Keke Zhai

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Education:

SUN YAT-SEN UNIVERSITY, Intelligent Science and Technology Sept. 2011-Jun. 2015

GPA: Major 4.4/5.0 Overall 4.1/5.0

Main course: machine learning (96/100), artificial intelligent (94/100), digital image processing (92/100), introduction of robot (90/100)

Research Experience:

Do research in the laboratory of Professor Yunong Zhang

Jul. 2012-present

Research focus 1: investigate the relationship between two different levels robotic schemes (i.e., the velocity-level schemes and the acceleration-level schemes) [1] [3].

- Equivalent relationship of different levels has been successfully established in two kinds of redundancy-resolution scheme (i.e., minimum velocity norm scheme and minimum kinetic energy scheme) via theoretical analysis and computer simulations.
- Constructively make the redundant robotic control more flexible and indicate a way of robotic research developing from single-level schemes to different-level mixed schemes.

Research focus 2: design ZG controllers for linear and nonlinear tracking control systems [2].

- Based on ZD and GD methods, the ZG controllers are effectively designed with the tracking control errors very small (below 10^{-3} or even small).
- The ZG controllers can even conquer the division-by-zero problem.

Curriculum on aircraft design

Aug. 2014-Sept. 2014

Class missions: complete a given program to make the aircraft fly along the white line on the ground, land on the red square floor when right over it.

- Use the PID control method to manage the pitch, roll and yaw angles as well as the x-axis and y-axis speed, keeping the aircraft steady in the air.
- Process the images the aircraft capture to extract the white line (using the library function in OpenCV) and the red square (using the RGB components) on the floor.

Curriculum on machine learning

Sept. 2013-Feb. 2014

Class missions: analyze your state (such as running, eating, sleeping and so on) by training the collected data from sensors in the mobile phone.

- Collect the sensors' (e.g., wifi, volume, GPS and so on) data in responding to different states and train them by Weka software (i.e., supervised learning).
- Effectively determine the state of a person based on the trained parameters (i.e., unsupervised classification).

Curriculum on artificial intelligent

Sept. 2013-Feb. 2014

Class missions: complete one of the top ten algorithm in data mining.

- Successfully complete the Naive Bayes algorithm by consulting lots of literature and programming.

Extra Experience:

Participate in Chinese Service Robot Contest

Mar. 2014-May 2014

Competition missions: program a sequence of movements given part of the environmental initial statements and the task to complete

- Search keywords in the natural language and convert it to the command language.
- Use A* algorithm to find out the best decision the program can predict based on the smallest cost.

Global leadership course with students from Brigham Young University

Class missions: learn the characters of the global leaders and work in group to make a team strong and competitive.

- ❖ Communicate and collaborate with each other in the group to determine the best scheme we should adopt.
- ❖ Help overseas friends to make them adapt to the culture and life in China.

Publications

[1] Dongsheng Guo, Keke Zhai, Xiaotian Yu, Binghuang Cai and Yunong Zhang, Zhang Equivalence of Different-Level Robotic Schemes: an MVN Case Study Based on PA10 Robot Manipulator, in proceeding of IEEE International Conference on Robotics and Biomimetics (ROBIO), pp. 1592-1597, Shenzhen, China, 2013.

[2] Yunong Zhang, Keke Zhai, Ying Wang, Dechao Chen and Chen Peng, Design and Illustration of ZG Controllers for Linear and Nonlinear Tracking Control of Double-Integrator System, in press.

[3] Dongsheng Guo, Keke Zhai, ZhengLi Xiao, Hongzhou Tan and Yunong Zhang, Acceleration-Level Minimum Kinetic Energy (MKE) Scheme Derived via Ma Equivalence for Motion Planning of Redundant Robot Manipulators, in press.

Awards & Honors

National Scholarship for Encouragement	Oct. 2014/Oct. 2013/Oct. 2012
First-class Scholarship of Sun Yat-sen University	Oct. 2014/Oct. 2013/Oct. 2012
Chinese Service Robot Contest of Simulation on Natural Language	May 2014
Chinese Service Robot Contest of Simulation on Command Language	May 2014
Second-class Scholarship of Sun Yat-sen University	Oct. 2013/Oct. 2012

Program Language

C, C++, MATLAB, LaTeX