

Tsvetan I. Zhivkov

SOFTWARE ENGINEERING · MACHINE LEARNING

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"I am a researcher in robotics, passionate about software engineering and machine learning."

Experience

Lincoln Agri-Robotics, University of Lincoln

Lincoln, United Kingdom

POSTDOCTORAL RESEARCHER

May 2020 - present

- Developed and Engineered software for a new Agricultural Weeding robot platform with custom sensors and created a ROS based physics simulation.
- Secured a £300,000 grant for a three-year Tree Singulation Project.
- Integrated custom LiDAR sensors for UAV Crop Mapping and Ground Robot Navigation.
- Performed UAV flights for mapping and scanning crops to test Machine Learning models.
- Set up a robotics arena for Teaching and Research in Fleet Robotics and Agri-Robotics.
- Maintained and configured a Private 5G Network, and designed and configured a WiFi system for Robot Communication.
- Researched the Speed-Up of 5G Agri-Robotics communication and developed tools for the analysis of Quality-of-Service metrics and Data Representation.
- Planned and organised demonstrations and presentations during the Fresh Produce Consortium (the biggest agri-event for the University of Lincoln).
- Held guest seminars on "Multi-Robot System Design and Implementation" to postgraduate students.

Engineering Department, King's College London

London, United Kingdom

ROBOTICS SOFTWARE DEVELOPER

Dec. 2019 - May 2020

- Part-time: Developed custom drivers for specialist robotic hardware; Delivered workshops for robot applications that used specialised Multi-Sensor Perception to perform classical Computer Vision Techniques on compute-limited devices to perform plant detection and identification.

Faculty of Natural & Mathematical Sciences, Graduate Teaching Scholarship, King's College London

London, United Kingdom

TEACHING ASSISTANT

Oct. 2015 - Apr. 2020

- Lab assistant for: 4th year Data Mining (Python), Computer Vision (MATLAB) and Computer Programming for Data Science (Python), 2nd year Database Systems (SQL/SQLite), 1st year Programming Practise & Applications (JAVA)
- Taught tutorials/seminars for: Programming Practise & Applications and Computer Vision.
- Marked assignments, coursework and delivered either written or verbal student feedback for: Programming Practise & Applications, Computer Programming for Data Science and Data Mining.

Centre for Robotics Research Recruitment & Outreach, King's College London

London, United Kingdom

DEMONSTRATOR/PRESENTER

Jun. 2016 - Dec. 2019

- Performed robotic demonstrations for industry professionals and potential students.
- Co-organiser of the 2017 open day for Centre for Robotics Research (CoRe) group.

Summer Internship on Data Capture, University of Liverpool

Liverpool, United Kingdom

APPLICATION DEVELOPER

Jun. 2014 - Sep. 2014

- Researched and Developed methods of retrieving text and image data from users who operated mobile devices (iPad).
- Designed a prototype application that enabled users to take photographs, annotate them and leave comments.
- Implemented a method for data storage that enabled Multi-Platform Data Retrieval for further analysis.

Education

King's College London

London, United Kingdom

PHD (GRADUATE TEACHING SCHOLAR) IN COMPUTER SCIENCE

Sep. 2015 - Mar. 2020

- **Research Title:** *A Multi-Robot Communication Framework for the Analysis and Mitigation of Network Perturbations.*
 - Investigated the impact of disrupted communication on Multi-Robot Teams.
 - Developed signal strength models using Support Vector Regression machine learning, which are used to identify communication failures.
 - Developed an algorithm to mitigate communication failure, which evaluates Multi-Robot communication against the two Signal Strength Models in real-time.
 - Evaluated Simulated and Physical robot empirical results, using a large selection of Performance Metrics.
- **Research Field(s):** Multi-Robot Systems, Communication-Based Control, Agent Behaviour, Software Development.

University of Liverpool

Liverpool, United Kingdom

MENG IN COMPUTER SCIENCE AND ELECTRONIC ENGINEERING

Sep. 2011 - Jul. 2015

- **Fourth Year Group Project:** Robot Object Search and Retrieval Team - Developed an application to improve human-robot interaction.
- **Third Year Project:** Multistage Electromagnetic Projectile Accelerator.

Publications

The need for speed: How 5G communication can support AI in the field

Virtual

PRESENTED AT UKRAS21 CONFERENCE: ROBOTICS AT HOME

Jun. 2021

Modelling variable communication signal strength for experiments with multi-robot teams

Lincoln, United Kingdom

PRESENTED AT UKRAS20 CONFERENCE: ROBOTS INTO THE REAL WORLD

May 2020

MRCComm: Multi-Robot Communication Testbed

London, United Kingdom

PRESENTED AT THE 20TH TOWARDS AUTONOMOUS ROBOTIC SYSTEMS CONFERENCE

Jul. 2019

Establishing Continuous Communication through Dynamic Team Behaviour Switching

Loughborough, United Kingdom

PRESENTED AT THE 2ND UK-RAS19 CONFERENCE ON EMBEDDED INTELLIGENCE: ENABLING & SUPPORTING RAS TECHNOLOGIES

Jan. 2019

Measuring the Effects of Communication Quality on Multi-Robot Team Performance

Surrey, United Kingdom

PRESENTED AT THE 18TH TOWARDS AUTONOMOUS ROBOTIC SYSTEMS CONFERENCE

Jul. 2017

Skills and interests

RELEVANT SKILLS

- Programming** Python (Expert), C++ and MATLAB (Advanced), JAVA and Objective-C (Intermediate), JavaScript and Swift (Beginner).
- Scripting** Bash (Expert), Command Prompt (Advanced).
- Software** Git and Latex (Expert), Microsoft Office (Advanced).
- Frameworks** ROS (Expert), Docker, VirtualBox, Scikit-learn, Pandas, Matplotlib and PyTorch (Advanced) and many more.
- Operating Systems** Linux Ubuntu and Microsoft Windows (Expert), Mac OSX (Advanced).

HOBBIES AND INTERESTS

- Computer building** Passionate about building computers and keeping up to date with current technology trends and news.
- Fitness** Regularly indulge in fitness activities including weightlifting, bouldering and tennis.
- Board games** Board game lover who frequently meets with friends and colleagues to play a large variety of games, including DnD.