Sumesh Thakur

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Profile

2nd year master's student at Saint Mary's University, Halifax. Part of Graphics & Spatial Computing lab. Passionate about computer vision and deep learning. Highly capable leader, having led multiple group projects to completion. Proficient in a range of modern technologies including Python, C++, JAVA, and JavaScript. Expertise in modern deep learning libraries including PyTorch, Keras and TensorFlow.

Education

MASTER OF SCIENCE IN MATHS & COMPUTER SCIENCE | APRIL '19 - PRESENT | SAINT MARY'S UNIVERSITY, HALIFAX, NOVA SCOTIA

- Working towards developing a robust and accurate object detection system for vehicles through 3D LiDAR point clouds using deep learning as part of the master's thesis.
- Worked on various projects like **objects segmentation and clustering of point clouds**, **3D fully convolution layers for pedestrian detection in road scene**, **sparse convolutions for feature learning from Point clouds**.
- **GPA 3.7 / 4.3 (until May 2020)**
- Supervisor: Dr. Jiju Poovancheri

BACHELOR OF TECHNOLOGY IN COMPUTER SCIENCE ENGINEERING | JULY '14 - JULY '18 | CHANDIGARH ENGINEERING COLLEGE, I.K GUJRAL PUNJAB TECHNICAL UNIVERSITY, MOHALI, PUNJAB

- Lead Coordinator of Computer Science Engineering Gaming Club.
    - Lead a team of 6 coordinators for organizing inter university video game competition, 2017, with participation from 10+ universities with 600+ participants.
- **GPA: 75% (with Distinction)**

Technical Skills

- Broad experience in **Modern Computer Vision**, **Deep Learning**, **Convolution Neural Networks** Algorithms, **Graph Representation Learning**, **Mobile app development, Machine Learning Algorithms** and **Web Technologies**.
- Programming Languages: Python3, C++, JAVA, JavaScript, HTML
- Software Libraries and Frameworks:
    - **Deep Learning and Machine Learning**: Pytorch, Keras,Tensorflow,Sklearn
    - **Point Cloud Processing**: PCL, Open3D
    - **Data Visualization**: MatplotLib
    - **Computer Graphics**: OpenGL
    - **Optimization and Calculations**: Numpy, Numba, Pandas
    - **Mobile and Web Development**: Android Studio, VueJs

Work Experience

INNOVATION ASSOCIATE | BARRIERBREAK SOLUTIONS | DEC 2017 – APRIL 2019

- Involved looking at how to make the organization better, by improving existing tools, processes, and technologies. Involves delving into aspects of Mobile Applications, deep learning, augmented reality, NLP, and more.
- Lead the development of "6 by 6" Android Toolkit, first Indian currency detection application using deep learning.

Relevant Courses

- **CSCI-6671**: Computer Graphics, **Saint Mary's University**.
- **CSCI-6691**: Special Topics in Real-Time 3D Vision (Directed Studies), **Saint Mary's University**.
- **BTCS-701**: Artificial Intelligence, **Punjab Technical University.**
- **BTCS-503**: Design & Analysis of Algorithms, **Punjab Technical University.**
- **CS224W**: Machine Learning on Graphs (Stanford University), **MOOCs.**
- **CS231N**: Convolutional Neural Networks (Stanford University), **MOOCs**

Scholarships & Rewards

- **FGSR Fellowship**, Saint Mary's University,2019.
  - valued at $ 17,500 per year
- **First Position**, **3 Minute Thesis Competition** at Saint Mary's University, 2020.
  - Won $750 as winning prize, competing with 19 participants from master's and PhD program.
  - Representing Saint Mary's University in Eastern Regionals (Postponed due to COVID-19).
- **Instructional Skills Workshop** Certified Instructor, 2019.
  - Completed certification for ISW instructor program, a comprehensive three-tiered instructor development program that serves as the foundation for several professional development activities.

Projects

- **Professional Projects**
  - **"6 by 6" Android Application**
    - Developed three In-App Modules namely Currency Detector, Light Detector and Magnifier for visually impaired.
    - Created "Indian Currency" dataset from scratch, consisting "10 currency classes" and 100000 images.
    - Employed Inception Net (MobileNet) architecture for currency classification, on Android platform.
    - Currently application has more than 5000+ downloads with an average 4.0+ rating.
- **Academic Projects**
  - **Bird Detection in Wild for Shape Matching**
    - Developed a bird detection tool in wild for analyze and study bird formations.
    - Created a "bird" dataset consisting of more than 1200 bird images with more than 4500 manually annotated objects (birds, airplanes, kites etc.)
    - Employed SSD architecture at backend for object detection.
  - **Cornell Box generation using Raytracing.**
    - Constructed Cornell box as part of CSCI-6671 course, using raytracing with features like Reflections, Diffused Shadows and Antialiasing.
  - **Procedural Landscape creation using Perlin Noise.**
    - Constructed a virtual world landscape using Perlin noise in OpenGL.
  - **Poisson Grid Sampling in 3D Pointclouds.**
    - Modified Poisson grid sampling algorithms to 3D points.
  - **3D point segmentation and clustering using RANSAC and K-D Trees**
    - Performed object clustering and segmentation on KITTI LiDAR dataset samples.

Publications

- Bivash Pandey, **Sumesh Thakur**, Hemanchal Joshi, Ayusha Pradhanga, Yasushi Akiyama and Jiju Peethambaran" **Towards Video based Collective Motion Analysis through Shape Tracking and Matching**", **IET Electronic Letters, June 2020 [In press]**