Amol Mandhane

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Education

B.Tech., Chemical Engineering, IIT Bombay — CPI 7.42 — 2014

Research Interests

Artificial intelligence, Machine learning, Deep learning and artificial neural networks, Computer vision, Cognitive science, Applied statistics, Control systems, Advanced web & database technologies

Key Projects and Internships

Jun 2014 – Ongoing

Bilingual (English-Hindi) OCR system

Guide: Prof. Ganesh Ramakrishnan

- Creating an **Optical Character Recognition** (OCR) system for bilingual structured documents
- Devised **three-stage recognition process** for Hindi language, reducing the sizes of the neural networks involved from thousands of output nodes to <250
- Proposed a novel method for determining structure of low quality document images using morphological structure
- Submitting the research to be presented at 13th International Conference on Document Analysis and Recognition (ICDAR 2015)

Apr 2013 – Jul 2013

Deutsche Bank CIB Centre Ltd.

Programming Internship

- Proposed and developed a **machine learning algorithm** for pricing of securities loan contracts in Asian markets
- Created an **anomaly detection** procedure in Python in existing contracts which detects the unused and overpriced contracts in Deutsche Bank book
- Designed utilities which combined with the above algorithms improved the performance of stock loan procedure and created a profit of **USD 4000/day**
- Received a **Pre-Placement Offer** from the bank in recognition of outstanding performance in the project

Sep 2014 – Ongoing

Indoor Tracking of Android Phones

Sensus Labs

- Developing algorithms for **tracking movements of android phones in large buildings** using accelerometer, gyroscope, GPS and other sensors
- Attempting to improve tracking accuracy with use of deep neural networks for regression and time series analysis

Feb 2014 – Jul 2014

SBHS Virtual Lab Automated Server

Guide: Prof. Kannan Moudgalya

- Created a **fault detection process** based on designed heuristics of the Single Board Heater System (SBHS)
- Re-designed the server and interface of virtual labs for increasing the efficiency of parallel control of 40 SBHS

Jan 2014 – Apr 2014

English-Hindi SMS Translator

CS 712 Course Project

- Created **English-Hindi statistical machine translator** based on Phrase based translation model using Moses
- Created a interface of the translator with **android devices** with an app and other mobile devices via **SMS service**
- Created a **SMS text normalization procedure** based on rule based translation model
- Evaluation of the translator resulted in a BLEU score of 24.3 (WMT '11 FR-EN highest BLEU 30.5)

Jan 2013 – Apr 2013 | **Baseball Pitcher Salary Predictor**
CL 672 Course Project
Code | https://github.com/amol-mandhane/baseball-salary-model/

- Created a linear regression based **Machine Learning model** in **R** for predicting salaries of baseball pitchers
- Evaluation of the model resulted in 85% accuracy on a real test dataset from 1987 Major League Baseball

Jan 2014 – Apr 2014 | **Optimization of Fantasy Football Team**
CL 603 Course Project

- Modeled the optimum team selection problem for fantasy premier league as a modified **Knapsack problem**
- Modifying the existing **dynamic programming algorithm** for Knapsack problem to optimize Knapsack-based team selection with additional constraints related to a proper football team
- Performed multivariate sensitivity analysis on the optimal output to generate different approximate solutions

Jul 2013 – Nov 2013 | **Low Rank Matrix Recovery**
CS 663 Course Project

- Studied and implemented **Robust principal component analysis** for low rank matrix recovery via convex optimization using **augmented lagrange multiplier method**
- Studied and evaluated various applications of RPCA in image processing like background modeling, camera stabilization, batch image alignment etc.

Aug 2013 | **Konnactivity**
Yahoo HackU 2013

- Won **Hackers' Choice Award** for developing the most popular hack in the competition
- Developed a Web application to recommend people with similar interest by analyzing users' posts, likes, questions on social sites and uses their **Wikipedia meaning to extract semantics**
- Created a activity recommender based on **Low Rank Matrix Recovery** algorithm for Netflix problem

Programming Projects

Dec 2013 – Ongoing | **htmlPy**
GUI development library for Python applications
Link | http://amol-mandhane.github.io/htmlPy/

- Developed a **Python** library using QT GUI **library for designing Graphical User Interface** in standalone applications using popular technology like HTML5, CSS3 and Javascript
- Integrated the library with various popular web/application development frameworks which **results in great simplicity** in standalone application development in Python

2012 – Ongoing | **Freelance Software Development**

- Worked as a freelance software developer in various companies and start-ups for consultations regarding internal company softwares and websites
- Peel-works Analytics - Optimized MySQL databases and queries to **reduce database server load by 5 fold**
- 24x7Style - **Automated data mining processes** using web scraping to extract competitors' data for pricing
- Delphoenix Technologies - Created a biometric employee record management system

Seminars

Mar 2014	**Discriminative Reranking for Machine Translation** CS 712 course seminar
Link	http://amol-mandhane.github.io/reranking.pdf

- Presented applications of discriminative machine learning algorithms in improving generative models for statistical machine translation
- Original research: Shen, Libin, Anoop Sarkar, and Franz Josef Och. "Discriminative reranking for machine translation." HLT-NAACL. 2004.

Teaching Experience

Course/Platform	Duration	Teaching
TA for CL 417: Process Control	Fall 2014	Designed and conducted **control systems labs** and quizzes for CL 417 in fall 2014 semester
TA for CL 692: Digital Control	Spring 2014	Designed and conducted **control systems labs** and quizzes for CL 692 in spring 2014 semester
InstaEDU	2014 –	Tutoring various students on **Artificial Intelligence, Statistics, general programming** and chemical engineering
Workshops	2012 –	Actively conducting workshops on various programming languages like **Ruby, Javascript** etc. at IIT Bombay under various organizations

Courses Undertaken

Completed	Artificial Intelligence, Machine Learning†, Practical Machine Learning†, Regression Models†, Statistical Inference†, Algorithms†, Databases†, Topics in Natural Language Processing, Mining Massive Datasets†, Social and Economic Networks†, Game Theory†, Digital Image Processing, Applied Multivariate Statistics, Automata†, Cryptography†, Compilers†, Process Control, Digital Control, Optimization, Advanced Process Control
Ongoing	Functional Programming†, Linear and Integer programming†, Process Mining†

†: courses done on popular MOOC websites. Certificates: http://amol-mandhane.github.io/SoA/