CV of

Md Mostafa Kamal Sarker (Ph.D.)

Postdoctoral Research Fellow

The Precision Medicine Centre of Excellence (PMC)
Queen's University Belfast, Belfast BT9 7AE, UK.

Phone: +44(0)7902833970 , **Email:** m.kamal.sarker@gmail.com

Google Scholar : https://scholar.google.ca/citations?hl=en&user=0QoHURIAAAAJ

Research Interests:

My research is in the areas of Artificial Intelligence (AI), Deep Learning (DL), Machine Learning (ML), Computer Vision (CV), Image Processing, Medical Image Analysis, Cancer Image Analysis, and Digital Pathology, etc.

Education:

2003 - 2008	**B.Sc.,** Physics, Shahjalal University of Science and Technology, Sylhet, Bangladesh.
2011 - 2013	**M.Eng.,** Electronics Engineering, Chonbuk National University, Jeonju-si, South Korea.
2016 - 2019	**Ph.D. (Cum laude),** Computer Engineering and Mathematics Security, Rovira i Virgili Univerisity, Tarragona, Spain. Thesis title: "Efficient Deep Learning Models and Their Applications to Health Informatics".

Employment History:

Academic Appointments

01.05.2020-present	Postdoctoral Research Fellow, The Precision Medicine Centre of Excellence (PMC) Queen's University Belfast, United Kingdom.
01.09.2019-01.31.2019	Research Associates, Fundació Bosch i Gimpera, University of Barcelona, Spain.
01.09.2016-31.08.2019	Pre-doctoral Research Fellow, Department of Computer Engineering and Mathematics Security, Rovira i Virgili Univerisity Tarragona, Spain.
01.09.2013-31.08.2016	Research Fellow, National Research Foundation of Korea, Wonkwang University, South Korea.
01.09.2011-31.08.2013	Research Assistant, Department of Electronics Engineering, Chonbuk National University, South Korea.

Other Employment

01.03.2011-31.08.2013	Lead Researcher in a project "License Plate Recognition Engine", Dics Vision Co., Ltd. Jeonju-city, South Korea.
01.01.2010-31.08.2011	System Engineer (IT and Technical), Radio Furti Ltd., Dhaka, Bangladesh.

Post Graduate Education and Training:

05.07.2017 - 06.07.2017	Summer school on Deep Learning, University of Alicante, Spain.
01.10.2018 – 03.01.2019	Internship, INP-ENSEEIHT, University of Toulouse, France.

Knowledge and Skills:

- **Knowledge**: Machine Learning, Deep Learning, Computer vision, Image Processing, Scene Classification, Medical Image Analysis, Cancer Image Analysis, Digital Pathology, Vehicle tracking and Sensors, etc.
- **Knowledge in Deep Learning**: CNN, RNN, Transformers, GANs, etc. in 2D and 3D.
  Classification: VGG, ResNet, Inception, MixNet, EfficientNet, NFNet, etc.
  Segmentation: FCN, SegNet, UNet, PSPNet, DeepLab, etc.
  Object Detection: FasterRCNN, YOLO, SSD, MaskRCNN, Detectron, etc.

- **Knowledge in Machine Learning:** Logistic Regression, Decision Tree, SVM, Random Forest, Gradient Boosting algorithms, K-Means, Dimensionality Reduction Algorithms (e.g., PCA), etc**.**
- **Knowledge in programming:** 1. Python, C/C++, Matlab, SLURM (HPC), Flux, HTML, etc**.**
  2. *CV and ML based Open Source software*: OpenCV, Scikit-learn, Scikit-image, SimpleITK**.**
  3. *Deep Learning programming libraries*: PyTorch, Tensorflow, Kears.
  4. *Medical imaging modalities*: Histopathology, Ultrasound, X-Ray, CT, MRI, DICOM, NifTI, SVS, etc.
  5. *Version control*: GitHub, Bitbucket, GitLab**.**

Publications:

Peer-reviewed journal articles (J):

1. **Md Mostafa Kamal Sarker**, Hatem A. Rashwan, Mohamed Abdel-Nasser, Vivek Kumar Singh, Syeda Furruka Banu, Farhan Akram, Forhad U H Chowdhury, Kabir Ahmed Choudhury, Sylvie Chambon, Petia Radeva, Domenec Puig. "MobileGAN: Skin Lesion Segmentation Using a Lightweight Generative Adversarial Network", Under Review in Expert Systems with Applications. (**Q1: Impact factor: 5.452**).
2. **Md Mostafa Kamal Sarker,** Yasmine Makhlouf, Syeda Furruka Banu, Sylvie Chambon, Petia Radeva, Domenec Puig, "A web-based efficient dual attention networks to detect COVID-19 from X-ray images", Volume 56, Issue 24, 26, p. 1298 – 1301, Electronics Letters, November 2020. (**Q2: Impact factor: 1.316**).
3. Vivek Kumar Singh, Mohamed Abdel-Nasser, Farhan Akram, Hatem A Rashwan, **Md Mostafa Kamal Sarker**, Nidhi Pandey, Santiago Romani, Domenec Puig, "Breast tumor segmentation in ultrasound images using contextual-information-aware deep adversarial learning framework", Expert Systems with Applications. pp. 113870. August 2020. (**Q1: Impact factor: 5.452**).
4. **Md Mostafa Kamal Sarker,** Hatem A. Rashwan, Farhan Akram, Estefania Talavera, Syeda Furruka Banu, Petia Radeva, and Domenec Puig. "Recognizing Food Places in Egocentric Photo-streams using Multi-scale Atrous Convolutional Networks and Self-Attention Mechanism", IEEE Access, pp. 39069-39082, vol. 7, 2019. (**Q1: Impact factor: 4.09**).
5. Estefania Talavera, Maria Leyva-Vallina, **Md Mostafa Kamal Sarker**, Domenec Puig, Nicolai Petkov and Petia Radeva. "Hierarchical approach to classifying food scenes in egocentric photo-streams", IEEE Journal of Biomedical and Health Informatics. 2019. (**Q1: Impact factor: 4.217**).
6. Singh, Vivek Kumar, Hatem Rashwan, Farhan Akram, Nidhi Pandey, **Md Mostafa Kamal Sarker**, Adel Saleh, Domenec Puig. "Breast Tumor Segmentation and Shape Classification in Mammograms using Generative Adversarial and Convolutional Neural Network", Expert Systems with Applications. pp.112855, July 2019. (**Q1: Impact factor: 4.217**).
7. **Md Mostafa Kamal Sarker** and Moon Kyou Song. "Segmentation and Recognition of Korean Vehicle License Plate Characters Based on the Global Threshold Method and the Cross-Correlation Matching Algorithm", Journal of Information Processing Systems, vol. 12, no. 4, pp. 661~680, 2016. (**Q3: Impact factor: 0.26**).
8. **Md Mostafa Kamal Sarker**, Cai Weihua, and Moon Kyou Song. "Detection and Recognition of Illegally Parked Vehicle based on Adaptive Gaussian Mixture Model and Seed Fill Algorithm", Journal of Info. and Communication Converg. Eng. (JICCE), vol.13, no. 3, pp. 197~204, 2015. (**Q3: Impact factor: 0.24**).
9. Moon Kyou Song and **Md Mostafa Kamal Sarker**. "Modeling and Implementing Two-Stage AdaBoost for Real-Time Vehicle License Plate Detection", Journal of Applied Mathematics, Article ID 697658, 2014. (**Q4: Impact factor: 0.2**).
10. **Md Mostafa Kamal Sarker** and Moon Kyou Song. "Real-Time Vehicle License Plate Detection based on Background Subtraction and Cascade of Boosted Classifier", The Journal of Korea Information and Communications Society (J-KICS), vol.39C, no.10, pp. 909-919, 2014.
11. **Md Mostafa Kamal Sarker**, Sook Yoon, and Dong Sun Park. "A Fast and Robust License Plate Detection Algorithm Based on Two-stage Cascade AdaBoost", KSII Transactions on Internet and Information Systems (TIIS), vol.8, no.10, pp.3490-3507, 2014. (**Q3: Impact factor: 0.19**).

12. **Md Mostafa Kamal Sarker**, Sook Yoon, Jaehwan Lee, and Dong Sun Park, "A Novel License Plate Detection Method Based on Heuristic Energy Map", The Journal of Korea Information and Communications Society (JKICS), vol. 38C, no. 12, pp. 1114-1125, 2013.

Conference proceeding (C):

1. **Md Mostafa Kamal Sarker**, Hatem A. Rashwan, Estefania Talavera, S. Furruka Banu, Petia Radeva, and Domenec Puig. "MACNet: Multi-scale Atrous Convolution Networks for Food Places Classification in Egocentric Photo-Streams", In: European Conference on Computer Vision - **ECCV** 2018 (EPIC@ECCV WS). Munich, Germany. September 8 -14, 2018.
2. **Md Mostafa Kamal Sarker**, Hatem A. Rashwan, Syeda Furruka Banu, Adel Saleh, Vivek Kumar Singh, Forhad Chowdhury, Domenec Puig. "SLSDeep: Skin Lesion Segmentation Based on Dilated Residual and Pyramid Pooling Networks", In: Medical Image Computing and Computer Assisted Intervention – **MICCAI** 2018. Granada, Spain. September 16-20, 2018. (**CORE ranking: A**)
3. Singh, Vivek Kumar, Santiago Romani, Hatem A. Rashwan, Farhan Akram, **Md Mostafa Kamal Sarker**, Domenec Puig. "Conditional Generative Adversarial and Convolutional Networks for X-ray Breast Mass Segmentation and Shape Classification", In: Medical Image Computing and Computer Assisted Intervention – **MICCAI** 2018. Granada, Spain. September 16-20, 2018. (**CORE ranking: A**)
4. **Md Mostafa Kamal Sarker**, Mohammed Jabreel, Hatem A. Rashwan, Syeda Furruka Banu, Petia Radeva, and Domenec Puig. "CuisineNet: Food Attributes Classification using Multi-scale Convolution Network", 21st International Conference of the Catalan Association for Artificial Intelligence (CCIA 2018), Roses, Spain. 8-10th October 2018.
5. Singh, Vivek Kumar, Hatem Rashwan, Farhan Akram, Nidhi Pandey, **Md Mostafa Kamal Sarker**, Adel Saleh, Domenec Puig. "Retinal Optic Disc Segmentation using Conditional Generative Adversarial Network", 21st International Conference of the Catalan Association for Artificial Intelligence (CCIA 2018), Roses, Spain. 8-10th October 2018.
6. Farhan Akram, Miguel Angel Garcia, Vivek Kumar Singh, **Md Mostafa Kamal Sarker** and Domenec Puig. "Brain MR Image Segmentation Using Multiphase Active Contours Based on Local and Global Fitted Images". 21st International Conference of the Catalan Association for Artificial Intelligence (CCIA 2018), Roses, Spain. 8-10th October 2018.
7. Adel Saleh, Mohamed Abdel-Nasser, **Md Mostafa Kamal Sarker**, Vivek Kumar Singh, Saddam Abdulwahab, Nasibeh Saffari, Miguel Angel Garcia, and Domenec Puig. "Deep visual embedding for image classification", In 2018 International Conference on Innovative Trends in Computer Engineering (ITCE), Aswan, Egypt. 19-21 February 2018.
8. **Md Mostafa Kamal Sarker**, Maria Leyva, Adel Saleh, Vivek Kumar Singh, Farhan Akram, Petia Radeva and Domenec Puig. "FoodPlaces: Learning Deep Features for Food Related Scene Understanding", 20th International Conference of the Catalan Association for Artificial Intelligence (CCIA 2017), Deltebre, Spain. 25-27th October 2017.
9. Vivek Kumar Singh, Santiago Romani, Jordina Torrents-Barrena, Farhan Akram, Nidhi Pandey, **Md Mostafa Kamal Sarker**, Adel Saleh, Meritxell Arenas, Miguel Arquez and Domenec Puig. "Classification of Breast Cancer Molecular Subtypes from their Micro-Texture in Mammograms using a VGGNet-Based Convolutional Neural Network", 20th International Conference of the Catalan Association for Artificial Intelligence (CCIA 2017). Deltebre, Spain. 25-27th October 2017.
10. Farhan Akram, Miguel Angel Garcia, Vivek Kumar Singh, **Md Mostafa Kamal Sarker**, and Domenec Puig. "Image segmentation using active contours driven by bias fitted image robust to intensity inhomogeneity", 20th International Conference of the Catalan Association for Artificial Intelligence (CCIA 2017), Deltebre, Spain. 25-27th October 2017.

11. **Md Mostafa Kamal Sarker**, and Moon Kyou Song. "Korean Car License Plate Character Recognition using Local Line Binary Pattern", In Proceedings of the Korea Information Communications Society Winter 2015 Conference, pp. 112-114, Seoul, Korea, Jan. 2015.
12. **Md Mostafa Kamal Sarker**, and Moon Kyou Song. "A novel license plate character segmentation method for different types of vehicle license plates", 2014 International Conference on Information and Communication Technology Convergence (ICTC), pp. 84-88, Busan, Korea, 2014.
13. **Md Mostafa Kamal Sarker**, D. S. Park and L. Badarch. "Electronic control sensors applications for the next generation tractor based on open source library", 2012 Sixth International Conference on Sensing Technology (ICST), pp. 486-491, Kolkata, India, 2012.
14. **Md Mostafa Kamal Sarker**, Dae Seok Jang, Sook Yoon, and Dong Sun Park. "License Plate Detection Based on Haar-like Features and AdaBoost Algorithm", in Proc. of KISM Spring Conference 2013, vol.2, no.1, Sunchon, Korea, Jun. 2013,
15. **Md Mostafa Kamal Sarker**, and Dong Sun Park. "License Plate Character Region Detection Using Contour Algorithm in Night Time Vehicle Image", in Proc. of KISM Fall Conference 2012, vol.1, no.1, Jeonju, Korea, Dec. 2012.
16. **Md Mostafa Kamal Sarker**, Dong Sun Park, Woonchul Ham, Enkhbaatar Tumenjargal and JaeHwan Lee. "Embedded Workbench Application of GPS Sensor for Agricultural Tractor", in Proc. of 2012 WORLDCOMP'12 Conference on Embedded Systems and Applications (ESA 2012), Las Vegas, USA, 2012.

Other articles (O):

1. Farhan Akram, Vivek Kumar Singh, Hatem A Rashwan, Mohamed Abdel-Nasser, Sarker, **Md Mostafa Kamal Sarker**, Domenec Puig. "Adversarial Learning with Multiscale Features and Kernel Factorization for Retinal Blood Vessel Segmentation", arXiv preprint arXiv:1907.02742. 2019.

Research Projects:

Current projects

1. *Position*: Postdoctoral Research Fellow,
   Name: PathLAKE: Pathology Image Data Lake for Analytics Knowledge & Education.
   Supported by: The Precision Medicine Centre of Excellence (PMC) in Queen's University Belfast, UK.
   Responsibilities: Design and develop a deep learning-based pathology image analyst system. Clinical workflow and annotation process with Standard Operating Procedures (SOPs), large dataset management, Key Performance Indicator (KPI), algorithm development, training, and validation, Quantification of Colon Cancer biomarkers, e.g., CD3, CD4, CD8, and ICOS, etc, and patient Survival Analysis, source code management for reproducibility and production.

Past projects

1. *Position*: Lead Researcher,
   Name: A web-based app to detect COVID-19 from X-ray images.
   Supported by: Voluntary/Charity Project.
   Responsibilities: Design and develop a web-based application for COVID-19 identification. Open source COVID-19 Chest X-ray datasets are processing, DL model design, training, and validate, web-app deployed with Python, Flux, HTML, etc. [*ref. publication: **J-2**]*
2. *Position*: Research Associates,
   Name: IKIWI Industrial Cleaning Robot.
   Supported by: Fundació Bosch i Gimpera, University of Barcelona, Spain.
   Responsibilities: Design and develop an industrial cleaning robot. Open source 3D Object and Scene datasets are processing, DL 3D model design, training, and validate, deployed the 3D DL model on NVIDIA Jetson TX2 (backbone of the robot) with Intel realsense D435i depth camera to identify the industrial garbage, Raspberry pi 4 with Arduino used to execute the mechanical functions of the robot for cleaning the industrial garbage.

3. *Position*: Pre-doctoral Research Fellow.
   Name: Food related scene classification under the paradigm of lifelogging.
   Supported by: Martí Franquès Research Fellowship Programme, Rovira i Virgili University, Spain
   Responsibilities: Design and develop deep learning algorithms for classifying food and related scenes using egocentric images. Design and develop project database, about 40K images are annotated and labeled with 22 food places, develop new state-of-the-art DL architectures for classifying the food places to understand the first-person food behavior. [*ref. publication: **J-4,5**, and **C-1,4,8**]*
4. *Position*: Lead Researcher.
   Name: Skin Lesion segmentation and classification in dermoscopic images.
   Supported by: Intelligent Robotics and Computer Vision (IRCV) group, Rovira i Virgili University, Spain
   Responsibilities: Design and develop deep learning algorithms for skin lesion segmentation and classification in dermoscopic images. Open source skin lesion segmentation datasets (ISBI2016, ISIC2017, and ISIC2018) are processing, design new state-of-the-art DL architectures, and training, validate, participate in open challenges to evaluate the robustness of the proposed model. [*ref. publication: **J-1,** and **C-2**]*
5. *Position*: Team member.
   Name: Breast tumor segmentation and sub-type classification.
   Supported by: Intelligent Robotics and Computer Vision (IRCV) group, Rovira i Virgili University, Spain
   Responsibilities: Design and develop deep learning algorithms for Breast tumor segmentation and sub-type classification in Ultrasound and Mammograms. The open-source (DDSM) and clinical private project datasets are processing, design new state-of-the-art DL architectures and training, validate, and deployed in the clinical workflow. [*ref. publication: **J-3,6,** and **C-3,9**]*
6. *Position*: Team member.
   Name: Retinal Image Analysis.
   Supported by: Intelligent Robotics and Computer Vision (IRCV) group, Rovira i Virgili University, Spain
   Responsibilities: Design and develop deep learning algorithms for Retinal Optic Disc and Blood Vessel Segmentation in fundus retinal images. The open-source DRIVE and STARE datasets are processing, design new state-of-the-art DL architectures, and training, validate, participate in open challenges to evaluate the robustness of the proposed model. [*ref. publication: **C-5**, and **O-1**]*
7. *Position*: Team member.
   Name: Brain MR Image Segmentation.
   Supported by: Intelligent Robotics and Computer Vision (IRCV) group, Rovira i Virgili University, Spain
   Responsibilities: Design and develop active contours-based algorithms for Brain MR Image Segmentation. [*ref. publication: **C-6,10**]*
8. *Position*: Lead Researcher.
   Name: Identifying illegally parked vehicles by fusing of object detection algorithms.
   Supported by: National research foundation of Korea, South Korea.
   Responsibilities: Innovate new computer vision algorithms for identifying illegally parked vehicles. [*ref. publication: **J-8,9,** and **C-11**]*
9. *Position:* Lead Researcher.
   Name: Vehicle speed monitoring system on roads.
   Supported by: The Ministry of Trade, Industry & Energy, South Korea.
   Responsibilities: Research and develop techniques and algorithms for object detection towards vehicle speed monitoring system. [*ref. publication: **J-7,10**, and **C-12**]*
10. *Position*: Researcher.
    Name: Development of an electronic control technique for the next generation tractor.
    Supported by: The Brain Korea-21 (BK21), South Korea.
    Responsibilities: Research and develop an electronic control sensor for the next generation tractor. [*ref. publication: **C-13,16**]*

11. *Position*: Lead Researcher.
    Name: License plate recognition engine.
    Supported by: The Dics Vision Co. Ltd, for industrial collaboration with CBNU, South Korea.
    Responsibilities: Develop robust software for License plate recognition engine system. [*ref. publication:* ***J-11,12,*** *and* ***C-14,15****]*

Honors and Awards:

2011 Brain Korea 21 Fellowship, Chonbuk National University, South Korea, awarded for Master's studies.
2014 Award of Excellence, Wonkwang University, South Korea, awarded for research excellence.
2016 Martí Franquès Research Fellowship, Rovira i Virgili Univerisity, Spain, awarded for PhD studies.

Other Academic Activities:

- *The number of supervised students (Masters'):* **3**
- *Pilot-project collaboration universities in Bangladesh*: 1. North South University, 2. Independent University, 3. Shahjalal University of Science & Technology.

Editorial and Reviewer Activities:

Journal Reviewer Activities:	IEEE Access (IF: 4.09), IET Intelligent Transport Systems (ITS, IF: 1.887). IEEE Journal of Biomedical and Health Informatics (JBHI, IF: 4.217)
Conference Reviewer Activities:	MICCAI-2019, 2020.
Editorial Board Membership:	Journal of the Institute of Electronics and Computer.

Competitions and Challenges:

1. ISIC Skin Lesion Segmentation Challenge: Live: Rank: 2nd (web: https://challenge.isic-archive.com/leaderboards/live)

2. DRIVE: Retinal Vessel Extraction: Rank: 2nd (time of submission) (team "**ircv**": https://drive.grand-challenge.org/evaluation/results/)

3. REFUGE Challenge 2018-Task : Rank: 15th (web: team "**ircv**", https://refuge.grand-challenge.org/details/)

4. Kaggle's Cdiscount's Image Classification Challenge: Rank: 174/627. (web: https://www.kaggle.com/sarker/competitions)

WebApp:

A Deep learning-based COVID-19 Detector to identify COVID-19 infection from Chest X-ray image.
Link: https://covid19detector-cxr.herokuapp.com/

Voluntary Activities:

- Member of FMHLS Postdoctoral Society as the Precision Medicine Centre of Excellence (PMC) at Queen's University Belfast, UK (November 2020 - Present).
- Member of Ph.D. Society as the Department of Computer Engineering and Mathematics Security, Rovira i Virgili Univerisity Tarragona, Spain (September 2016 - August 2019).
- Head, School of Visual Arts at NONGAR, a lead Musical Organization in Shahjalal University of Science & Technology, Sylhet Bangladesh (January 2005 - August 2008).
- Blood donation ($O^{(+ve)}$), Member of SANDHANI Bangladesh Medical College Unit, Bangladesh.

Beyond Academics:

- Swimming, music, reading novels and poems, traveling, photography, watching movies.

YouTube:

Find some implementation of deep learning on my YouTube channel.
Link: https://www.youtube.com/channel/UCBEMo9VuaMG7hN7ELSm5IZA?view_as=subscriber