**AKMMAHBUBUR RAHMAN**

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**OBJECTIVE**

Looking for a full-time research or software engineering position in the area of machine learning with big data, statistical data science, and real-time systems.

**SUMMARY OF QUALIFICATION**

* Published papers in refereed journals and conferences.
* One year of hands on experience in machine-learning over Big Data using Hadoop, Map Reduce architecture, and Mahaut.
* Three years of experience for Big-Data analysis with R.
* Over 5 years of solid experience in implementing machine learning algorithms such as classifications, clustering, LSA, PCA, LDA, supervised-unsupervised techniques, regression, interpolation, and re-enforcement learning.
* More than 4 years of expertise in Statistical Inference, Bayesian Network, Dynamic Bayesian Network, Hidden Markov Models, MCMC, Gibbs Sampling, and Statistical Data Mining, ANOVA.
* Over 6 years of experience in C/C++ implementation of object recognition, object tracking, and image registration using OpenCV.
* Three years of experience in implementing 2D/ 3D tracking algorithms with SLAM, Kalman Filters and the state-of-the-art feature extraction algorithms like SIFT, SURF, and FERNS.
* More than 4 years of proficiency in Mobile Programming.
* More than 3 years of experience of full Software Development Life Cycle (SDLC) with Java/C++/C# in industry standard agile paradigm.

**EDUCATION**

**PhD in Computer Engineering**

Department of Electrical and Computer Engineering, University of Memphis

Graduation Date: December 2013

**MS in Computer Engineering**

Department of Electrical and Computer Engineering, University of Memphis

Graduation Date: Aug 2011

**Bachelor of Science in Computer Science and Engineering**

Jahangirnagar University, Dhaka, Bangladesh.

Graduation Date: Nov 2006

**TECHNICAL SKILLS**

* **Programming:** C, C++, C#, JAVA, OpenCV, Android, Perl, Python, Matlab, OpenGL.
* **Big Data Analysis:** R, Hadoop, MapReduce, Mahaut.
* **Statistical Analysis:** R, SPSS, WinBUGs, SAS.
* **Web**: HTML, JavaScript, PHP, JSP, HTML5.
* **Database**: PL/SQL, Oracle 8i, MS SQL, MySQL.
* **Tools:** ArgoUML, Lyx (Linux ), OpenCV (Open source computer vision library), Praat, Weka, Microsoft Visual, .NET, NetBeans, Eclipse.

**INDUSTRIAL EXPERIENCES**

**Research Scientist Nov/2013 – Present**

Eyelock Inc, 42 Washington Rd, Princeton Junction, NJ 08550

* ***Scaling Iris Marching to Millions of Irises:*** designed and implemented graphical processing Unit (**CUDA**) based solution to scale the Iris-Match algorithm across database of 2 million irises. The implementation helped to raise the revenue by 10% for the company.
* ***Detection of Spoof Eyes:*** designed, invented, and implemented anti-spoof algorithm to block spoof eyes (such as printed eyes, artificial glass eyes) by utilizing eye tracking, 3D reconstruction using C/C++/CUDA. It is used in all of the Eyelock devices.
* ***Solving Real Life Problems:*** developed a number of research prototypes to solve real life computer vision problems such as focal distances, light changes, skin color variation, Iris-pupil segmentation and many more using Gaussian-mixture-model, image-patch experts, classifiers, and statistical inference using R/C/C++/OpenCV.

**Software Development Intern I June/2008 - August/2008**

FedEx Services, IT, Rocky Mountain Technology Center, Colorado Springs, USA

* ***Development software for Address Services (Java)*:** to develop java software to support Address Services for customers. Responsibilities: Analysis, coding, GUI design.
* ***Development of Test-Suits (Java):*** to create and generate test cases automatically for the Address Services Testing. Responsibilities: Coding, Address data manipulation.
* ***Mainframe Administration:*** tomaintain and administer the mainframe services, operations, and security. Responsibilities*:* network design, server setups, maintenance.
* ***Software Documentation (Java doc):*** todocument existing codes of Address Services.
* ***Professional Development Training:*** Quality Driven Management (QDM). Mission: Deliver market-leading customer experience, business excellence, and financial return through a Quality-oriented culture and day-to-day application of Quality science.

**Software Engineer May/2006 - July/2007**

SocialCube Limited, Dhaka, Bangladesh

* ***SaaS Application Development:*** to leverage a SOA application to SaaS. To design Multi-Tenant Database. Responsibilities: Software architect, requirement analysis, database design.
* ***Automated Form Generation (Java):*** to create report during run-time dynamically for the end user. Responsibilities: Design, coding, maintenance.
* ***Dashboard for Data analysis and Reporting (Java):*** to develop dashboard for analysis.
* ***Development of Public Key Infrastructure (Java and MySql):*** to employ digital certificates, digital signatures in a Corporate Office. Responsibilities: Design, analysis, coding, maintenance, upgrading.
* ***Development of Chat Software*** (C++ and platform independent): for employees.

Responsibilities: Coding, network design, server setups, maintenance.

* ***Development of a Drawing Software Tool (Java):*** for client. Responsibilities: GUI design, interface design, customization.

**RESEARCH EXPERIENCES**

**Research Assistant August/2007 – December/ 2013**

Computer Vision, Pattern and Image Analysis Lab

Department of Electrical and Computer Engineering, University of Memphis.

* ***Emotion for Blind People (Android-Java/C++/Hadoop)*:** Developing android mobile application for blind people to provide auditory feedback about their partners' facial expressions. A video sunglass is responsible to capture video frames and to transmit them to the android phone using Bluetooth. The facial expression recognition system is deployed in the phone using the state-of-the-art computer vision algorithms. Analyzed response is provided to the blind people as auditory feedback. Responsibilities: Implementing Transmission protocol, Speeded Up Robust Features (**SURF**) detector, Local Binary Pattern (**LBP**) feature detector, and **SLAM** algorithm. The features are processed using **Hadoop** and **Java**.
* ***Real Time Analysis of Physiological Signals (Hadoop and Cloud):*** Developing android mobile application that facilitates real-time Communication (Bluetooth) and Processing of Physiological Signals (Electrocardiogram-ECG, Respiration Rate, Body Postures, Heart Rate) using Continuous Time Bayesian Network (CTBN).Physiological signals are processed using **Hadoop -Java** and uploaded to amazon cloud.
* ***Annotation Tool for Facial Expressions(C#/C++):*** Development of a GUI based tool using C# and EmguCV (C# wrapper for OpenCV). The GUI facilitates to analyze and annotate facial expressions and facial muscle actions of a long video with frame by frame.
* ***Analysis of Facial Action Unit from Video*:** Real time analysis of Facial Action Units from video /camera using C# and OpenCV library. Responsibilities: Implementing Constrained Local Model (**CLM**), dynamic texture feature extractor, facial muscle motion energy computation.
* ***Continuous Emotion Recognition*:** Continuous recognition of emotion through facial expressions using temporal pattern of facial features with Hidden Markov Models (**HMM**s).
* ***Significant Subset of Facial Action Units (FAUs)*:** Some Action Units are more significant than others. They are easy to be detected from video. Significant FAUs are identified using statistical methods. Other insignificant FAUs are inferred with reasonable accuracies in real time without any computer vision techniques using Dynamic Bayesian Net (**DBN**).

**Research Assistant January/2010 - August/2010**

Emotive Computing Lab (<http://sites.google.com/site/memphisemotivecomputing/>)

Institute for Intelligent Systems (IIS), University of Memphis

* ***Detection of Affective State (Confusion) from video*:** Real time analysis of Affective state from video or camera. Most significant regions in the face have been identified through rigorous statistical analysis. Then, detection of confusion along the time series of facial behavior has been performed in real time using **SIFT** features.
* ***Software tool for facial feature analysis*:** Developing a GUI based software using C# and OpenCV library. It will facilitate researcher to analyze facial structures and to track facial muscles, eyes movements, & head nods/shakes using **Kalman** filters.

**PUBLICATION**

**Journal:**

* ***A K M M. Rahman*** and M. Yeasin, "A Unified Framework for Dividing and Predicting a Large Set of Action Units. IEEE Transaction of Affective Computing (**Accepted with Minor Revision**).
* **A K M M. Rahman**, ASM. I. Anam, and M. Yeasin, "EmoAssist: A Social Interaction Tool to assist the Visually Impaired in real world environment”. IEEE Transaction on Affective Computing (**In Review**).
* **A K M M. Rahman**, ASM. I. Anam, and M. Yeasin, "Analysis of Nonlinear Relations between Epistemic Mental States and Facial Features”. IEEE Transaction on System, Man, and Cybernetics B (**In Preparation**).
* ***A K M M. Rahman***, M. B. Khan, A. Bhuiyan, “Implication of Fuzzy Logic in Genetic Algorithm for Solving Mathematical Problems”, Journal of Science and Technology, Daffodil International University, Dhaka, Bangladesh.

**Conference:**

* **A K M M. Rahman**, ASM. I. Anam, M. I. Tanveer, and M. Yeasin, “*EmoAssist:* A Real-time Social Interaction Tool to assist the Visually Impaired", In Proceedings of the 15th International Conference on Human-Computer Interaction (HCII 2013), Las Vegas, NV.
* ***A K M M. Rahman***, M. I. Tanveer, ASM. I. Anam, and M. Yeasin, "*IMAPS:* A Smart Phone Based Real-Time Framework For Prediction Of Affect In Natural Dyadic Conversation", In Proceedings of the conference of Visual Communications and Image Processing (VCIP 2012) , San Diego, CA (acceptance rate = 22.3% oral).
* ***A K M M. Rahman***, M. I. Tanveer, and M. Yeasin. "A spatio-temporal probabilistic framework for dividing and predicting facial action units". In Proceedings of the 4th international conference on Affective computing and intelligent interaction - Volume Part II, ACII’11.
* M. I. Tanveer, A.S.M. I. Anam, S. Ghosh, ***A K M M. Rahman***, and M. Yeasin, “FEPS: A Sensory Substitution System for the Blind to Perceive Facial Expressions”, In Proceedings of the ASSETS 2012, Boulder, Colorado.
* R. Azevedo, R. Landis, R. F. Behnagh, M. Duffy, G. Trev., J. Harley, F. Bouchet, J. Burlison, M. Taub, N. Pacam., M. Yeasin, ***A K M M. Rahman***, M. I. Tanveer, and G. Hossain, “The Effectiveness of Pedagogical Agents’ Prompting and Feedback in Facilitating Co-Adapted Learning with MetaTutor”, Intelligent Tutoring Systems (ITS), LNCS, Vol. 7315/2012, 2012.
* ***A K M M. Rahman***, Sidney D’Mello, “Tracking Facial behavior from Video”, IIS, May, 2010
* M. S. Sorower, ***A K M M. Rahman*** and M. Yeasin, “A Survey on Machine Learning-based Approach for Testing Large Scale Software”, Workshop on advances and innovations in System Testing, Fedex Institute of Technology, The University of Memphis, May 4-6, 2008.

**ACADEMIC PROJECTS**

**C, C++, Java**

* Solution Software for Fuzzy Logic - to find solution for any Fuzzy System or Fuzzy Equation.
* English Dictionary and Small Encyclopedia – English dictionary with user friendly console.
* A Library Management System with GUI (using graphics.h) – GUI-based library management.
* A Student Database of Jahangirnagar University - containing all student information.
* An Internet Browser - customized browser for particular user.

**C#, MySQL**

* A Software Tool for Numerical Analysis – to find solution for any Numerical Analysis problem.
* A GUI based English to English dictionary – class project
* Accounting Software with Video Conference system - general management software for Corporate Office including video conference facilities.

**GRADUATE COURSES**

* Software Engineering, Algorithm, Linear Algebra, Inference Theory, Bayesian Inference, Multimedia Information Processing, Computational Intelligence, Human Computer Interaction, Machine Learning, Advance Machine Learning, Digital Signal processing

**REFERENCES**

* References are available upon request.