ABDUR RAHMAN

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Skills

Languages

English | Hindi | Urdu

Programming

Python | C | C++ | Arduino-C
Embedded C | Assembly | Verilog

Softwares

Jira Software | Confluence | GitBook
OpenCV | ROS | Gazebo | Matlab
Latex | Notion | Amazon AWS

Deep Learning Frameworks

Pytorch | Tensorflow | Keras

Development Boards

Arduino | Raspberry Pi

Hobbies

Writing | Chess | Football

Soft Skills

Teamwork | Leadership

Education

National Institute of Technology, Tiruchirappalli, India

Bachelor of Technology - CGPA: 9.41
Electronics & Communication Engineering
July 2017 - Present

International Indian School, Al-Jubail, Saudi Arabia

Class XII (CBSE AISSCE) - Score: 96.2%
2015 - 2017

Class X (CBSE AISSE) - CGPA: 9.8
2014 - 2015

Test Scores

TOEFL - 54
GRE - 314 (Verbal: 147 | Quant: 167)
SAT Subject Test - 2400

Internships

View in Portfolio

Technical University of Munich - *Remote Research Intern*

Guide: Prof. Dr. Nassir Navab (Head of Chair for Computer Aided Medical Procedures, TU Munich)
Aug 2020 - Present

- Image to image translation using conditional GANs to convert MRI scans of prostate glands into ultrasound scans.
- Implemented a structural consistency loss function to minimize the effect of tissue deformation when acquiring the ultrasound scans. This ensures a strong structural consistency between the input MRI scans and the generated ultrasound scans.

Origin Health Pte. Ltd. (Singapore) - *Deep Learning Intern*

Guide: Dr. Sripad Krishna Devalla (co-founder and CTO at Origin Health)
March 2020 - Aug 2020

- Created a proprietary deep learning framework for Backend Development including Image Enhancement and Semantic Segmentation.
- Implemented a Segmentation Network to visualize and detect birth defects in Fetal Ultrasound Scans.
- Confluence was used for documentation and Jira Software was used for Agile Software Development.

Indian Institute of Technology (IIT) Madras - *Research Intern*

Guide: Prof. Dr. Pratyush Kumar Panda (Founder at AI4Bharat, IIT Madras)
March 2019 - Aug 2019

- Implemented a convolutional neural network for 6-DoF global pose regression and odometry estimation from consecutive monocular images. The network estimates the camera pose from a sequence of monocular images from the camera.
- The neural network was built and trained from scratch in Tensorflow and it outperforms traditional feature-based visual localization algorithms, especially in texture-less regions

Projects

View in Portfolio

Automated Image Captioning using CRNN

June 2020

A Convolutional-Recurrent Neural Network (a combination of CNN and LSTM), trained on the MS COCO dataset, to caption images. As the model generates captions, word by word, its gaze (attention) shifts across the image. This allows it to focus on those parts of the image which is more relevant for the next word to be generated. Furthermore, beam search is used during inference to suppress suboptimal captions.

Face Landmarks Detection using CNN

May 2020

A neural network trained to localize facial landmarks. The model was trained on the DLib Dataset containing 6666 face-images along with corresponding 68-point landmarks for each face. Additionally, a custom data preprocessing pipeline is written in PyTorch to increase variance in the input images to help the model generalize better.

UG Courses

Probability Theory and Random Processes
Data Structures and Algorithms
Database Management Systems
Pattern Recognition (ongoing)
Networks and Protocols
Cloud Computing

Online Courses

Deep Learning Specialization

Coursera - deeplearning.ai (5 courses)

Statistics with Python

University of Michigan (3 courses)

Achievements

DAAD-WISE Scholarship

Awarded DAAD-WISE Scholarship to pursue Research Internship at Technical University of Munich for summer 2020, on the project, **MRI Scan to Ultrasound Scan conversion using Conditional GANs**, under the supervision of **Prof. Dr. Nassir Navab** (Head of Chair for Computer Aided Medical Procedures at TU Munich). Unfortunately, due to the COVID-19 outbreak, my internship is being carried out remotely.

Following 2018

March 2018

Secured 1st place in Following 2018, a line follower robot-building competition for freshmen, conducted by Robotics and Machine Intelligence (RMI), the official robotics and artificial intelligence club of NIT-Trichy.

Science Fair

September 2015

Secured 1st place for building a foldable Radio-controlled Drone in the Annual Science Competition held across the Kingdom of Saudi Arabia.

National Science Olympiad

Feb 2011

All India Rank: 688
City Rank: 2

Smart Goggles for Gaze Analysis

Sep 2019 - Oct 2019

Goggles to track the user's gaze, classify the object the user is looking at, and the duration of attention on that object. The goggles have 3 cameras, one on each eye to track the pupil movement and the third one for mapping the gaze to the real world and detecting the gazed objects. Various important parameters such as pupil velocity, acceleration, and fixation time are calculated for statistical analysis. This is a nascent step towards automated diagnosis of Autism.

OpenQuad - *Open-source platform for drone automation*

July 2019 - Present

The aim of the project is to build an open-source quadcopter platform for research in the field of drone autonomy. Various deep learning and computer vision algorithms are being implemented on the drone including person tracking, gesture control using human pose estimation, obstacle avoidance, and depth estimation using monocular vision. Currently, algorithms are being developed and tested in Gazebo Simulation.

SEBART-Pro - *Smart Self-Balancing Robot*

May 2018 - July 2018

SEBART-Pro is a robot that follows a ball while balancing on two wheels. It also recognizes traffic signs and acts accordingly. The robot senses the tilt using a 6-axis gyroscope and accelerometer, a PID control algorithm to balance on two wheels and a Convolutional Neural Network to recognize traffic signs.

Publications

View in Portfolio

Search and Reconnaissance Robot for Disaster Management

Published in iNaCoMM-2019 **View Publication**

Search and Reconnaissance Robot (SRR), an all terrain robot capable of locating survivors stuck under the debris caused by earthquakes. A novel amalgamation of Active-Articulation and Assisted-Autonomy allows the SRR to detect obstacles ahead and climb autonomously over them. Additionally, modularity allows it to detach into smaller modules to enter tight spaces.

Extracurricular

Robotics and Machine Intelligence (RMI) - *Project Head*

RMI is the official robotics and AI club of NIT-Trichy. It provides its members with funding and resources to take up research oriented projects in the areas of computer vision, deep learning and robotics. As a member, I have actively participated in numerous projects. Additionally, as the project head of OpenQuad, I guide the pre-final year RMI members working on OpenQuad.

Towards Data Science - *Author*

Towards Data Science provides a platform for thousands of people to exchange ideas and to expand their understanding of data science and artificial intelligence. It is one of the largest publishers on Medium, with over 200,000 followers. I publish articles regularly on AI and Data Science and they have received over 5,000 views.

Genesis '18 - *Organizer and Teacher*

Organized Genesis, an yearly robotics and artificial intelligence workshop conducted by RMI for institute freshmen, where I taught deep learning and computer vision.

NIT-Trichy Orientation - *Institute Student Mentor*

Served as the Institute Student Mentor, organizing orientation events and mentoring the institute freshmen.