He (Richard) Zhao

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Education

Northwestern University, Evanston, IL (GPA: 3.92/4.00)   Jun. 2017
Ph.D, Mechanical Engineering
M.S., Computer Science

University of Notre Dame, Notre Dame, IN   May 2012
B.S., Aerospace Engineering

Professional Experience

Software Engineer, SkinIO, Chicago, IL   Jun. 2016 – Present
- Design and implement from scratch a Python machine learning module for skin cancer image analysis at a biotech startup
- Apply transfer learning with convolutional neural network in Caffe that achieves 90.4% skin lesion classification accuracy
- Work within DevOps team to deploy machine learning component using AWS EC2 and Elastic Beamstalk for production
- Develop data collection workflow using AWS DynamoDB and Elastic BeanStalk in an AngularJS web app
- Improve feature extractions with data-driven approach from temporal full-body computer vision analysis using OpenCV

Lead Developer, NanoMine *(nanomine.northwestern.edu)*   Sept. 2015 – Present
- Lead a multi-university team of 10+ on data collection, software development, user outreach and academia publications
- Develop a web-based data resource and online community for polymer composite materials research using Python/Django
- Design XML schema and data collection workflow using MongoDB and RESTful API in a Python app
- Implement statistical analysis and physics-based simulation tools as Django web apps and connect with database engines

Research Experience

Graduate Research Assistant, Northwestern University, Evanston, IL   Sept. 2012 – Present
Thesis title: *Data-driven Analysis and Modeling of Polymer Nanocomposite Properties*
- Apply statistical and deep transfer learning models in Python and Caffe as well as image analysis in MATLAB to capture and quantify geometric features from material micrograph images for property optimization and material design
- Develop a NoSQL database system that archives materials data from literature and lab sources. Design XML schema and Django web app to store, index and curate collected data
- Develop a web app that extracts and analyzes text, image and binary objects from online academia journal publishers and Google Scholar using Python Beautiful Soup, gensim and matplotlib
- Design and implement an inverse regression-based heuristic model coupled with physics-based finite element modeling for nanocomposite materials mechanical and dielectric property prediction with ABAQUS and COMSOL

Coursework and Professional Skills

- Programming: Python, Java, C++, MATLAB, UNIX Shell, HTML/CSS, SQL, JavaScript, R, SAS
- Platforms: Amazon Web Services, CentOS, Debian, MongoDB, MySQL, Django, Git/Bitbucket, Node.js, AngularJS
- Deep Learning: Caffe, TensorFlow, Lasagne
- Courses: Algorithms, Database, Data Structure, Machine Learning, Deep Learning, Numerical Optimization, Computer Vision, Artificial Intelligence, Social Media Mining, Statistical Pattern Recognition, Transportation Analytics

Academic Engagement and Activities

- Invited academic paper reviewer for over five journals and conferences
- Invited speaker at multiple international conferences on materials informatics (2015 US-Japan Materials Data Consortium, 2016 International Data & Analytics for Materials Research Summit)
- Guest/visiting scholar at US Nat'l Institute of Standards and Technology and Japan Nat'l Institute of Materials Science