MANISH U. KURSE, Ph.D.

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Summary R**esearch scientist and engineer** passionate about data driven solutions to problems of business/customer impact. With experience in academia and industry, designing and performing experiments to generate data, and using machine learning, mathematical modeling and computational tools to draw insightful conclusions from that data.

Skills

- Machine learning, data analysis, statistics, mathematical modeling, optimization
- Designing and running experiments to collect data
- Communication of results to business leaders, regulatory agencies and research community
- Programming: Matlab, C/C++, Python (NumPy, Pandas, scikit-learn, matplotlib), SQL

Education

University of Southern California, Los Angeles, CA *2012*
Ph.D. and M.S., Biomedical Engineering, GPA: 3.96/4.0
Dissertation: Inference of computational models of tendon networks via sparse experimentation.

Cornell University, Ithaca, NY *2007*
Graduate course work, Mechanical Engineering, GPA: 4.03/4.0

Indian Institute of Technology (IIT) Madras, Chennai, India *2006*
Bachelor of Technology, Mechanical Engineering, GPA: 9.08/10.0

Projects

- Ph.D.: Nonlinear regression functions modeling human finger movement, inference of computational models of the finger's tendon networks
- Kaggle: Bike Sharing Demand, Titanic Survival Prediction
- For details: **manishkurse.github.io**

Work Experience

Research Assistant, University of Southern California *2007-2012*

- Designed experiments to gather data from multiple sensors using computer-controlled actuation of the tendons of 11 human cadaveric hands. Cleaned and prepared data for machine learning.
- Performed non-linear regression to define analytical functions defining finger movement from the above experimental dataset and compared accuracy, number of parameters, and robustness to noise, of polynomial vs. symbolic regression implemented using Eureqa.
- Developed a novel non-linear finite element method (FEM) simulation environment in C/C++ and Matlab to model the mechanics of elastic tendon networks.
- Implemented stochastic hill climbing in Matlab to infer parameters of the FEM model of the human finger from an experimental dataset.
- Programmed these algorithms to run on parallel processors using Matlab Parallel Computing Toolbox and Distributed Computing Server on the USC cluster.
- Compared accuracy of Support Vector Regression and Neural Networks in their ability to predict joint angles for a prosthetic application as part of a Machine Learning class project.

Senior R&D Engineer, Boston Scientific Neuromodulation, Valencia, CA *2012-present*

Boston Scientific is one of the largest medical device companies in the United States.

- Played a key role in obtaining ImageReady™ Head-Only MRI labeling for the Precision Spectra™ Spinal Cord Stimulation system, Boston Scientific's first MRI conditional neuromodulation system in the US that was critical for Boston Scientific to meet competition in the Neuromodulation market.
  - Determined thresholds of clinical safety based on literature study and mathematical analysis.
  - Provided technical support for regulatory submission and participated in subsequent conversations with the US Food and Drug Administration (FDA) enabling smooth approval of the submission.
- Executed pre-clinical studies to collect biological data on which I performed statistical analyses to define a patient safety threshold for MRI conditional neuromodulation systems.
- Successfully defined strategy and test methods using experimentation and data analysis in Matlab to determine MRI safety of active implantable systems. This strategy is now being used across different projects to design new MRI conditional systems.

Intern Research Consultant, Deallus Inc., Los Angeles, CA *2011*

Deallus is a startup that provides strategy and competitive intelligence consulting services to clients in the pharmaceutical and biotechnology industry.

- Conducted research to gather competitive intelligence in new drug/diagnostic development and commercialization.
- Analyzed data using Microsoft Excel and presented key findings to clients from the biotechnology-pharmaceutical industry through Powerpoint slides aiding them in strategy development and decision-making.

Courses

- Machine learning (USC), Applied Mathematics (Cornell), Biostatistics (USC), Advanced Dynamics (USC), Linear Control Systems (USC), Non-linear Dynamics (Cornell)
- Self taught: SQL, Machine Learning (Andrew Ng, Coursera), Algorithms and Data Structures (Interactive Python)

Honors/ Awards

Knowledge Driven Product Development Award, Boston Scientific *2013*

Meaningful Innovation Award, Boston Scientific *2013*

Checkered Flag Award, Boston Scientific (awarded for going above and beyond to make a difference to a program supporting company goals) *2012, 2013*

Olin Fellowship for graduate study, **Cornell University** *2006*

Best Poster Presentation Award, Biomedical Engineering Graduate Research Symposium, University of Southern California. *2010, 2011*

Second Prize in the STEM category**,** Graduate and Professional Students Senate Poster Competition**,** University of Southern California *2011*

Ranked among top 0.8% of more than 112500 students in the IIT Joint Entrance Examination (IIT-JEE) *2002*

Among top 30 students (0.1%) of 30000 participants in the Indian National Chemistry Olympiad *2002*