

# Deepak MAURYA

## PERSONAL DATA

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RESEARCH INTERESTS: Theoretical Machine Learning  
WEB PAGE: <https://d-maurya.github.io>

GOOGLE SCHOLAR: [Link](#)  
EMAIL: [dk.cs.iitm@gmail.com](mailto:dk.cs.iitm@gmail.com)

## EDUCATION

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- 2018 - 2021 (Expected) **Indian Institute of Technology, Madras**, Chennai, India  
Master of Science in [Computer Science & Engineering Department](#)  
CGPA: 8.2 out of 10 (India)  
Thesis: Spectral Hypergraph Theory  
Advisors: [Prof. Balaraman Ravindran](#), [Prof. Shankar Narasimhan](#)
- 2011-2016 **Indian Institute of Technology, Madras**, Chennai, India  
M.Tech & B.Tech - Dual Degree in [Electrical Engineering](#)  
CGPA: 7.72 out of 10 (India)  
Thesis: Identification of Linear Dynamic Systems using Dynamic Iterative PCA  
Advisors: [Prof. Arun K. Tangirala](#), [Prof. Shankar Narasimhan](#)

## AWARDS

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- [Best Student Paper Award](#) at ICC 2019
- Travel grant of \$500 and student registration of \$490 to attend [KDD 2019](#)
- Travel grant to attend [CoDS-COMAD 2020](#) and [ICC 2019](#), covering all expenses

## PUBLICATIONS

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### 4.1 Accepted

1. ARX Model Identification using Generalized Spectral Decomposition, **Deepak Maurya**, Arun K. Tangirala, Shankar Narasimhan, To appear in 24th International Symposium on Mathematical Theory of Networks and Systems ([MTNS 2020](#)), [\[arXiv link\]](#)
2. Optimal Filtering and Residual Analysis in Errors-in-variables Model Identification, Vipul Mann, **Deepak Maurya**, Arun K. Tangirala, Shankar Narasimhan. Industrial & Engineering Chemistry Research. 2020;59(5):1953-65. [\[Paper\]](#), [\[Code\]](#)
3. Identification of MISO Systems in Minimal Realization Form, Chaithanya K. Donda, **Deepak Maurya**, Arun K. Tangirala, Shankar Narasimhan, IFAC-PapersOnLine, 53(1), pp.141-146. [\[Paper\]](#)
4. Hypergraph Partitioning using Tensor Eigenvalue Decomposition, **Deepak Maurya**, Balaraman Ravindran, Shankar Narasimhan, Accepted for a poster presentation in [Sets and Partitions](#) workshop in [NeurIPS 2019](#). [\[Poster\]](#), [\[arXiv link\]](#)
5. Hyperedge Prediction using Tensor Eigenvalue Decomposition, **Deepak Maurya**, Balaraman Ravindran, Shankar Narasimhan, Accepted for a poster presentation in [Tensor Methods for Emerging Data Science Challenges \(TMEDSC\)](#) workshop in [KDD 2019](#). [\[Slides\]](#)
6. Identification of Output-Error (OE) Models using Generalized Spectral Decomposition, **Deepak Maurya**, Arun K. Tangirala, Shankar Narasimhan, In Fifth Indian Control Conference (ICC 2019) (pp. 28-33), IEEE. Won the [Best Student Paper Award](#). [\[Paper\]](#), [\[Code\]](#), [\[Slides\]](#)
7. Identification of Errors-in-Variables Models Using Dynamic Iterative Principal Component Analysis, **Deepak Maurya**, Arun K. Tangirala, Shankar Narasimhan, Industrial & Engineering Chemistry Research. 2018;57(35):11939-54. [\[Paper\]](#), [\[Code\]](#)
8. Identification of Linear Dynamic Systems using Dynamic Iterative Principal Component Analysis, **Deepak Maurya**, Arun K. Tangirala, Shankar Narasimhan, IFAC-PapersOnLine, 49(7), pp.1014-1019. [\[Paper\]](#), [\[Code\]](#), [\[Slides\]](#)

## 4.2 Manuscript Under Preparation / Submission

1. Degree-corrected SBM for Hypergraphs, **Deepak Maurya**, Balaraman Ravindran
2. An Efficient Certification of Graph Isomorphism on Selected Graph Classes, **Deepak Maurya**, Balaraman Ravindran, Srinivasan Parthasarathy
3. HEAL: Embedding Multi-layer Hypergraphs. Naganand Yadati, Tarun Kumar, **Deepak Maurya**, Partha Talukdar, Balaraman Ravindran
4. Identification of Errors-in-Variables ARX Models Using Modified Dynamic Iterative PCA, **Deepak Maurya**, Arun K. Tangirala, Shankar Narasimhan, [\[arXiv link\]](#)
5. Least squares methods in a Nutshell, **Deepak Maurya**, Shankar Narasimhan
6. Incorporating prior knowledge about structural constraints in model identification, **Deepak Maurya**, Sivadurgaprasad chinta, Abhishek Sivaram, Raghunathan Rengaswamy, [\[arXiv link\]](#)

## RESEARCH PROJECTS

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MS THESIS Jan 2018 to Present	<b>Spectral Hypergraph Theory</b> Guide : <a href="#">Prof. Balaraman Ravindran</a> , <a href="#">Prof. Shankar Narasimhan</a> Utilizing the Laplacian spectrum of hypergraphs represented using tensors for various learning tasks such as hypergraph partitioning, hyperedge prediction, and graph isomorphism. The preliminary version of first two works are accepted in workshops held at <a href="#">NeurIPS 2019</a> , <a href="#">KDD 2019</a> and the extended version is under review.
M.TECH THESIS June 2015 to May 2016	<b>Identification of Linear Dynamic Systems using Dynamic Iterative PCA</b> Guide : <a href="#">Prof. Arun K. Tangirala</a> , <a href="#">Prof. Shankar Narasimhan</a> The work is concerned with identifying linear dynamic models from data that have errors in both outputs and inputs, popularly known as errors-in-variables (EIV) problem. We developed a novel approach in the principal component analysis framework which provides unbiased model with minimal user intervention. The work is published and can be found <a href="#">here</a> .

## SERVICE

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- Co-organizer for [Graphs & more Complex structures for Learning & Reasoning \(GCLR\)](#) workshop held at [AAAI 2021](#)
- Reviewer for [ECML-PKDD 2020](#), [ACODS 2018, 2020](#), [ADCOM 2018](#), [ICC 2019](#)
- Teaching assistant for a MOOC course on Introduction to ML offered on [NPTEL](#) during [July-Oct 2019](#), [Jan-Apr 2020](#), and [July-Dec 2020](#) enrolled by 20K, 30K, and 40K students respectively.

## INDUSTRIAL EXPERIENCE

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DATA SCIENTIST July to Nov 2016	<a href="#">Mad Street Den</a> , Chennai, Mentor: <a href="#">Dr. Aravindakshan Babu</a> Key Performance Indicators - Predictions and Optimizers Prediction of multiple key performance indicators (KPIs) like the number of page-views, add-to-carts for any e-commerce website. We implemented various efficient and scalable time series models using data tables package in R.
PROJECT ASSOCIATE May to Dec 2017	<a href="#">IIT Madras</a> , Chennai, Mentor: <a href="#">Prof. Raghunathan Rengaswamy</a> Aluminium Smelting Furnace I trained a classification and regression model to predict the pot leaks and temperature inside an aluminum smelting furnace, which has been successfully deployed. This project was done in collaboration with General Electric Global Research.

## SCHOLASTIC ACHIEVEMENTS

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- All India Rank in **top 0.64%** in AIEEE 2011 attempted by **1.12M** candidates.
- All India Rank in **top 0.92%** in [IIT-JEE 2011](#) attempted by **485K** candidates.
- All India Rank 451 in **top 0.36%** in GATE 2015 attempted by **126K** candidates.