Rohit Tripathy
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Education

- **Purdue University** — West Lafayette, IN
  PhD., Mechanical Engineering — *January. 2016 - Present*
  - Relevant courses: Uncertainty Quantification, Computational Methods in Optimization, Bayesian Data Analysis, Machine Learning Theory.
- **Purdue University** — West Lafayette, IN
  MS., Mechanical Engineering — *August 2014-December 2015*
  - Relevant courses: Applied Decision Theory and Bayesian Statistics, Finite Element Method, Computational Fluid Dynamics, Atomistic View of Materials, Fluid Mechanics.

Research Experience

- **Predictive Science Lab, Purdue University** — West Lafayette, IN
  Graduate Research Assistant — *August 2014 - Present*
  - Currently work here under the supervision of Prof. Ilias Bilionis.
  - Rsearch focuses on uncertainty propagation in high dimensions and small data regime.
  - Developed a novel gradient-free, dimensionality reduction technique called Active subspace Gaussian process regression (ASPGP).
  - Implemented `Python` code for ASPGP. Open source code hosted on `github` (see 'links' section below).

Publications

- **Gaussian processes with built-in dimensionality reduction: Applications to high-dimensional uncertainty propagation**

  Rohit Tripathy, Ilias Bilionis, Marcial Gonzalez; Journal of Computational Physics, Sept. 2016.

  - Dimensionality reduction technique which relies on discovering a low dimensional manifold known as the "active subspace" which captures maximal variation of the quantity of interest.
  - Method bypasses requirement of the gradient of the quantity of interest with respect to the inputs and Bayesian formulation makes the method robust to observational noise.
  - Method applied to a challenging high dimensional dynamical system problem of quantifying uncertainty in properties of solitary waves propagating through granular crystals.

Talks / Presentations

- **ASME Verification and validation Symposium** — Las Vegas, NV
  Probabistic Active subspaces (oral presentation). — *May 2016*

- **SIAM Purdue CSESC 2016** Purdue University
  A novel method for gradient-free dimensionality reduction (poster presentation). *March 2016*

Selected Coursework Projects

- **Optimization over the Stiefel Manifold**
  Computational methods in optimization course, CS 520 *Jan 2016 - May 2016*
  - Implemented, in `Python`, a modified form of gradient descent on manifold space, with update scheme based on the Cayley transform.
- **Finite element solver for a plane stress hypoelasticity problem**
  Finite Element Methods course, ME 681. *Jan. 2015 - May 2015*
  - Implemented in `Python` from scratch a nonlinear finite element solver for 2D hypoelasticity problem for a square plate.
- **2-D Incompressible Navier Stokes solver**
  Computational Fluid Dynamics course, ME 614 *Jan. 2015 - May 2015*
  - Implemented, in `Python`, from scratch, a fully conservative finite difference solver with a staggered grid formulation to solve the lid driven cavity problem.

Skills

Languages (In order of comfort): `Python`, `R`, `MATLAB`, C/C++.

Deep Learning frameworks: `caffe`, `Theano`.

Other software: LaTeX, `git`, ANSYS, Solidworks.

Previous work experience

- *Vocational Trainee*, Hindustan Aeronautics Limited, Kanpur, India (May 2012 - June 2012).
- *Manufacturing intern*, Scooters India, Lucknow, India (December 2012).

Interests

Academic: Uncertainty Quantification, Machine Learning, Deep learning and Artificial Intelligence, Data Analysis, Finite Element methods. Computational physics.

Membership: Society of Industrial and Applied Mathematics (SIAM) student member (August 2015-present), SIAM Purdue chapter Treasurer (August 2016 - present)

Links

- **Bitbucket**: https://bitbucket.org/rohitkt10/
- **Active subspace project github**: https://github.com/PredictiveScienceLab/py-aspgp