

# Mohammad Samin Yasar

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<b>EDUCATION</b>	<b>University of Virginia</b> , Charlottesville, Virginia	Aug 2017 – Present
	▪ Ph.D. in Computer Engineering	
	<b>BRAC University</b> , 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	

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<b>RESEARCH EXPERIENCE</b>	<b>Collaborative Robotics Lab</b> , University of Virginia	Mar 2020 – Present
	▪ Supervisor: Prof. Tariq Iqbal	
	<b>Dependable Systems and Analytics</b> , University of Virginia	Aug 2017 – Dec 2019
	▪ Supervisor: Prof. Homa Alemzadeh	
	<b>Selected Projects</b>	
	▪ 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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<b>WORK EXPERIENCE</b>	<b>Graduate Teaching Assistant</b> , University of Virginia	Jan 2020 – May 2020
	▪ Course: Embedded Systems and Robotics 1 and 2	
	• Conducting tutorial sessions and grading assignments	
	<b>Graduate Teaching Assistant</b> , University of Virginia	Jan 2019 – May 2019
	▪ Course: Dependable Computing Systems	
	• Conducting tutorial sessions, grading assignments and exams	
	<b>Assistant Manager</b> , MGH Group, Bangladesh	Sep 2015 – Aug 2017
	▪ Department: Strategic Planning	
	• Analyzing and forecasting market behavior for strategic investments	
	<b>Undergraduate Teaching Assistant</b> , BRAC University	May 2013 – Aug 2015
	▪ Course: Electromagnetic Waves and Signal	
	• Conducting tutorial sessions, grading assignments and exams	

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<b>PUBLICATIONS</b>	<b>CONFERENCES</b>
	[1] <b>M.S. Yasar</b> and T. Iqbal, “Improving Human Motion Prediction Through Continual Learning” ACM/IEEE International Conference on Human-Robot Interaction (HRI), Lifelong Learning and Personalization in Long-Term Human-Robot Interaction (LEAP-HRI) Workshop, 2021.
	[2] <b>M.S. Yasar</b> and T. Iqbal, “A Scalable Approach to Predict Multi-Agent Motion for Human-Robot Collaboration” IEEE Robotics and Automation Letters, 2021.
	[3] S.M. Preum, S. Munir, M. Ma, <b>M.S. Yasar</b> , D.J. Stone, R. Williams, H. Alemzadeh, J.A. Stankovic, “A Review of Cognitive Assistants for Healthcare: Trends, Prospects, and Future Directions” ACM Computing Surveys (CSUR), 2021.
	[4] <b>M.S. Yasar</b> and H. Alemzadeh, “Real-Time Context-aware Detection of Unsafe Events in Robot-Assisted Surgery,” <i>50th Annual IEEE/IFIP International Conference on Dependable Systems and Networks (DSN)</i> , Jul 2020.

- [5] 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.
- [6] **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.
- [7] **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.
- [8] **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

- Tensorflow
- PyTorch
- Scikit learn

##### Robotics

- ROS
- Gazebo

##### Computer Skills

- Programming Languages: Python, Java, C, C++, VHDL
- Code Instrumentation: LLVM, Pin
- Others: UNIX/Linux, BASH, L<sup>A</sup>T<sub>E</sub>X

##### 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

<b>Selected to volunteer and attend ICML 2020</b>	Jul 2020
<b>DSN Travel Grant</b>	Jun 2019
<b>ISMR and SSMR Travel Grant</b>	Apr 2019
<b>Second place, ECE Research Poster competition</b> , University of Virginia Annual Research Poster Session for Graduate Students in ECE	Sep 2018
<b>Vice Chancellor's/Dean's List</b> , BRAC University For attaining a semester GPA of at least 3.7 (Dean's List) or 3.9 (Vice Chancellor's List)	2012 – 2015
<b>Merit Based Scholarship</b> , 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  
 Statistical Learning and Graph Models  
 Probability and Stochastic Processes  
 Digital Image Processing  
 Software Security

Algorithms  
 Dependable Computing  
 Computer Architecture and Design  
 Advanced Embedded Systems  
 Machine Learning

**SELECTED TALKS**    ▪ **ISMR 2019** - Context-aware monitoring in Robotic Surgery

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▪ **IDHD 2019** - Synthesizing realistic errors on the Raven II

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**PROFESSIONAL  
SERVICES**

**Reviewer**

- TENCON
- ISMR

Jul 2016

Jan 2020

**External Reviewer**

- DSN
- ICCPS

Dec 2017, Dec 2018

Nov 2018, Nov 2019,

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**MENTORING  
EXPERIENCE**

**Mentor**, University of Virginia

- Harshneet Bhatia - Undergraduate in CS
- Gabriel Mallari - Undergraduate in ECE
- Parisa Roohafzaii - Undergraduate in CS

Jan 2019 - Dec 2019

Aug 2019 - Dec 2019

Sep 2018 - Dec 2018

**Mentor**, Young Digital Entrepreneur Camp, Bangladesh

Nov 2016

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