



# Pankaj Bhambhani

UMass Amherst CS Graduate, 3 years of Experience. Seeking Full-Time Opportunities - Machine Learning, AI, Data Science, Software Dev.

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**Skills** — Java, Python, Keras, Tensorflow, Docker, AWS, MATLAB, Bash, MySQL, JS, Node.js, C++, Spring, Android, Hadoop, Redis, AngularJS, Selenium, Git

## Experience

### Machine Learning for Data Science Lab – Software Developer

(May 2017 to Present)

Currently involved in the Machine Learning for Data Science (MLDS) Lab, working on Dark Ecology, which uses CNN based image recognition to identify bird migration patterns from radar image data. We use WSRLIB, a MATLAB library for Weather Surveillance Radar written specifically for this task, coupled with a Convolutional Neural Network trained on a VGG-16 model. Contributions include scaling up the service to run on AWS using a docker image built to execute batches of radar data stored in S3. Plans include improving the performance of the CNN network. **Technologies** – MATLAB, AWS S3, AWS Batch, Docker, Python.

### Play Games 24x7 Pvt. Ltd. - Software Development Engineer

(July 2013 - May 2016 – 2 years 10 months)

Worked as SDE for RummyCircle.com, one of the major products of Games24x7. Involved in Full Stack Web Development.

**Accomplishments** - Horizontal scaling and optimization of distributed caches using Ehcache and Terracotta, Building Restful Services for handling Cash and Reward Point transactions, strengthening application security using Spring Security, Building Event Detection System and Optimization of gameplay bot.

**Technologies** - Java, Spring, Spring Security, Test-NG, Jersey (JAX-RS), Hbase, Ehcache, Terracotta, Redis, Akka, MySQL, Bash, MyBatis, Node.js, JUnit.

### KDE (Google Summer of Code) - Software Developer

(May-July 2011 & May – August 2012 – 7 months)

Integrated features of Facebook into KDE's micro blogging client, Choqok (Under Google Summer of Code 2012). Initially I helped built the base library LibKFBAPI, and was later involved in using the library to build features such as the ability to create a post, view posts as well as like and comment on a post.

**Technologies:** KDE4 based on Qt (C++ based GUI Framework). **Link** - <https://github.com/pankajb64/choqok-facebook>

## Projects

### Evaluating Machine Learning Techniques for Website Fingerprinting Attacks – Independent Study

(May – August 2017)

Pursued an independent study to evaluate the assumptions made by different machine learning models for targeting Website Fingerprinting (WF) attacks on the Tor network. Existing models include Naïve Bayes, Decision Trees and SVM, but they all employ certain restrictions (e.g., user visits only a small set of web pages, a single tab whose content is unchanging) that aren't realistically attainable. Evaluated the assumptions made by such models and the performance when these assumptions are violated. **Proposed two neural network models** (a single-layer network as well as a 1D CNN) as a tool to effectively classify multi-tab, open-world, time-variant crawl data, and evaluate their performance against the state-of-the-art SVMs. Results are promising and merit further research.

**Technologies** – Keras, Numpy, Scikit-learn, Python, C++, Bash. **Link** - [https://github.com/pankajb64/wf\\_attacks\\_evaluation](https://github.com/pankajb64/wf_attacks_evaluation)

### Image Captioning with Visual Attention - Machine Learning Course Project

(October – December 2016)

Incorporated an attention mechanism with gradient descent based training algorithms to build a deep learning model that learns to generate image descriptions given an unseen image, inspired by the state-of-the-art work in this field. Our results showed that attention based deep learning models can learn to produce good image captions and generate visualizations to infer how a model can focus on certain parts of the image while predicting the next word. We used a Convolutional Neural Network (CNN) to generate attention based features and a Long Short-term Memory Network (LSTM) for generating image captions.

**Technologies:** Keras, Theano, Python. **Link** - [https://github.com/pankajb64/image\\_caption\\_using\\_attention](https://github.com/pankajb64/image_caption_using_attention)

### Automated Extractive Summarization of a Book using its Index - Natural Language Processing Course Project (October – December 2016)

Generating coherent summaries of long documents such as books is a relatively untouched field, with most of the research work being focused on short documents. In this Project, we looked at summarization of books which have a back-index as a novel technique for generating good summaries. We provided a new dataset for the evaluation of such summarization systems. We focused on extractive summarization using LexRank, an unsupervised learning algorithm based on eigenvector sentence centrality and compared it with the current state-of-the-art methods. The results were promising and merit future research.

**Technologies:** NLTK, Python. **Link** - <https://github.com/pankajb64/bookesis>

### Pictionary with Jibo - HackUMass 2016

(October 2016)

Taught the robot Jibo to play Pictionary on a set of hand-drawn images. We used Jibo SDK to capture a picture and send it off to be classified by our custom-trained TensorFlow neural networks. We used openCV to detect the playing area within the board and crop off the rest of the image and make it black and white, we then passed it off to our TensorFlow model to be classified. We built the neural network using hundreds of images pulled automatically from Bing Image Search. Using TensorFlow's Image Recognition Algorithm "Inception", we successfully trained it to recognize common objects such as house, chair, etc.

**Technologies:** TensorFlow, Jibo SDK, OpenCV, Python. **Link** - <https://github.com/pankajb64/jibo-pictionary>

## Education

### University of Massachusetts Amherst MS - Computer Science (GPA – 3.95)

(September 2016 – PRESENT)

**Relevant Coursework** – Machine Learning, Natural Language Processing, Artificial Intelligence, Systems

### DA-IICT B.Tech. - Information & Comm. Technology

(2009-2013)

**Relevant Coursework:** Algorithms, Data Structures, Computer Networks, Databases, Operating Systems, Cryptography, Graph Theory, Natural Computing