Vivek ROY

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EDUCATION

Jadavpur University
Kolkata, India

Bachelor's degree in **Computer Science and Engineering** *July '15 – May '19*
GPA (major): **8.71/10** | *Departmental Rank: 7/75*

Coursework: Image Processing, Artificial Intelligence, Operating Systems, Computer Networks, Database Management Systems, Numerical Methods

RESEARCH EXPERIENCE

Visiting Researcher
Carnegie Mellon University
Pittsburgh, PA

Indoor localization using beacons and IMU
Sep '19 – Present

Advised by **Prof. Kris Kitani**

Using bluetooth low energy based beacons and IMU sensors for high precision indoor localization. Developing the complete pipeline for data collection and training deep networks. Using meta-learning to generalize better to various hardware and walking styles.

RISS 2019 & Visiting Researcher
Carnegie Mellon University
Pittsburgh, PA

Multitask Learning combining Detection, Segmentation, Tracking and Forecasting
Jun '19 – Aug '19

Advised by **Dr. Luis E. Navarro-Serment** and **Prof. Martial Hebert**

Formulated a temporally consistent neural network by extending MaskRCNN. Tracking is done by associating segmentation masks over time. Introduced a motion forecasting module to learn a motion model of the object and further improve detection and tracking.

RISS 2018
Carnegie Mellon University
Pittsburgh, PA

Visual Object Tracking using Optical Flow
Jun '18 – Aug '18

Advised by **Prof. Martial Hebert**

Implemented a CNN based visual object tracker. Leveraged the geometrical information captured by the Brox method for computing dense optical flow to track everyday hand-held objects more robustly even in scenarios of partial occlusion by the holding hand.

Undergraduate Research Project
Jadavpur University
Kolkata, India

Document Image Binarization
Sep '18 – May '19

Advised by **Prof. Ram Sarkar**

Proposed a CNN based neural network for the task of Document Image Binarization. Proposed method secured the **12th** rank in the competition (DIBCO) conducted as part of ICDAR 2019 among the 200+ submissions.

Undergraduate Research Project
Jadavpur University
Kolkata, India

Image Captioning using cycle-consistency loss
Sep '18 – May '19

Advised by **Prof. Sanjoy Kumar Saha**

Proposed a loss function, inspired by the idea of cycle-consistency loss used in Cycle-GAN. The cycle loss is obtained by first generating captions for the input images followed by generating new images from the captions and calculating a loss between the generated and input images.

PUBLICATIONS

WACV 2020

Estimating 3D Camera Pose from 2D Pedestrian Trajectories

Yan Xu, **Vivek Roy**, Kris Kitani

Accepted in WACV 2020. • Paper

RISS Journal 2019

Multitask Learning combining detection, segmentation, tracking and forecasting

Vivek Roy, Luis E. Navarro-Serment, Martial Hebert

Journal • Paper • Poster

RISS Journal 2018

Using Convolutional Neural Networks on Optical Flow for Visual Object Tracking

Vivek Roy, David Russell, Satyaki Chakraborty, Martial Hebert

Journal • Paper • Poster

PROJECTS

Department of Homeland Security
Carnegie Mellon University

Vehicle Detection and Tracking
Dec '19 – Present

Funded by the **U.S Department of Homeland Security**
Guided by **Prof. Kris Kitani**

Leading a team to build a system for vehicle speed estimation using tracking and vehicle type classification using detection. To be deployed on U.S borders for border protection.

Undergraduate Project
Jadavpur University

Visual Odometry
Jan '18 – May '18

Guided by **Prof. Sanjoy Kumar Saha**

Used Deep learning for feature points selection and combined that with geometrical tracking for real-time performance. Deployed on an autonomous robot developed by Jadavpur University.

Defence Research of India
Govt. of India

Security vulnerability detection from event logs
Sep '17 – Dec '17

Funded by the **Defence Research and Development Organisation of India (DRDO)**
Guided by **Prof. Chandan Mazumdar**

Policy non-compliance detection from log records using Natural Language Processing to report security vulnerabilities. Currently deployed on DRDO log servers.

Google Summer of Code (GSoC) 2017
Haiku Inc.

Student developer
June '17 – Aug '17

Working for **Haiku Inc.**

Developed 3D Hardware accelerated graphics drivers for Haiku OS.

Project Proposal · Weekly reports

ACHIEVEMENTS

Undergraduate scholarship

National Talent Search Examination Scholarship
2014

Awarded by the **Govt. of India**

This scholarship is awarded to the top 1,000 students in the country, by the Govt. of India, every year across the fields of science and social science.

Mathematics Olympiad

Regional Mathematics Olympiad
2012 – 14

One of the selected 35 students in the state, 3 years in a row

The oldest and biggest international olympiad in the world. Largely (but not solely) sponsored by Google.

Informatics Olympiad

Zonal Informatics Olympiad
2014

One of the selected 40 students in the state.

The second largest olympiad after mathematics in the world with patrons like UNESCO and IFIP.

LEADERSHIP

CodeClub
Jadavpur University

Student Convener
2016 – 19

CodeClub, Jadavpur University

Dedicated three years (from the beginning of Sophomore year) to teach competitive programming.

Science Club
Jadavpur University

Mentor and Teacher
2017 – 18

Science Club, Jadavpur University

Taught mathematics and computer science to underprivileged high school students. Organized an annual robotics competition to motivate the students in the field of Robotics.

SKILLS

Languages
Python C++ C Java Kotlin Rust Swift Javascript Shell (Bash) MATLAB

Deep Learning
Keras Tensorflow PyTorch Caffe CUDA

Tools & Libraries
Android iOS OpenCV LaTeX CMake Qt
Web Frontend: ReactJS Web Backend: Go, NodeJS, Python