# Pratyush **Kumar**

Data Scientist · Deep Learning Engineer

(+91) 78-9539-5395 | hi@pratyushkumar.me | pratyushkumar.me | pratyush19 | pratyush19

## Summary

Currently Senior Data Scientist in AI firm ParallelDots, Inc. 2+ years experience specializing in deep learning, machine learning and bayesian modeling. Interested in solving cutting edge AI problems, learning new things, writing blog and exploring the world.

## Work Experience

### ParallelDots

*Gurgaon, India*

Senior Data Scientist/Data Scientist — *Jan 2019 - Present/May 2017 - Dec 2018*

- Worked on an AI health-care product (*Dentistry.AI*) which mark dental caries on bitewing X-rays.
- Developed multi-step deep learning model to detect dental caries from bitewing x-rays.
- Implemented computer vision tasks viz., classification, detection, semantic segmentation on real world X-rays images.
- Working on predictive modeling, demand forecasting, Bayesian Inference, and probabilistic programming.

## Education

### Indian Institute of Technology Roorkee

*Roorkee, India*

B.Tech. in Industrial Engineering — *Jul. 2013 - Apr. 2017*

- Percent: 73.1%

### Holy Mission School

*Muzaffarpur, India*

Senior Secondary (CBSE) — *2013*

- Percent: 90.8%

## Publication

### Detection of Tooth caries in Bitewing Radiographs using Deep Learning

NIPS 2017 ML4H, Long Beach, CA — *Nov. 2017*

- Developed a Computer Aided Diagnosis (CAD) system, which enhances the performance of dentists in detecting wide range of dental caries.
- Developed annotated dataset of 3000 bitewing radiographs and utilize it for developing the CAD system.
- The CAD system consists of a deep fully convolutional neural network consisting 100+ layers, which trained on bitewing radiographs.
- Compare the performance of proposed CAD system with three certified dentists for making dental caries and exceeds the average performance of the dentists in both recall (sensitivity) and F1-Score (agreement with truth) by a very large margin.

### Example Mining for Incremental Learning in Medical Imaging

IEEE SSCI 2018 — *Nov. 2017*

- Developed a method called Incremental Example Mining (IEM) to incrementally train Deep Learning model where annotated data arrives in patches.
- IEM makes use of Hard Example Mining technique to automatically select a subset of dataset to fine-tune the existing network weights such that it adapts to new data while retaining existing knowledge.
- IEM solve the widely known challenge of incremental learning comes from subsequent forgetting as the model is tuned to adapt to new unseen data.

## Certifications

### Deep Learning Specialization (deeplearning.ai)

Coursera — *Mar. 2018*

- Neural Networks and Deep Learning: Computational Graph, Vectorization, Shallow and Deep Neural Networks
- Improving Deep Neural Networks: Hyperparameter tuning, Regularization and Optimization, Deep Learning Frameworks
- Structuring Machine Learning Projects: Evaluation metrics, Error Analysis, Transfer Learning, Multi-task Learning, End-to-End Deep Learning
- Convolutional Neural Networks: Object Detection, Face Recognition, Neural Transfer, Region Proposal, Landmark Detection, NMS, YOLO
- Sequence Models: RNN, GRU, LSTM, Natural Language Processing, Word Embeddings, Sentiment Classification, Beam Search, Attention Model

### Data Analyst Nanodegree

Udacity — *Sep. 2016*

- Data Analysis, Data Wrangling, Exploratory Data Analysis, Data Visualization, Machine Learning, A/B Testing

### Machine Learning (Stanford University)

Coursera *Oct. 2016*

- Linear regression, Logistics Regression, Cost Function, Gradient Descent, Bias/Variance, Support Vector Machines, K-Means, Neural Network (Representation & Learning), Dimensionality Reduction, Anomaly Detection, Gaussian Distribution, Online Learning, Recommender Systems

### Computational Investing

Coursera *Oct. 2016*

- Headge Funds, Arbitrage, CAPM, QSTK, Market Simulator, Portfolio Optimization, Event Studies, Indicators, Bollinger Bands

## CourseWork

Probability and Statistics, Engineering Mathematics, Product and Process Optimization, Operation Research, Robotics and Control, Machine Design, Programming and Data Structures, Engineering Economy, Economics, Financial Management, Banking and Bank Finance

## Skills

| | |
|---|---|
| **Programming** | Python, Java, R, C++ |
| **Data Analysis** | NumPy, Pandas |
| **Data Visualization** | Matplotlib, D3, ggplot2 |
| **Machine Learning** | Scikit-learn, PyMC3, Xgboost, LightGBM, TPOT |
| **Deep Learning** | PyTorch, Lasagne, Keras, Theano, Tensorflow |
| **Misc.** | Git, MySQL, Academic research, LaTeX |

## Achievements

2018 **74 out of 2310,** World Bank Poverty Prediction competition hosted by DrivenData

2017 **54 out of 1404,** NSE ISB CodeSprint competition hosted by HackerRank

2016 **Top 18%,** Allstate Claims Severity competition hosted by Kaggle

2016 **Bronze,** Week of Code 19 competition hosted by HackerRank

## Projects

### Haptics Robot for Motor Rehabilitation

IIT Roorkee *Aug. 2016 - Apr. 2017*

- The project involves design and development of haptic planner robot hand.
- Virtual environment for providing force feedback mechanism to the haptic hand is being developed.
- Machine learning algorithms like the Neural Network has been implemented to train the haptic hand.
- Finally, the hand is used for motor rehabilitation purposes.

### Identifying Fraud from Enron Emails and Financial Data

Udacity *Jul. 2016 - Aug. 2016*

- The Aim was to explore the Enron dataset, use data wrangling and visualization techniques to clean and visualize the data, find the correlation between various features, identify extreme outliers and finally use the appropriate machine learning algorithm to predict Person of Interest 'POI' i.e., employees who committed fraud.
- The accuracy of algorithms was calculated by the F1 score; the logistic regression with PCA gave the best results.
- Achieved the highest accuracy among all the code submissions.

## Extracurricular Activities

### IITiansClub

Executive Member *Mar. 2015 - Aug. 2016*

- Worked as an Executive Member of IITiansClub.com (a study portal to help and guide JEE aspirants to prepare effectively).
- Created Practice Lounge for online quizzes and tests. Developed a discussion forum for the online doubts and counseling.

### Robotics Club, IIT Roorkee

Member *Jun. 2014 - Apr. 2015*

- Worked as a member to conduct various robotics lectures, organized events and programmed KUKA robot.
- Created a snake robot and programmed it with arduino that can easily climb on the wall.

### NSS, IIT Roorkee

Member *Jul. 2013 - Apr. 2015*

- Taught more than 80 underprivileged students from primary schools who could not otherwise afford tuition fees.
- Actively participated in organizing events such as Blood Donation camp, Tree Plantation drives.