Eric Xue

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Passionate, creative, and diligent university student pursuing an interest in robotics and artificial intelligence.

RESEARCH EXPERIENCE

"Granular Analysis of Pretrained Object Detectors" - 2021

- Performed subgroup analysis on the KITTI vision dataset using Faster R-CNN and YOLOv3 detectors
- Implemented image perturbations (e.g. color distortion, Gaussian blur, etc.) with PyTorch
- Evaluated the performance of object detectors in different subgroups (e.g. different occlusion levels) with precision-recall curves
- Accepted by ICAIIC 2022 (International Conference on Artificial Intelligence in Information and Communication)

"Classification of Cell Type Based on Single-cell RNA Sequencing Using Machine Learning Methods" – Summer 2019

- Applied dimension reduction techniques such as PCA (Principal Component Analysis) to efficiently train and evaluate machine learning models on a large dataset with 24244 x 20499 entries
- Investigated the performance of a number of classifiers including decision tree, Support Vector Machine, k-Nearest Neighbor, and Naive Bayes
- Produced a 9-page report on the results of the study

WORK EXPERIENCE

MOZI AI – Summer 2020

- Implemented features for an open-source knowledge graph-based gene annotation tool in Python
- Conducted tests and identified errors during deployment
- Communicated frequently with the development team through weekly meetings and Slack chats

Copyleft Games - 2019-2020

- Helped to develop Copyleft Game's open-source game engine PySoy using Python
- Studied existing API and wrote code samples as a part of PySoy's documentation
- Identified and resolved dependency conflicts
- Developed physics-based 3D Python games with PySoy

HONORS / AWARDS

Google Code-In – Runner-Up (2020)

- Competed in the Google Code-In contest with more than 3500 participants from around the world
- Placed as a Runners-Up

RoboCup Junior Soccer

- Placed 2nd (2019), 15th (2018), 3rd (2017) at the international level

Honour Roll with Distinction – 2021, 2020, 2019, 2018, 2017

PROJECT EXPERIENCE

WorldChat (Social Media Web App) – 2021 to Present

- Developed a social media web app using JavaScript and React
- Finished the UI, including dashboard, contacts, and chat interface
- Backend development is currently in progress

Coveet (Twitter Sentiment Analyzer for COVID-19) – 2021

- Developed a program in Python that processes and analyzes the sentiment intensity of tweets from Twitter in JSON format with NLTK (Natural Language Toolkit)
- Created an interactive visualization of results sorted by geographical regions using PyQt5

BuddyBreed (Dog Breed Recognition App) – 2020

- Cooperated with a UI designer and developed a complete client-side app using Swift
- Developed the server-side app using Firebase and Python that processes uploaded photos with an object detector to determine a dog's breed
- Implemented an object detector based on ResNet50 in the server-side to predict dog breed, achieving more than 80% confidence in most photos

Participation in RoboCup@Home Education – 2019 to 2020

- Programmed a home service robot in a three-person team with features including object delivery, person-following, and voice source localization
- Implemented SLAM (Simultaneous Localization and Mapping) in ROS
- Implemented pathfinding on a given map using Python with AMCL (adaptive Monte Carlo localization)
- Implemented object detection on a variety of household objects using OpenCV
- Integrated the voice recognition module and the robot arm control module into the main program

Participation in FIRST Tech Challenge – 2018 – 2020

- Led high school robotics team with fifteen members to compete in the FTC (FIRST Tech Challenge) competition
- Guided and mentored many team members with no prior robotics experience
- Programmed the teleoperation capability of the robot using Java
- Created the autonomous script for the robot to perform a series of pre-determined actions, with simple decision-making based on visual recognition
- Implemented image recognition using Vuforia to allow the robot to identify various objects

Unity Game Design – 2018 to 2020

- Worked on multiple game projects with Unity (the most recent three projects are listed below)
- Developed a visual novel tool that allows users to create a visual novel by providing text flow controls, background music system, and character sprite management
- Developed a bowling game in VR with movement control and item interaction
- Developed a high-quality game scene demo with dynamic lighting, distance-sensitive sound effects, and rigged character animation

Participation in RoboCup Junior Soccer – 2016 to 2019

- Led a team of three to compete in a robotics competition at both regional and international levels
- Designed, modeled, and 3D-printed the multi-layer chassis structure of the robot using Solidworks, with components such as an OpenMV camera, a custom PCB, motors, and a solenoid kicker
- Developed multiple algorithms in C, such as ball localization with an omnidirectional camera, pathfinding to a moving ball, and robot localization using ultrasonic sensors