Yang Li

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Education

Ph.D. in Computer Science, *University of Colorado Boulder*   **Aug. 2015 - present**

M.S. in Computer Science, *East China Normal University*   **Sep. 2012 - Jul. 2015**

Exchange Student, *Shanghai Jiao Tong University*   **Feb. 2010 - Jul. 2010**

B.S. in Computer Science, *East China Normal University*   **Aug. 2008 - Jun. 2012**

Current Projects

- **Grasping with Kinova Robot Arm**: the project aims to control the Kinova arm to grasp object in the environment automatically. We program in C++ and Python with ROS. First use RGB-D camera to calibrate the robot and get centroids of objects in the environment. Then calculate the translation between source and target frames. Finally, control the arm to reach and grasp the specified object.

- **Distributed Camouflage**: research on the mechanism of cephalopods' camouflage, and mimic it with artificial camouflage system.

Previous Projects

- **Camouflage on Droplets Platform**, *Correll Lab, CU Boulder*   **Jun. 2016 - Jul. 2016**
  - Implemented a distributed camouflage algorithm on a swarm of micro robots call Droplets with C language (as described in paper [C5])
  - Each Droplet can sense RGB color projected on it, emit RGB color, perform range-bearing to decide neighboring Droplets' relative directions and distances, and broadcast messages to other Droplets

- **Winner of Manipulation Competition**, *RoboSoft Grand Challenge, Livorno, Italy*   **Mar. 2016-May. 2016**
  - Implemented a self-contained soft robotic hand composed of soft pneumatic actuators
  - Designed a PCB and program with it to control the actuators with C language

- **Grading Scripts**, *Teaching Assistant, CU Boulder*   **Spring, Summer, Fall 2016**
  - Maintain an online grading website called COG written with Python
  - Grade students' submissions with Bash, C++ and Python

- **Course Project**, *Computer Graphics*   **Nov. 2015 - Dec. 2015**
  - Created a 3-D scene with OpenGL
  - In the scene, there are a bunch of Baxter robots, a room, flags waving and music singing. With keyboard to control move of the camera, move of robots' hands and change of robots' faces

- **Intern**, *Wicresoft Co., Shanghai*   **Jun. 2011 - Sep. 2011**
  - Implemented an online chatting platform using C#
  - Mastered MVC (model-view-control) model to interact with database

- **Project Leader**, *National Undergraduate Students Innovation Project*   **Oct. 2010 - Dec. 2011**
  - Worked with two project members to implement a Genetic Computing Visualization Software
  - Made the software to select optimization algorithms automatically

Computer Systems

Programming Languages (in order): C++, Python, C, Matlab, Bash, C#

Operating Systems: Linux, Windows, OS X

Teaching Experience

Teaching Assistant, *University of Colorado Boulder*

- CSCI 2270: Data Structures   Spring, Summer, Fall 2016
- CSCI 3155: Principles of Programming Languages   Fall 2015

Teaching Assistant, *East China Normal University*

- UML Information System Modeling   Fall 2013

Research Experience

- **Graduate Student**, *Correll Robotics Lab, University of Colorado Boulder*   **Sep. 2015 - present**
  - Presented a distributed algorithm for a swarm of active particles to camouflage in an environment (published in [C5])
    - Each particle is equipped with sensing, computation and communication, allowing the system to take color and gradient information from the environment and self-organize into an appropriate pattern.
  - Designed a self-contained, soft robotic hand composed of soft pneumatic actuator modules that are equipped with strain and pressure sensing (published in [P1])
    - We show how the obtained data can be used to discern whether a grasp was successful. Collocating sensing and embedded computation with the actuators greatly simplifies control and system integration.
  - Worked with ROS on Baxter (RethinkRobotics) doing motion planning, interaction with environment

- **Graduate Student**, *East China Normal University*   **Sep. 2012 - Jul. 2015**
  - Combination of multiple Differential Evolution (DE) operators for multi-objective optimization (published in [C4])
    - Proposed a combining strategy to improve the performance of decomposition based multi-objective evolutionary algorithm (MOEA/D)
    - The algorithm shows promising results on instances with different complexities and characteristics
  - Use of priori and posteriori knowledge for multi-objective knapsack problem (published in [C3])
    - Introduced a probability model using priori and posteriori knowledge
    - Demonstrated posteriori knowledge can improve exploration and priori enhances exploitation
  - Data storage engine based on memory-mapped file (published in [J1])
    - The embedded storage engine provides a simple yet flexible interface for data storing
    - Memory-mapped technique enhances the fast and huge data storage

- **Undergraduate Student**, *East China Normal University*   **Aug. 2008 - Jun. 2012**
  - Estimation of distribution algorithm for multi-objective knapsack problems (published in [C2])
    - Used estimation of distribution algorithm to do produce high quality solutions efficiently
  - Simulated annealing with probabilistic neighborhood for traveling salesman problem (TSP) (published in [C1])
    - A probabilistic neighborhood model is used to guide the search in a heuristic method

Publications

Journal

[J1] Sanyi Jiang, Zhenzhen Dai, **Yang Li** and Aimin Zhou, "Data storage engine based on memory-mapped file for evolutionary algorithms," in *Computer Engineering and Applications*, 2013. (In Chinese)

Conference

[C1] **Yang Li**, Aimin Zhou and Guixu Zhang, "Simulated annealing with probabilistic neighborhood for traveling salesman problems," in *International Conference on Natural Computation* (ICNC), 2011.

[C2] **Yang Li**, Aimin Zhou and Guixu Zhang, "A Decomposition based estimation of distribution algorithm for multiobjective knapsack problems," in *International Conference on Natural Computation* (ICNC), 2012.

[C3] **Yang Li**, Aimin Zhou and Guixu Zhang, "A Probability Model based Evolutionary Algorithm with Priori and Posteriori Knowledge for Multiobjective Knapsack Problems," in *World Congress on Intelligent Control and Automation* (WCICA), 2014.

[C4] **Yang Li**, Aimin Zhou and Guixu Zhang, "An MOEA/D with Multiple Differential Evolution Mutation Operators," in *IEEE Congress on Evolutionary Computation* (CEC), Shanghai, China, 2014.

[C5] **Yang Li**, John Klingner and Nikolaus Correll, "Distributed Camouflage for Swarm Robotics and Smart Materials," in *Distributed Autonomous Robotic Systems* (DARS), London, UK, 2016.

Paper

[P1] Nicholas Farrow, **Yang Li** and Nikolaus Correll. "Morphological and Embedded Computation in A Self-contained Soft Robotic Hand", CoRR abs/1605.00354, 2016.

Last updated: October 8, 2016