

## Deepak Kumar

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### INTERESTS

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Deep Learning, Computer Vision, Transfer Learning, Data Visualization

### EDUCATION

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**Ph.D. in Computer & Information Sciences** Fall, 2018

University of Massachusetts, Dartmouth

**M.S in Data Science** August, 2018

University of Massachusetts, Dartmouth

3.85/4.00

**B.S in Computer Science** June, 2013

Shaheed Zulfikar Ali Bhutto Institute of Science and Technology, Karachi

2.92/4.00

### WORK EXPERIENCE

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**University of Massachusetts, Dartmouth – Research Assistant** September, 2016 – Present

- Worked on Different Deep Learning and Machine Learning Projects
  - Cross Database Mammographic Image Analysis through Unsupervised Domain Adaptation
  - Video Classification using Keras and TensorFlow
  - Working on Multi View Action Recognition

**Center for Data Science – EduEnrich - Data Analyst** December, 2013-December, 2015

- Responsible for design and development of Relational Databases for collecting data, processing data, and maintaining integrity during data extraction
- Analyzed the data, conducted statistical analysis using R, and developed recommendations based on the analysis

**Pakistan Telecommunication Limited – Internee** June 2012 – August 2012

- Responsible for design and development of Web Portal to transfer their spread sheet data over databases for their internal use

### SKILLS

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- **Programming Languages:** Python, R, Matlab, C(Parallel Programming), C++, HTML/CSS/JS
- **Data Tools:** Tableau, scikit-Learn, Matplotlib, Numpy, Pandas, NLTK, D3, Rapid Miner
- **Machine Learning Packages:** Keras, Tensor Flow, Caffe, LibSVM
- **Other Tools:** Git, Latex, Linux

### Certificate Courses

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#### Certificate of Accomplishment

- **Coursera | Jhon Hopkins University, USA:** The Data Scientist's Toolbox, The R Programming, Data cleaning and Exploring
- **University of Nicosia, Cyprus:** Introduction to Digital Currencies
- **Center for Excellence in Journalism | Institute of Business Administration, Pakistan**
  - **dBootCamp Karachi** (Data Bootcamp for Journalists)

### Research Experience

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- **Conference Papers**
  - Deepak Kumar, Chetan Kumar, Ming Shao, Cross-Database Mammographic Image Analysis through Unsupervised domain adaption, 2<sup>nd</sup> International Workshop on Big Data Transfer Learning in Conjunction with IEEE Big Data Conference, 2017
- **Workshop Presentation**
  - Oral Presentation on Cross-Database Mammographic Image Analysis through Unsupervised domain adaption in **2017 New England Computer vision workshop** held at Northeastern University, Boston
- **Work in Progress**
  - **Action Recognition in Multi view Dataset (Master's Thesis – In Progress):** Dense Trajectories method is used for feature extraction and two stream model is used to get deep learned features, after feature extraction will work on common interest point matching in different views using the Bipartite Graphs.

### Professional Services

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- **Conference (External) Reviewer**
  - Association for Advancement of Artificial Intelligence (AAAI) 2017
  - International Joint Conference for Artificial Intelligence (IJCAI) 2018
  - Journal of Electronic Imaging (JEI) 2018

## Professional Association

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- Institute of Electrical and Electronics Engineers (IEEE)

## Academic Projects

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- **Visual Human Action Recognition through Dense Trajectories (Master's Project):** Features from Videos are extracted using Dense Trajectories method, the performance is evaluated using the bag-of-features approach, and non-linear SVM with different kernels used for classification.
- **Cross-Database Mammographic Image Analysis through Unsupervised domain adaptation:** Mammogram images features are extracted using end to end deep learning model. Different transfer learning methods (TCA, BDA, CORAL) are explored for the cases where feature space changes across image databases, and when target dataset has no labels. Classification is done using non-linear SVM with different kernels.
- **Video Classification using Keras and TensorFlow:** Videos are converted into equal number of frame sequences and extracted CNN features using inception model and stitch the sampled frames features together, then train RNN model with the wide LSTM layer followed by dense layers. URL: <https://goo.gl/evB3ba>
- **Action Recognition in Cross View Videos:** Features extracted from Improved Dense Trajectories and using two stream models to get deep learned features, then performance is evaluated using the bag-of-features approach, features are transferred in common subspace using different transfer learning methods (TCA, BDA, GFK) and non-linear SVM with different kernels used for classification.
- **Data Visualization:** Worked on **US Election 2016** Data set. Visualized each candidate campaigning expenses, number of visits they made to each state, and number of counties they won and what other demographic factors affect their results. URL: <http://deepak-rathi.com/DV/>
- **Computational Reproducibility:** Reproduced a paper “**Deep Compositional Captioning: Describing Novel Object Categories without paired Training Data**” using python and caffe. Drawn the relationship between original results and reproduced results. The paper didn't completely reproduced, but some part of the paper was reproduced.
- **Visual Analytics – Twitter Sentiment Analysis:** Created a web App, where on the frontend user draws a circle on map to select the area, and a text box to write a hashtag that user want to search. All tweets are processed on the backend using the Natural Language Processing (NLP) library and machine learning techniques. Backend processing is done using the Scala, Sql and Java, and the analyzed data is visualized using the D3.
- **Text Processing and Text Mining:** Jupyter Notebook was configured on Stampede (Super Computer) to access it on local machine for performing the text processing and text mining on unstructured data using the Python NLTK library. URL: <https://goo.gl/kXN445>