Yuchen Rao

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Portfolio: https://yuchenrao.github.io/Portfolio/

EDUCATION

Master of Science in Robotics (MSR) 09/2016 - Present
Northwestern University, Evanston, IL (GPA 3.93/4.00)
Bachelor of Science in Mechanical and Electrical Engineering 09/2012 - 07/2016
China Agricultural University (CAU), Beijing, China (GPA 3.88/4.00, Rank: 1/43)

PROJECTS

MS in Robotics Course Projects, Northwestern University 09/2016 - 04/2017

- Musical instrument classification based on MFCC audio processing algorithm and SVM algorithm
- Dynamic simulation of multi-body mechanical systems in generalized coordinates involving friction, impacts, and external forcing using Mathematica
- Development of a library for analysis of serial robot arms; features included: forward and inverse kinematics, inverse dynamics, trajectory generation, and visualization of trajectories through V-REP

Baxter Drawing Control based on Detected Facial Emotion, Northwestern University 01/2017 - 04/2017

- Extracted facial features based on OpenCV Haar Cascade and dense SIFT algorithm
- Classified emotions (happy, sad, surprise, and disgust) based on SVM algorithm, with an accuracy of 98.1%
- Controlled Baxter drawing specific faces based on live detected emotion by using ROS-based SDK

Freescale Cup: Intelligent Car Racing(electromagnetism group), Beijing, China 05/2014 - 05/2015

Team Leader of Freescale Cup: Intelligent Car Racing of North China region (3rd place finish)

- Coded control program for controlling the car to follow a wire with an XS128 microcontroller
- Improved adaptive PID algorithm to maintain steady velocity (1m/s), and improved adaptive PD algorithm to improve the stability and accuracy of turning angle of steering engine
- Promoted a more stable and accurate controlling method by using a filter function for sensors, fitting a function of car position by MATLAB, and using fuzzy control theory to control deflection angle of steering engine

Indoor Orientation and Navigation System based on RFID, Beijing, China 05/2014 - 05/2015

- Team Leader , designed and coded method of orientation and navigation with three fixed sensors and one moving sensor, and designed a method to expand the area of orientation from one equilateral triangle to whole area

RESEARCH EXPERIENCE

Emotional Classification of Chinese Micro-blog Articles, Tsinghua University, Beijing, China 10/2015 - 06/2016

- Classified emotions of online articles based on words and structure features of sentences with SVM^{Perf}, and improved accuracy by 15% for only training features of words
- Divided sentences into terms, analyzed terms' properties and syntactic dependency by LTP-Cloud with Java
- Represented corpus as matching feature vectors learned by word2vec, and trained the labeled vector document by SVM^{Perf} to separately do predictions for words' features and sentences' structure features
- Used SVM Binary Classification method to classify 'surprise' and 'afraid,' and used SVM One Versus One method to multi-classify 'sad,' 'angry,' 'happy,' and 'disgust,' with a highest accuracy of 94%

SKILLS

C(Level 2 Certificate, National Computer Rank Examination, 06/2013), Python, ROS, MATLAB, Mathematica, Eagle, MPLAB, C++, SOLIDWORKS, AutoCAD, CodeWarrior, Java, V-REP, Gazebo, Weka

AWARDS

Outstanding Graduates for Beijing, Outstanding Graduates for CAU 06/2016
Excellent Student Award with Scholarship, CAU 09/2015
Excellent Student Award in Academics Grade 1 with Scholarship, CAU 09/2013 - 07/2015
Excellent Student Award granted by the Ministry of Education with Scholarship, China (twice) 09/2013 - 07/2014

EXTRACURRICULAR ACTIVITIES

Chinese Orchestra of CAU (First Award of Beijing University Students Performance) 09/2012 - 09/2014
Teaching volunteer, cleaning library and helping pupils and CIGR Conference volunteer 09/2012 - 09/2014
League Branch Secretary (organized and planned activities of classmates) 09/2012 - 09/2013