Aadiv Shah

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EDUCATION

Veermata Jijabai Technological Institute   Mumbai, India

B.Tech in Electronics and Telecommunication, CGPA: 8.38/10   Aug, 2017 – May, 2021 (Expected)

EXPERIENCE

Technical Consultant Intern   May – July, 2020

PricewaterhouseCoopers (PwC)   *Mumbai, India*

- Developed a *Demand Driven Material Replenishment Planning (DDMRP)* system combining concepts of Control Theory and Supply Chain Management to reduce cascading and compounding disruptions of the bullwhip effect.

Research Project Intern   May – July, 2019

Mahindra and Mahindra Ltd.   *Mahindra Research Valley, Chennai, India*

- Developed robot control algorithms for an *Autonomous Agricultural All Wheel Steered Ackerman Holonomic and Non Holonomic Drive* robot (Unmanned Ground Vehicle).
- Developed Path Planning Algorithms facilitating the robot to translate and rotate simultaneously while moving from node to node along straight or curved paths.
- Manufactured 3D printed disc cams using *Fused Deposition Modelling* Technology to locate the azimuthal home position of drive wheels.
- Developed *Deep Learning Based Classifier* for an autonomous cotton de-weeding implement.

PATENTS AND PUBLICATIONS

- Assignee: Mahindra and Mahindra Ltd. 2020. *Methods and Systems for Controlling Agricultural Implement for Removing Weeds.* Indian Patent Application No. 202041048166. Filed Nov 4, 2020. Patent Pending.

- Assignee: Mahindra and Mahindra Ltd. 2020. *Methods and Systems for Identification of Plant(s).* Indian Patent Application No. 202041048169. Filed Nov 4, 2020. Patent Pending.

- Revathi Prasad, Hari Nair, **Aadiv Shah** et al. Co- Author. *"Autonomous Weeder for Cotton Crop."* Symposium on International Automotive Technology (SIAT), 2021 by SAE International. [Accepted]

PROJECTS

Defect Detection in PMR Yoke   August, 2020 – Present

Mentor: Prof. Dr. Faruk Kazi, Center of Excellence, VJTI

- Industry project to identify and classify types of defects in *"yokes"* using Computer Vision and Deep Learning Methods to achieve a classification accuracy of 99% within a cycle time of 6 seconds.
- Developed iterative thresholding and morphological algorithms using MATLAB to enhance and extract features of the image for superior classification accuracy.
- Developing a Convolutional Neural Network to categorize images as "non-defective" vs "defective" and classify defective images into 7 specific types of defects.

Path Planning for UAVs in Constrained Environments [Link]   July, 2020 – Present

Mentor: Prof. Dr. Alice Cheeran, Department of Electrical Engineering, VJTI

- Developing Shortest Path algorithms to build a Path Planning model for point-to-point optimization for UAVs to solve the Travelling Salesman Problem.
- Developing a *Reinforcement Learning Model* to find the most optimized path for UAV to spray pesticide in an agricultural field using soil parameters like *NDVI, EC* as extracted from multi-spectral satellite images.

RFID Servo Metro Gate   November, 2019

Term Project
- Constructed a Metro Gate token validation system using *RFID* tags (13.56 MHz), MFRC522 to read RF Tokens and 6-volt, 13.5 kg-cm servo motors to control opening of gates.

Harnessing Energy from Flowing Water in Canals   May, 2014

Google Science Fair, Top 100
- Device to harness the potential energy from flowing water in canals using Bernoulli's Principle in a U-Tube, producing Simple Harmonic Motion to generate an Electromotive Force.

ACHIEVEMENTS

Robots to Solve Complex Problem Statements [Link]   July, 2017

FIRST Global Challenge, Gold and Bronze
- Represented India at the *Olympics of Robotics* at Washington, D.C.
- Ranked 1st in Engineering Design and 3rd in Robot Game amongst 163 countries.
- Designed and constructed a robot to manipulate and segregate different balls with a 3-channel color sensor ball sorting mechanism - 6 ball per second using linear retractable arms to lift the bot onto a rod 2.5 feet off the ground.

Confederation of Indian Industry and i4C [Link]   February, 2014

Youngest Innovator Award
- Presented and demonstrated a working prototype of *SHRAVAN an Intelligent Staircase Climbing Mechanism* using ultrasonic and touch sensor feedback to negotiate staircases. A unique climbing algorithm keeps the user upright at all times, maintaining a low center of gravity.

MENTORING AND VOLUNTEERING

Robots to Solve Citywide Problems [Link]   May, 2020

PTC Onshape Challenge, 1st Place
- Mentored FRC #6024 (15 students) to conceptualize and design a robot to autonomously detect and repair potholes on asphalt roads by analyzing data from Camera feeds and an Inertial Measurement Unit.

Technical Mentor   2017 – Present

FIRST Robotics Competition, FRC #6024
- Construction mentor to 70+ students with 47+ international awards and 1000+ hours of CAD Training
- Designed mechanisms: West Coast Chassis, Multi Stage Pneumatic Dog Shifting Gearboxes, High Speed Cascading Multi-Stage Elevators, Full Body Roller Intake, Turreted Shooter Mechanisms.

Technical Mentor   August, 2018 – Jan, 2019

FIRST Lego League, Sankalp Shiksha Sanstha (NGO)
- Imbibed concepts of physics and mechanics through LEGO-based Robots, to 18 speech and hearing-impaired students.

Technical Mentor   August – October, 2019

FIRST Global Challenge, India All Girls Team
- Mentored an all-girls to construct a robot to manipulate different sized game elements while traversing uneven terrain, representing India amongst 193 countries.

Technical Volunteer October, 2019

FIRST Global Challenge, Dubai
- *Robot Clinic for REV Robotics:* inspected, helped in repairing robots for 190+ international teams.

Chief Sponsorship Officer 2018 – 2019

Technovanza, VJTI's Technical Festival
- Invited Hanson Robotics and SOPHIA to a 3-day Tech-Expo featuring the *Indian Space Research Organization (ISRO)* and *Bhabha Atomic Research Center (BARC)* witnessing a footfall of over 80,000 people.

RELEVANT COURSEWORK

Mathematics: Calculus, Linear Equations, Fourier Analysis, Numerical Techniques, Statistical Theory of Communication
Physics: Engineering Mechanics, Electromagnetic Wave Theory, Microwave Engineering, Antenna Theory, Applied Physics
Control and Signal Processing: Control Systems, Digital Image Processing, Digital Signal Processing, Digital Communication Systems, Signals and Systems
Electronics: Electronic Circuit Analysis and Design, Integrated Circuits, Digital Logic Design, Microprocessor and Micro-controllers

TECHNICAL SKILLS

Mathematical Packages: MATLAB, Simulink, Scilab
CAD Software: Autodesk Fusion 360, PTC Onshape, Solidworks, ZWCAD, Multisim
Programming Languages: C++, Java, Python

CERTIFICATIONS

CSWP: Certified Solidworks Professional - Mechanical Design [Link]
CSWA: Certified Solidworks Associate - Mechanical Design [Link]
CSWA-AM: Certified Solidworks Associate - Additive Manufacturing [Link]
CSWA-SD: Certified Solidworks Associate - Sustainable Design [Link]