

Manish Sapkota

CONTACT INFORMATION

Mobile: (859)-948-8714
E-mail: manish.sapkota@gmail.com
Website: biprajiman.github.io
GitHub: <https://github.com/biprajiman>

PROFESSIONAL INTERESTS

Machine Learning/Deep Learning, Computer Vision, High Performance Computing, Programming Languages, Software Engineering.

EDUCATION

University of Florida, Gainesville, Florida, USA

MS-Ph.D., Electrical and Computer Engineering, **August, 2018**

Candidacy: *High Throughput Biomedical Image Analysis and Imaging Informatics for Computer Aided Diagnosis*

GPA: 3.93

Advised By Lin Yang, Ph.D.

University of Kentucky, Lexington, Kentucky, USA

Ph.D., Computer Science, **Continued at University of Florida from August 2014**

Candidacy: *High Throughput Biomedical Image Analysis and Imaging Informatics for Computer Aided Diagnosis*

Advised By Lin Yang, Ph.D.

Purbanchal University, Kathmandu, Nepal

B.E., Computer Engineering, September, 2007

Thesis: *Automated Speech Recognition System*

ACADEMIC EXPERIENCE

University of Florida

Graduate Student Researcher

August, 2014 - August, 2018

Research and coursework towards Ph.D. with a focus on biomedical imaging informatics and computer aided diagnosis.

Supervised Teaching

August, 2015 - May, 2016, August, 2016 - December, 2016

Graduate student supervised teaching for advanced graduate image processing, computer vision and pattern recognition, and undergraduate computer applications for biomedical engineering courses. Shared responsibility for leading the sections, preparing lectures, and grading.

Course Work

Advanced Machine Learning, Machine Learning, Biometric Identification, Intermediate Differential Equations, Computer Communication, Pattern Recognition, Big Data Ecosystems, Cloud Computing.

University of Kentucky

Graduate Student Researcher

August, 2011 - July, 2014

Research and coursework towards Ph.D. with a focus on online learning for biomedical image analysis.

Teaching Assistant

August, 2011 - May, 2012, August, 2012 - May, 2013

Graduate student teaching assistant for undergraduate first course in computer programming. Shared responsibility for leading the labs, designing assignments, and grading.

Selected Course Work

Database Systems, Numerical Analysis, Phylogenetic Analysis, Computer Networks, Algorithm Design, Computational Photography, Special Topics in Machine Learning.

RESEARCH

Machine Learning/Deep Learning

- Researched on supervised deep learning methods particularly fully convolutional neural network (CNN) and applied towards different image processing tasks such as object detection and cell segmentation.
- Researched and developed a method to learn vector representation of sentences that describe images using Recurrent Neural Network (RNN). These representation are further utilized for classification and binary hashing.
- Developed binary hashing methods based on deep CNN and RNN to learn bits representation for images and sentences. Binary representation is utilized for fast image and sentences query, search and retrieval. Most of these methods have at least 5% improvement over the baseline model in the histopathological images (e.g. skeletal muscle, lung cancer etc.).
- Researched and prototyped production quality code in *python* to train deep learning algorithms using different tools such as pytorch, tensorflow etc. Self initiated the prototyping tasks to help lab colleagues in their research.
- Researched and evaluated the performance of various traditional machine learning methods such as SVM in image classification problem.

High Performance Computing with MapReduce

- Implemented MapReduce jobs for image preprocessing.
- Improved the efficiency and throughput of different image informatics applications such as training deep networks, training high dimensional feature indexing methods (e.g. product quantization, kd-tree), processing and analyzing whole slide images etc.
- Improved image search and retrieval throughput to fraction of seconds in database of approximately 600000 images.
- Configured the local Spark and Hadoop clusters, and remote Amazon AWS clusters.

Computer Aided Diagnosis

- Developed an end-to-end high-throughput automated diagnosis system/framework consisting of automated object detection, object and region segmentation, image representation/feature extraction, feature visualization, image query, search and retrieval, and final classification.

Software Development

- Developed Standalone and Web applications for low level image processing and region segmentation using OpenCV, .Net, HTML, and Javascript. Applications allow to easily highlight region-of-interests and record the description for each regions at the same time.
- Developed numerous Graphical User Interfaces (GUI) using .Net C# to allow users to easily utilize all the algorithms developed in the lab for image processing and quantitative analysis. Lead and assisted in most of the software development tasks in the lab.

PROFESSIONAL EXPERIENCE

Foresight AI, San Jose, California, USA

Machine Learning Engineer

Nov, 2018 - Current

- Researched and implemented machine learning methods for object detection, tracking and semantic segmentation.
- Scale the machine learning methods to handle large volume of data using Google Cloud and Amazon AWS.
- Implemented multi-process inference to utilize all the GPUs in the cloud compute engines. Reduced inference time from 60 hours to 3 hours for 5 minutes of videos.
- Contribute to industry and academic conferences.

Cytoinformatic LLC, Lexington, Kentucky, USA

Summer Intern

May, 2014 - July, 2014

- Created graphical user interface for muscle cell segmentation with feature to allow manual curve adjustment.
- Created C# image processing library including algorithms developed in collaboration with BICI2 lab.

Physical Plant Division, University of Kentucky, Lexington, Kentucky, USA

Student Programmer

May, 2013 - August, 2013

- Worked in Facilities Management with Associate Director of Facilities Information Services.
- Analyzed and developed prototypes for Web Applications to utilize in-house GIS data using .Net (C#), MSSQL database, HTML, JQuery and Dojo toolkit.
- Created a Mobile App to track the position of the user and alert if the user is in smoking free zone or not within the campus.
- Created an interactive Web-based

Application to display Campus Events on the Campus Map.

IT Offshore Nepal Pvt. Ltd., Kathmandu, Nepal

Senior Software Engineer

September, 2008 - June, 2011

- Worked with Dot Net team.
- Lead different teams to develop and maintain more than 10 Windows and Web applications using MSSQL and MySql database, .Net, HTML, Javascript, Silverlight, WPF, Objective C, CSS etc.
- Configured and maintained Windows Server to host the applications.
- Helped analyzing client requirement, and budgeting time and cost for the software development.

Prologic First India Pvt. Ltd., Gurgaon, India

Software Developer

February, 2008 - July, 2008

- Developed Web applications using .Net C# and MSSQL.

ResCon Pvt. Ltd., Kathmandu, Nepal

Software Developer

January, 2007 - July, 2011

- Developed and maintained the company's AJAX frontend and backend web application.

TECHNICAL
SKILLS

Programming Languages (Scientific): Python, Pytorch, C++, Matlab

Programming Languages (Additional): C#, Java, Javascript (jQuery), HTML, XAML, Scala, PHP, SQL, Asp.net

Tools: VStudio, XCode, Eclipse, SVN, GIT, MSSQL, MySql

PROFESSIONAL
MEMBERSHIPS

IEEE, Student Member, 2013 - present

Biomedical Engineering Society, 2014 - 2015

REFEREED
PUBLICATIONS

Zhang, Z., Chen, P., McGough, M., Xing, F., Wang, C., Bui, M., Xie, Y., **Sapkota, M.** and others Pathologist-level interpretable whole-slide cancer diagnosis with deep learning accepted at Nature Medicine Intelligence (NMI)), 2019.

Shi, X., **Sapkota, M.**, Xing, F., Liu, F., Cui, L., & Yang, L. Pairwise based Deep Ranking Hashing For Histopathology Image Classification and Retrieval accepted at Pattern Recognition Special Issue (PR), 2018.

Sapkota, M., Shi, X., Xing, F., & Yang, L. Deep Convolutional Hashing for Low Dimensional Binary Embedding for Histopathology images under review to IEEE Journal of Biomedical Health and Informatics (JBHI), 2018.

Zhang, Z., Chen, P., **Sapkota, M.**, & Yang, L. TandemNet: Distilling Knowledge from Medical Images Using Diagnostic Reports as Optional Semantic References at International Conference on Medical Image Computing and Computer Assisted Intervention Society (MICCAI), 2017.

Sapkota, M., Liu, F., Xie, Y., Xing, F., & Yang, L. AIIMDs: An Integrated Framework of Automatic Idiopathic Inflammatory Myopathy Diagnosis for Muscle at IEEE Journal of Biomedical Health and Informatics (JBHI), 2016.

Shi, X., Xing, F., Xu, K., **Sapkota, M.**, & Yang, L. Asymmetric Discrete Graph Hashing at the 31st AAAI Conference on Artificial Intelligence, 2017.

Xie, Y., Zhang, Z., **Sapkota, M.**, & Yang, L. Spatial Clockwork Recurrent Neural Network for Muscle Perimysium Segmentation at the 19th International Conference on Medical Image Computing and Computer Assisted Intervention Society (MICCAI), 2016.

Sapkota, M., Xing, F., Su, H., & Yang, L. Automatic Muscle Perimysium Annotation using Deep Convolutional Neural Network at IEEE 12th International Symposium on Biomedical Imaging (ISBI), 2015.

Sapkota, M., Xing, F., Liu, F., & Yang, L. Skeletal Muscle Cell Segmentation Using Distributed Convolutional Neural Network at High Performance Computing for Biomedical Image Analysis Workshop in conjunction with the 18th International Conference on Medical Image Computing and Computer Assisted Intervention (HPC-MICCAI) 2015.

Xing, F., **Sapkota, M.**, & Yang, L. Histopathological Lung Cancer Image Mining Using Kd-tree and MapReduce at HPC-MICCAI, 2014.

Sapkota, M., Liu, F., & Yang, L. Distributed Content Based Muscle Image Retrieval Using Kd-Tree and MapReduce at HPC-MICCAI, 2013.

ACTIVITIES

Reviewer Transaction on Image Processing (TIP).

Reviewer Journal of Biomedical Health and Image Processing (JBHI).

PRESENTATIONS

Sapkota, M., Yuan, C., & Siddiqui, M. Finding Roads from a Bird's Eye View: A Novel Deep Learning-based Method for Semantic Road Segmentation and Mapping. Abstract presented at GPU Technology Conference (GTC), 2019.

Sapkota, M., Xing, F., McGough, M. & Yang, L. Classification of Idiopathic Inflammatory Myopathies using Knowledge Transferred Fully Convolutional Neural Network. Abstract accepted to United States and Canadian Academy of Pathology (USCAP), 2018.

Sapkota, M., Xing, F., & Yang, L. Idiopathic Inflammatory Myopathies Classification Using Deep Convolution Neural Network. Abstract accepted to Biomedical Engineering Society Annual Meeting (BMES), 2015.