

Muhammad Soban Khan

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EXPERIENCE

- **Video Analytics Lab, NUST** Onsite
Computer Vision Engineer (Full-time) *Dec 2019 - Present*
 - **Research and Academic Writing:** Conducted research in modern computer vision. Wrote papers in Q1 journals
 - **Scripting and Debugging:** Designed, build and debugged application specific machine vision (ASMV) systems
 - **Data Preprocessing and Analytics:** Data acquisition, cleaning, encoding, splitting and feature scaling
 - **Git and Database Management:** Managed version control, pull requests, reviewing code, collecting public datasets
- **Pak Elektron Limited** Lahore, Pakistan
Intern (Full-time) *July 2017 - Aug 2017*
 - **Intern at Energy Meter production plant (EMP):** Designed and wrote a Feasibility report of "Passive sound suppression system" for ultrasonic welding machines
 - **Production line of EMP:** Documented the flow line production and suggested ways to improve redundancy

EDUCATION

- **National University of Sciences and Technology** Pakistan
Bachelor of Engineering - Electrical Engineering; GPA: 3.41 *Sept 2015 - June 2019*
Courses: Digital Image Processing, Embedded System Design, Digital Signal Processing, Microprocessors Systems, Data Structures, Object Oriented Programming, Control Systems
- **LaSalle Higher Secondary School, Multan** Pakistan
O/A Levels *Sept 2010 - June 2015*
Courses: Mathematics, Physics, Chemistry, English

SKILLS SUMMARY

- **Languages:** Python, C++, CUDA, Matlab, Bash
- **Frameworks:** Pytorch, Keras, OpenCV, scikit-learn
- **Tools:** GIT, Docker, SageMaker, Colab, Altium Designer, NI Multisim
- **Platforms:** Linux, Windows, OpenBSD, Arduino, Raspberry, AWS
- **Soft Skills:** Innovation, Troubleshooting, Research skills, Writing

PROJECTS

- **Vision - Offline Signature Verification using multi resolution feature extraction:** Made a custom feature extraction method along with a custom multi channel CNN architecture, obtaining state of the art accuracies across public datasets including, GPDS synthetic, CEDAR and BHSig260. Repository not public yet
- **Vision - Age and Gender Estimation:** Preprocessed datasets including wiki-imdb, FGnet, made csv files including age, gender and class labels. Applied data augmentation, detected faces using mtcnn for cropping face only. Tested the datasets on VGG16 and Resnet networks. Fine tuned hyper parameters to achieve maximum accuracy. Code available on github
- **Vision - Multi-focus image fusion:** Generated a custom dataset using a lens with shallow depth of field, with six images per frame, each image set to a particular depth of field. Made a fusion algorithm to fuse all six images to a final image with information from all six images fused together. Code available on github
- **Embedded - Data Diode:** Designed and implemented data diode architecture based communication link. It provided a guaranteed isolation of host server as there is no receive link from host to device
- **Embedded - Electronic Travel Aid (ETA) for visually impaired(Final Year Project):** Designed and implemented a multi sensor fusion based ETA with haptic feedback from coin based vibration motors. Designed a custom PCB that included a distance sensor, battery, micro-controller and a vibration motor for feedback in a single package

PUBLICATIONS

- **Journal: Offline Signature Verification using Multi-resolution Feature Extraction:** Submitted to Elsevier IPM journal, in review phase. State-of-the-art performance in offline signature verification by using a custom multi-resolution feature extraction method and a custom Deep Network
- **Journal: Generative Adversarial Network for Fluid Simulation using 3D smoke Dataset:** Work in Progress

HONORS AND AWARDS

- Awarded Rector's Gold Medal for Final Year Project
- Awarded funding for Final Year Project by Toyota Indus Motor Pakistan
- Awarded distinction scholarship in semester 5 of Bachelour Degree
- Runner's Up at FICS 2019 event at NUST, Islamabad

VOLUNTEER EXPERIENCE

- **CUDA Parallel Programming Tutorials on Github:** Created a public repository of tutorial on parallel programming concepts and their implementation using CUDA. Taught the use of Nvidia Visual Profiler for bottleneck identification, memory transfer and kernel launch management