduPilot Mega controller, IMU sensor shield, brushless motors, ESC's and GPS for waypoints
- Currently programming the quadrotor for simple flight error correction and waypoint following

MECHATRONICS PROJECT *Spring 2010*

AUTONOMOUS ROBOT DESIGN: **4 Members**

- Programmed a mobile robot by coding the DSP/BIOS of a TI MSP430 Microcontroller, as well as processing sensing data from CMOS camera, rate gyros, LADAR, & IR sensors
- Devised a control algorithm with closed loop feedback, iterative error correction mechanism
- Wirelessly communicated with the robot and plotted the robot data on a VB based graphical interface
- Added the ability to computer control the robot such as stop operation or correct estimated position information

SYSTEMS PROGRAMMING *Spring 2010*

OPERATING SYSTEM PROJECT: **4 Members*****: Rank 4 of 15***

- Created a Unix Based Operating System on x-86 Intel architecture and a Linux kernel, that supported opening & closing files, multithreading, virtual memory, video memory, interrupt handlers, partial GUI, timers and power save features

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TECHNOLOGY SKILLS

- Programming languages: MATLAB, C/C ++, Java, Visual Studio
- Proficient in Assembly Language, Systems and Application Programming, Object Oriented Programming
- Extensive experience in Amazon Web Services (EC2), NX Protocol, LAMP and various server level technologies

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ACTIVITIES & LEADERSHIP

- President Servo-Motor Robot Design Team, Faculty chair of Gamma Epsilon Honors society, Treasurer FIRM Consulting
- Completed Six Sigma Yellow Belt Training and training in Toyota Production System
- Fluent in English, Urdu and Hindi
- Sports – Club Tennis, Illinois Cricket Board

HONORS

- Kenneth Hamming Scholarship, **2008**
- Industrial Enterprise and Systems Engineering Service Award, **2007 and 2009**
- Idea2Product competition, UIUC regional

BACKGROUND

- Currently a United States Permanent Resident Card Holder. Filed application for US citizenship with an expected acceptance date in December 2011
- Travel enthusiast with a keen interest in learning about cultures. Grew up in India and visited almost 20 countries in the Middle East, Asia and Africa