Mohammad Samin Yasar

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EDUCATION

University of Virginia, Charlottesville, Virginia   Aug 2017 – Present

- Ph.D. in Computer Engineering

BRAC University, Dhaka, Bangladesh   Jan 2012 – Apr 2015

- B.S. in Electrical and Electronic Engineering
  - Major: Electronics, Computer Group
  - Minor: Computer Science
  - Cumulative GPA: 3.90 / 4.00

RESEARCH EXPERIENCE

Collaborative Robotics Lab, University of Virginia   Mar 2020 – Present
- Supervisor: Prof. Tariq Iqbal

Dependable Systems and Analytics, University of Virginia   Aug 2017 – Dec 2019
- Supervisor: Prof. Homa Alemzadeh

Selected Projects
- Real-time detection of adverse events in robotic surgery [1]
  - Detection of operational context in common surgical tasks, using supervised learning approaches
  - Simulation of realistic robot failure modes using software fault injections, for training and evaluation
  - Development of a safety monitoring system that can detect unsafe events, given the current operational context
- Automated detection of objects in surgical workspace using Transfer Learning [2]
  - Fine-tuning the final layers of pre-trained MRCNN, using ResNet 101 as the backbone
  - Generating a dataset for the Pick and Place Task
- Context-aware monitoring in robotic surgery [3]
  - Unsupervised segmentation of common surgical tasks
  - Learning constraint-based safety properties of surgical sub-tasks, based on kinematics features
  - Detection and localization of adverse events using vision based cues

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WORK EXPERIENCE

Graduate Teaching Assistant, University of Virginia   Jan 2020 – May 2020
- Course: Embedded Systems and Robotics 1 and 2
  - Conducting tutorial sessions and grading assignments

Graduate Teaching Assistant, University of Virginia   Jan 2019 – May 2019
- Course: Dependable Computing Systems
  - Conducting tutorial sessions, grading assignments and exams

Assistant Manager, MGH Group, Bangladesh   Sep 2015 – Aug 2017
- Department: Strategic Planning
  - Analyzing and forecasting market behavior for strategic investments

Undergraduate Teaching Assistant, BRAC University   May 2013 – Aug 2015
- Course: Electromagnetic Waves and Signal
  - Conducting tutorial sessions, grading assignments and exams

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PUBLICATIONS

CONFERENCES

[1] **M.S. Yasar** and H. Alemzadeh, "Real-Time Context-aware Detection of Unsafe Events in Robot-Assisted Surgery," *50th Annual IEEE/IFIP International Conference on Dependable Systems and Networks (DSN),* Jul 2020.

[2] K. Hutchinson, **M.S. Yasar**, H. Bhatia and H. Alemzadeh, "A Reactive Autonomous Camera System for the RAVEN II Surgical Robot," *International Symposium on Medical Robotics (ISMR), 2020.,* Atlanta, Georgia, USA, Apr 2020.

[3] **M.S. Yasar**, D. Evans and H. Alemzadeh, "Context-aware Monitoring in Robotic Surgery," *International Symposium on Medical Robotics (ISMR), 2019.,* Atlanta, Georgia, USA, Apr 2019.

[4] **M.S. Yasar**, M.T. Rashid and M.K. Rhaman, "Digitization of the Entire Traffic System and Mitigation of the Ongoing Traffic Crisis Across Cities of Developing Nations," *IEEE TENCON 2015 - 2015 IEEE Region 10 Conference*, Macau, China Nov 2015.

[5] **M.S. Yasar** and M.T. Rashid, "Implementation of dynamic traffic light controllers using artificial neural networks to diminish traffic ordeals", *European Modelling Symposium*, Madrid, Spain Oct 2015.

SKILLS & EXPERTISE	**Machine Learning/Deep Learning**

Machine Learning/Deep Learning
- Tensorflow
- PyTorch
- Scikit learn

Robotics
- ROS
- Gazebo

Computer Skills
- Programming Languages: Python, Java, C, C++, VHDL
- Code Instrumentation: LLVM, Pin
- Others: UNIX/Linux, BASH, LaTeX

Computer Vision/Image Processing
- OpenCV
- Matlab

SELECTED PROJECTS

Detection and Tracking of subject in a video based on a given template
- Extracted HOG features of the template from the first frame of the video
- Trained a discriminative classifier (linear SVM) to distinguish between the subject and background based on HOG features, using a sliding window approach
- Code availability: https://github.com/MohammadYasar/ObjectTracking

CNN-based Product Price Prediction from Images
- Implemented a web crawler to create a dataset comprising of product images and their meta data
- Developed a product price predictor, comprising of a pre-trained model that extracts visual features for each product, followed by a fully-connected regressor to predict the product price
- Code availability: https://gist.github.com/MohammadYasar/7f8bebe7b35781e1edf58080e1bae823

Intrusion Detection System for tele-operated surgery
- Developed an attack model for simulating intrusion into the robot network
- Distinguished between normal tele-operation and abnormal behavior by leveraging previously recorded data patterns
- Code availability: https://github.com/MohammadYasar/SWSecurity/

Generic interface for applying machine learning tools to detect fraudulent transactions
- Designed the pipeline for data preprocessing and feature selection for an unbalanced dataset
- Trained and validated different classifiers (kNN, SVM, XGBoost, Random Forest) using double cross validation
- Code availability: https://github.com/MohammadYasar/MachineLearningGenericInterface

AWARDS & SCHOLARSHIPS

Selected to volunteer and attend ICML 2020	Jul 2020
DSN Travel Grant	Jun 2019
ISMR and SSMR Travel Grant	Apr 2019
Second place, ECE Research Poster competition, University of Virginia Annual Research Poster Session for Graduate Students in ECE	Sep 2018
Vice Chancellor's/Dean's List, BRAC University For attaining a semester GPA of at least 3.7 (Dean's List) or 3.9 (Vice Chancellor's List)	2012 – 2015
Merit Based Scholarship, BRAC University Awarded on the basis of outstanding performance in GCE O and A Levels	Jan 2012– Apr 2015

GRADUATE COURSES

Deep Learning for Visual Recognition	Algorithms
Statistical Learning and Graph Models	Dependable Computing
Probability and Stochastic Processes	Computer Architecture and Design
Digital Image Processing	Advanced Embedded Systems
Software Security	Machine Learning

SELECTED TALKS
- **ISMR 2019** - Context-aware monitoring in Robotic Surgery
- **IDHD 2019** - Synthesizing realistic errors on the Raven II

PROFESSIONAL SERVICES

Reviewer

- TENCON	Jul 2016
- ISMR	Jan 2020

External Reviewer

- DSN	Dec 2017, Dec 2018
- ICCPS	Nov 2018, Nov 2019,

MENTORING EXPERIENCE	**Mentor**, University of Virginia	
	▪ Harshneet Bhatia - Undergraduate in CS	Jan 2019 - Dec 2019
	▪ Gabriel Mallari - Undergraduate in ECE	Aug 2019 - Dec 2019
	▪ Parisa Roohafzaii - Undergraduate in CS	Sep 2018 - Dec 2018
	Mentor, Young Digital Entrepreneur Camp, Bangladesh	Nov 2016