Md. Kamrul Hasan

Erasmus Scholar on Medical Imaging and Applications (MAIA) [2017-2019]

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Research Interest

Deep learning, DCNN and Transfer Learning for Medical Images, 3D Reconstruction of Medical Images, and Bio-mathematics.

Work Experiences

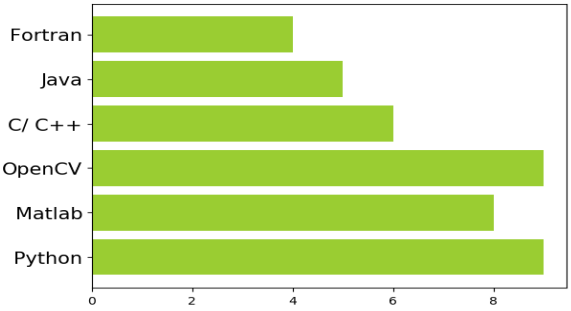
April 2015 to till date (Currently, on Study leave)	Lecturer Dept. of Electrical and Electronic Engineering (EEE) Khulna University of Engineering & Technology (KUET), Khulna-9203, Bangladesh.
January 2016 to July, 2017	Adjunct Lecturer Dept. of Electrical and Electronic Engineering (EEE) North Western University (NWU), Khulna, Bangladesh.
January 2015 to April, 2015	Lecturer Dept. of Electrical and Electronic Engineering (EEE) Daffodil International University (DIU), Dhaka, Bangladesh.

Educations

M. Sc. in **Medical Imaging and Applications (MAIA)** 2017 – 2019 (Expected)	University of Burgundy (France), UNICAS (Italy) and University of Girona (Spain) supported by Erasmus Mundus Scholarship. ***Marks***: 1st Semester: **14.49** (Out of **20**), and 2nd Semester: **18.13** (Out of **20**)
M. Sc. in **Electrical and Electronic Engineering (EEE)** 2015 – 2017	Khulna University of Engineering & Technology (KUET) CGPA: **4.00** (Out of **4.00**) [**98%** Marks] Thesis: "Prediction of Epileptic Seizure by Analyzing Time Series EEG Signal Using k-NN Classifier". Supervised by Prof. Dr. Engr. Mohiuddin Ahmad, Dept. of EEE, KUET, Khulna, Bangladesh.
B. Sc. in **Electrical and Electronic Engineering (EEE)** 2010 – 2014	Khulna University of Engineering & Technology (KUET) CGPA: **3.93** (Out of **4.00**) [**93.4%** Marks] Class position: **1st** (Out of 115 students) Thesis: "A Direct Noninvasive Brain Interface with Computer Based on Steady- State Visual Evoked Potential (SSVEP) With High Transfer Rates". Supervised by Prof. Dr. Engr. Mohiuddin Ahmad, Dept. of EEE, KUET, Khulna, Bangladesh.

Technical Skills

Programming Languages (Score is out of 10)



Applications Packages

CMAKE, QT, IntelliJ Idea, ImageJ, Visual Studio, ITK, VTK, Biopac, Acqknowledge, P-Spice, Origin, Proteus, Ubuntu/Windows, Latex/ MS word.

Project Implementation

1. **Laparoscopic Tool Segmentation for Automatic Pose Estimation Using Deep Convolution Neural Network**
   Supervisor: Dr. Lilian Calvet and Prof. Dr. Adrien Bartoli, EnCoV, France.

In this project, I have annotated laparoscopic video frame to get only surgical tool/ tools using ImageJ and morphological post-processing. Then, I trained U-Net and Fully Convolution Network (FCN) using transfer learning approaches from VGG16 pre-trained model on ImageNet. Results obtained from the trained model was state of the art label.

2. **Automatic Mass Detection in Breast Using Deep Convolutional Neural Network and SVM Classifier**
   Supervisor: Prof. Dr. Francesco Tortorella, UNICAS, Cassiono, Italy.

In this project, I have used Deep Convolution Neural Network to extract the features from the extracted patches of the breast mammography. To extract the features, VGG19 pre-trained model which is trained on ImageNet was used. After extracting feature, classification has been done using SVM classifier. Robustness of the trained SVM model also measured.

3. **Automatic Mass Classification in Breast Using Transfer Learning**
   Supervisor: Prof. Dr. Mario Molinara, UNICAS, Cassiono, Italy.

In this project, I have done fine tune the last layer and bottle neck layer of VGG16 with the INbreast mammographic data set to classify the mass and non-mass breast images.

4. **Automatic Skin Lesion Segmenation Using Image Analysis**
   Supervisor: Dr. Alessandro Bria, UNICAS, Cassiono, Italy.

In this project, only image analysis approaches were used to segment the skin lesion. To remove the noise from the ISIC challenges images set, image analysis techniques were used. After that Watershed and Mean shift segmentation have need done to get segmented region. The main contribution was to make the own pipeline using image analysis that will able to detect the skin lesion with high degree Jaccard Index (JI).

5. **Automatic Skin Lesion Segnemtation Using Transfer Learning Approaches of DCNN**

In this project, I have implemented 4 different DCNN models e.g. U-Net, FCN8s, FCN32s and SegNet for the automatic skin lesion segmentation without any pre-pressing on the train and test images. The performances of the test segmented images were measured by Sensitivity, Specificity, Dice-coefficient, Tanimoto coefficient, and AUC.

6. **Inverse Kinematic controller to emulate a screwing movement**
   Supervisor: Prof. Dr. Gianluca Antonelli, UNICAS, Cassiono, Italy.

7. **Face Recognition Using Principal Component Analysis**
   Supervisor: Prof. Dro. Desire Sidibe, University of Burgundy, Dijon, France

8. **Quantification of Trabeculae Inside the Heart from MRI Using Fractal Analysis**
   Supervisor: Prof. Dr. Alain Lalande, University of Burgundy, Dijon, France

9. **Implementation of Content Aware Image Resizing**
   Supervisor: Prof. Dro. Desire Sidibe, University of Burgundy, Dijon, France

10. **3D Scanner Implementation Using C++**
    Supervisor: Prof. Dr. Y. Fougerolle, University of Burgundy, Dijon, France

11. **Merge sort implementation in GPU**
    Supervisor: Prof. Dr. S. De Vito, UNICAS, Cassiono, Italy.

12. **Brain Tumor detection using U-Net**

13. **Tool tracking for interactive AR visualization**

14. **Surgical Tool Segmentation Using Image Analysis**

Book Chapter

M. K. Hasan, M. S. H. Sunny, S. Hossain, and M. Ahmad, "**User Independency of SSVEP Based Brain Computer Interface Using ANN Classifier: Statistical Approach**", Advances in Intelligent Systems and Computing, vol. 566, Springer, Cham, 2017.

International Journals

M. K. Hasan, M. A. Ahamed, M. Ahmad, and M. A. Rashid, "**Prediction of Epileptic Seizure by Analyzing Time Series EEG Signal Using k-NN Classifier**", Applied Bionics and Biomechanics, vol. 2017, pp. 12, 2017.

M. K. Hasan, M. S. Hossain, T. K. Ghosh, and M. Ahmad, "**A SSVEP Based EEG Signal Analysis to Discriminate the Effects of Music Levels on Executional Attention**", American Journal of Bioscience and Bioengineering, vol. 3, issue 3-1, pp. 27-33, May 2015.

International Conferences

M. K. Hasan, R. Z. Rusho, T. M. Hossain, T. K. Ghosh, and M. Ahmad, "**Design and Simulation of Cost Effective Wireless EEG Acquisition System for Patient Monitoring**", 3rd International Conference on Informatics, Electronics & Vision (ICIEV), IEEE (DOI: 10.1109/ICIEV.2014.6850797), DU, Dhaka, Bangladesh, pp.1 - 5, 23-24 May 2014.

M. K. Hasan, R. Z. Rusho, and M. Ahmad, "**A Direct Noninvasive Brain Interface with Computer Based on Steady-State Visual-Evoked Potential (SSVEP) With High Transfer Rates**", 2nd International Conference on Advances in Electrical Engineering (ICAEE), IEEE (DOI: 10.1109/ICAEE.2013.6750360), IUB, Dhaka, pp.341 - 346, 19-21 Dec. 2013.

More Details about Publications:

Google Scholar: scholar.google.com/citations?user=36WXELIAAAAJ&hl=en

IEEE Papers: ieeexplore.ieee.org/search/searchresult.jsp?newsearch=true&queryText=md.%20kamrul%20hasan%20kuet

Achievements and other Activities

1. Erasmus Mundus Scholarship from European Union.
2. University **Gold Medalists**.
3. Dean's list every year in recognition of excellent performance in bachelor's degree.
4. Vocational Scholarship from KUET from 2010 to 2013 for outstanding result in bachelor's degree.
5. External Examiner at different reputed Government Universities, Bangladesh.
6. Member, Consultancy Research & Testing Services (CRTS) of Dept. of Electrical and Electronic Engineering, Khulna University of Engineering & Technology, Khulna-9203 Bangladesh.

References

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