Manpreet Singh Minhas

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Education

University of Waterloo
MASc in Systems Design Engineering (**91%**)
Research Area - Machine Learning and Intelligence
Dec 2019 (Expected) | Waterloo, ON

University of Mumbai
B.E. in Electronics and Telecommunication Engineering (Distinction)
July 2015 | Mumbai, India

Certifications

Deep Learning Specialization by Andrew Ng on Coursera

Skills

Programming Languages
Python • TensorFlow/Keras
Pytorch • Matlab •C++ • R

Hardware
Texas Instruments MSP430 • AVR ATmega • Arduino

Graduate Coursework

- Topics in Probability and Statistics - Deep Learning
- Statistical Signal Processing
- Quantitative Methods in Biomedical Engineering
- Remote Sensing Systems

TA Courses

- Linear Systems and Signals
- Systems Design Workshop

Extracurricular

- Vice Chairperson of 'IEEE-CRIT Student Chapter'
- Conducted an expert lecture on the topic 'Diagnostic Imaging and Engineering' as a guest speaker for BE students.
- Volunteer at 'I Lead India Navi Mumbai Youth Brigade' a cleanliness drive.

Hobbies

- Badminton
- Dancing: Bhangra, Salsa, and Bachata.

Projects

AnoNet: Weakly Supervised Anomaly Detection in Textured Surfaces using CNNs

- Developed a CNN architecture capable of learning to detect the actual shape of anomalies in textured surfaces from weakly labelled data.
- Proposed a filter bank based initialization technique leading to stellar performance. AnoNet achieves state of the art performance with an average F1 score of 0.91 and AUROC value of 0.92 across four challenging data-sets.
- AnoNet is an extremely compact network with just 65k parameters. It generalizes well to similar anomaly detection tasks and avoids over-fit to the weakly annotated data. It can learn to detect anomalies from limited number of images (as few as 53 images).

Road Crack Detection and Segmentation using CNNs

- Created a dataset of normal and crack images from weak annotation and built a model using transfer learning to detect cracks in top-down road images for the Ministry of Transportation of Ontario (MTO).
- Achieved an accuracy of 96.6% on the validation set of 440 images and used a sliding window approach to perform patch based crack segmentation.

Automatic Redaction of Video Recordings using Deep Learning

- A deep learning system using MTCNN and ResNet50 trained on VGGFace2 data-set for the task of automated redaction of video recordings.
- All the faces except the person(s) of interest are redacted from the video.

1st Rank in STAT 946 Kaggle Competition

- Used network based transfer learning on DenseNet161 architecture and achieved a Top 1 accuracy of 83.27% on CIFAR100 dataset. (Leaderboard)

Author of two technological blogs

- Expound AI: Blog on deep learning core concepts, projects and use of frameworks namely PyTorch and TensorFlow/Keras. Link: expoundai.wordpress.com
- Learning MSP430: Blog on microcontrollers and electronics with a total of over 220k views till date. Link: learningmsp430.wordpress.com

Patient Monitoring Smart Wheelchair (Capstone Project)

- Researched, designed and developed a smart wheelchair (Video Link) having following modes of operation: Voice Control, Gesture Control, Joystick Control and Eye Control.

Experience

Vision and Image Processing Lab | Graduate Researcher

Aug 2018 – Present | Waterloo, ON, Canada

- Currently conducting research on anomaly detection in textured surfaces using following approaches:
  - Weakly supervised anomaly detection using CNNs.
  - Semi-supervised anomaly detection using Autoencoders and GANs.
  - Supervised anomaly detection using CNNs.

Siemens Healthineers | Key Accounts Manager

July 2015 – Dec 2017 | Mumbai, India

- Developed technical expertise in Diagnostic Imaging modalities namely Radiography, MRI, CT, Cath Lab, Digital Subtraction Angiography, PET and SPECT.
- Generated a business volume of 12.5 Million CAD which contributed to 33% of the total western region business for the financial year 2017.
- Increased market share by 30% in my territory comprising of the western region of India.

Internship

'Advanced Robotics and Embedded Systems' Internship at ARK Technosolutions

- Gained hands-on experience on ATmega328 micro-controller, different types of sensors and actuators. Created a ball follower bot which tracked a single coloured ball.