AI Bass Drum Pedal
NVIDIA Jetson Rocket Challenge

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Joseph McMahon
Ozan Akyildiz
Sarmad Sharif

Joseph McMahon	Ozan Akyildiz	Sarmad Sharif
joem@safeai.ai	oakyildiz@wpi.edu	smaarij@gmail.com
Robotics Software Engineer	PhD Robotics Engineering	Robotics Industry Researcher
Safe AI, Inc.	Worcester Polytechnic Institute	Lux Research

Joe initially researched the competition, brought the team together, picked the project, and led the hardware development.	Ozan led the software development including the beat prediction algorithms, pedal controller, audio and I2C interfacing.	Sarmad led testing, logistics and video production, and his support was critical for Joe to finish hardware and Ozan to finish software.

Joseph McMahon

640 Boston Ave, Apt #409
Medford, MA 02155

(774) 551-6356
joe@joemcm.com
http://joemcm.com

Experience

- **SafeAI, Inc.** http://safeai.ai/ — Palo Alto, CA
  Robotics DevOps Engineer — Dec 2017 to **Present**

- **Vecna Technologies, Inc.** https://robotics.vecna.com/ — Cambridge, MA
  Robotics Software Engineer — Apr 2017 to Nov 2017
    - Engineered robotic software systems for prototype RC20, as well as QCBot and RL3600-DO
    - Integrated robot software and hardware, debugged electronics and firmware
    - Automated PostgresSQL database operations with shell scripting
    - Programmed using ROS, C++, Python, JavaScript, and Java
    - Used Jira, Confluence, Gerrit, Git

- **Aila Technologies, Inc.** http://ailatech.com/ — Natick, MA
  Part-time Developer — Jan 2014 to April 2017
    - Engineered Ailaweb for iOS using Swift: scan enabling webpages
    - Maintained websites before and after rebrand

- **Tishman Construction Corporation, An AECOM Company** — New York, NY
  BIM Engineer — Apr 2014 to Aug 2015
    - Managed MEP Coordination meetings with subcontractors in World Trade Center Tower 3, WTC Retail, One West End Avenue, and the New York Public Library in New York, NY
    - AutoCAD, Navisworks, Revit, 3ds Max. Maxscript, Excel VBA
    - Performed technical case studies with latest web and iOS technologies, http://tishmanconstruction.github.io/3d-model-viewer/, https://github.com/jmcmahon443/SkyCubeSTL/

Education

- **Worcester Polytechnic Institute** — Worcester, MA
  MS Robotics Engineering, 3.2/4.0 GPA — Feb 2017
    - Software Engineering Intern: Blustream Corporation in Worcester
    - Lab Monitor at WPI Humanoid Robotics Lab
        * NASA Valkyrie R5 robot for NASA Space Robotics Challenge
        * Boston Dynamics ATLAS Gen 1 robot, Kneeling model
    - Won Formal Methods of Robotics Challenge (Scaling Chains of Integrators) at ICRA 2016 in Stockholm, Sweden https://fmrchallenge.org/integrator_chains.html
    - Mass Academy of Math and Science Alumni

- **Boston University** — Boston, MA
  BS Mechanical Engineering, 3.3/4.0 GPA — May 2013
    - Internships: GE Aviation, BU Office of Technology Development
    - Vice President of Entrepreneurship Club - Organized TEDxBU on Nov 21 2011 https://www.bu.edu/buniverse/view/?v=2HwO8s15R
    - Alumni Scholarship - awarded for outstanding academic work
    - Filament Extruder for 3D Printing https://youtu.be/LLFl5iE3rME
    - University of Sydney, Spring 2012

Ozan Akyildiz

WPI 85 Prescott St – Worcester, MA 01609

+1-774-253-2498 • ✉ oakyildiz@wpi.edu • in ozan-akyildiz • oakyildiz

Full-time position in Robotics Engineering or a related field

Education

Worcester Polytechnic Institute (WPI)   **Worcester, MA**
○ **Master of Science**, *Robotics Engineering, 3.3*   *Jan 2016 – Feb 2018*
○ **Bachelor of Science**, *Robotics Engineering, 3.54*   *Aug 2012 – May 2016*

Relevant Coursework...

Graduate: Advanced Robot Navigation, Motion Planning , Systems Engineering, Computer Vision, Robot Control, Robot Dynamics, Machine Learning, Digital Signal Processing

Undergraduate: Unified Robotics (Actuation, Sensing, Manipulation, Navigation), Introduction to AI, Embedded Systems, Software Engineering, Systems Programming, Engineering Innovation and Entrepreneurship

Skills

Programming: *Advanced* – C++, C, Python, MatLab, XML. *Proficient* – Java, JavaScript.

Software: *Frameworks/APIs* – ROS, Qt, OpenCV, openrave, Android, React.js. *CAD* – Solidworks, AutoCAD, TopSolid. *Visual Design* – Photoshop, Flash Studio, Maya, 3ds Max. *Office* – MS Excel, Access, LaTeX.

Engineering: *Embedded* – AVR, MSP, NXT, Arduino. , Computer Vision, SLAM, AI, Controls, Digital Signal Processing, Circuit Analysis, Engineering Design, Material Analysis, Prototyping, Physics

Organizational: Team Leadership, Project Management, Problem Solving, Public speaking.

Languages:: Native Turkish, Beginner German.

Experience

Technocopia, Worcester Think Tank, Worcester, MA   **Sep 2017 – Present**
Graduate Intern – Implementing API features for parts-checking to a database server. Co-coaching Technocopia's First Lego League team.

WPI Pre-Collegiate Outreach Programs, Worcester – North Reading, MA   **Jul 10, 2017– Aug 11, 2017**
Graduate Assistant – Mentored elementary and middle school students in SPARK, Junior Robotics Challenge Program(at Amazon Robotics) and LAUNCH weekly Robotics camps.

Auriel Capital Ltd., London, UK   **Jun 2017**
Research Intern – Conducted business research on fields, challenges and trends in Robotics and its industry.Turned in a 22-page report with over a hundred resources about software, power and actuation limitations, autonomous vehicles, industry 4.0 and industry insights.

&BKG, MainScreen, Istanbul, Turkey (*remote*)   **Aug 2016 – Present**
R&D Specialist, Contract & Distribution Coordinator – Leading software development and consulting for technology acquisition in online and indoor creative advertisement projects at &BKG and managing international distributorship deals at MainScreen. Currently developing a programmatic ad sales system with React.js and Node.js while working with Kino-mo to deploy persistence-of-vision based hologram-like advertising in Istanbul.

Projects

Structural Damage Detection Using Convolutional Neural Networks, WPI   **Mar 2017 – July 2017**
– Training a Convolutional Neural Network for the detection of cracks on walls in real-time to improve search & rescue robots' situational awareness. The model is trained using Keras and Tensorflow, and wrapped in a ROS package that uses OpenCV for prediction.

LSD-SLAM for Windows, WPI   **Mar 2017 – July 2017**
– Ported Large-Scale Direct SLAM to Windows. After rebuilding the dependency tree, recovered the lost ROS message and node functionality using multithreading and UDP. Currently re-implementing the interface using PCL.

Space Robotics Competition (SRC) - Capstone Design Project, WPI   **Aug 2016 – Dec 2016**
– Implemented color and object recognition and image to real world transformations on ROS (C++/Python) as well as handling system integrity and debugging full body control for SRC qualification tasks with Valkyrie R5. The team consisted of three people.

WALRUS Rover Expansion - Major Qualifying Project (MQP), WPI   **Aug 2015 – May 2016**
– Enhanced disaster response robot WALRUS with 3D Simultaneous Localization and Mapping and GUI with 3rd person viewport features using ROS, Qt, and RViz. Reverse engineered the robot to debug drivers, fix CPU overflow and overheat issue while updating system diagnostics. Introduced multiple roslaunch configurations. Added Qt5 support using CMake. Was also responsible from engineering development, system management for Ubuntu, embedded systems, and drivers as well as version control in a team of three.

Microplastic Pollution - Interactive Qualifying Project (IQP), Hong Kong   **Jan 2015 – Feb 2015**
– Collected microplastic samples from multiple bays in HK and ran spectrometer analysis on them as a three-person group. Surveyed the locals about awareness on microplastic pollution.

Sarmad Sharif
Cambridge, MA
smaarij@gmail.com
508-502-8283

Hi

I am a problem-solving technology engineer looking for innovative positions in software development and robotics. I am a team player and comfortable with hands-on technical work as well as research, training, and management.

EDUCATION
University of Massachusetts, Amherst   May 2016
Bachelor of Science in Applied Physics with Concentration in Computer Science

EXPERIENCE
Associate Research Analyst, Lux Research, Boston, Ma   Feb 2017- Oct 2017
- Provided strategic intelligence for fortune-1000 companies about emerging technologies including robotics, artificial intelligence, sensors, IIot, machine-human interaction
- Answered 200+ strategic inquiries from clients by applying primary and secondary research
- briefed 50+ technology start-ups on technology and business model; recommended actions for clients

Robotics Project Engineer, Absolute Robot, Worcester, MA   Sep 2016- Feb 2017
- Initiated and optimized efficient automation work cells by integrating and programming various robots
- Troubleshot, diagnosed, and repaired robot equipment and all related auxiliary equipment
- Created robot user-manuals and provided training and documentation for customers and new engineers

Game Design Instructor, Youth Digital**,** Greater Boston area   Summer 2016
- Taught students to create **Java** code in eclipse and graphics using photo-editing software to modify Minecraft

Case Manager, Worcester Community Action Counsel, Worcester, MA   Summer 2014, 2015
- Worked as a mentor for youth and a point of contact for work partners who hire them
- Led the application process, over 1000 applicants
- Taught workshops about work-place professional skills, and personal finance management

Research Assistant, Smith College, Northampton, MA   November 2013 – Sep 2014
- Worked on a 3D system of multi Bose-Einstein condensate clouds in Matlab simulating quantum mechanics near absolute zero; observed cloud interference opposed to the interacting strength of the elements and looking formations of vortices

PROJECTS
Intelligent Robotic Bass Drum, Nvidia Jetson Competition   Oct 2017 – Present
- The robot listens to music through a microphone and can play along using a bass drum powered by a motor
- Open-source Python and ROS software to be installed on a Jetson developer kit

Baseball Pitch Simulation
- 3D Baseball pitch simulation using Matlab. starts with user giving inputs to direction, starting speed, and the spin of the ball. The program then will simulate the ball trajectory using vectors and render it accounting for gravity and aerodynamics acting on the ball from both the spin and air drag. If the ball's trajectory goes through the 2 dimensional strike zone 18.44 meters away, it gives the user a point.

Electrical engineering lab at UMass Amherst
- Built a digital clock, a signal modulator and a calculator using simple components and Arduino scripts

LANGUAGES AND SOFTWARE
Proficient languages: Java, Python, Matlab, Simulink, C++, Linux Command Line, Arabic
Software: Microsoft Office, ImageJ, Autocad, Unity, Data Studio, Igor Pro, SQL, Android Studio, Github,