

Abhisek Dey

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Research Interests

Pattern Recognition in Vision and Text, Document Analysis, Information Extraction and Retrieval, Entity Linking, Multi-modal embeddings.

Working under supervision of Dr. Richard Zanibbi in the **Document and Pattern Recognition Lab** (DPRL) at Rochester Institute of Technology (<https://www.cs.rit.edu/~dpri/>)

Education

Rochester Institute of Technology PhD in Computing and Information Sciences (Jan 2021 – Dec 2024 [Expected])

Rochester Institute of Technology M.S. in Computer Engineering (Dec 2020 | Cum. GPA: 3.86)

Kalinga Institute of Industrial Technology, India B.Tech in Electronics and Telecommunication Engineering (May 2016 | Cum. GPA: 7.46/10)

Publications/Patents/Thesis

Abhisek Dey and Richard Zanibbi, [ScanSSD-XYc: Faster Detection for Math Formulas](#), in ICDAR 2021 Workshops Proceedings (GREC), Lausanne, Switzerland

Ayush Kumar Shah, **Abhisek Dey**, Richard Zanibbi, [A Math Formula Extraction and Evaluation Framework for PDF Documents](#), in ICDAR 2021 Proceedings, Lausanne, Switzerland

Abhisek Dey, [Convex Object Detection](#), a Master's Thesis under supervision of Dr. Raymond Ptucha

Fritz Ebner, **Abhisek Dey**, Karthik Subramanian, [US 11244470](#): Methods and Systems for sensing obstacles in an indoor environment (Xerox Corporation)

Fritz Ebner, **Abhisek Dey**, Karthik Subramanian, [US 11026048](#): Indoor positioning system for a mobile electronic device (Xerox Corporation)

Research Experience

Mathseer Project (Jan 2021 - Current | <https://www.cs.rit.edu/~dpri/mathseer/> | RIT - Penn State)

- Creating a scalable math extraction framework from scientific documents (scans and born-digital PDF) that can extract and parse mathematical information into desired representations for indexing and retrieval. (Open-source project - <https://gitlab.com/dpri/MathSeer-extraction-pipeline>)
- Work with CiteSeerX team at Penn State lead by Dr. C. Lee Giles and Dr. Jian Wu to integrate both, creating an extraction plus retrieval framework

Molecule Maker Lab Project (Jan 2021 - Current | <https://moleculemaker.org/research/discovery> | UIUC – Penn State – RIT)

- Creating a chemical diagram extraction framework from scientific documents (scans and born-digital PDF) to extract and parse chemical diagrams in the desired machine readable representation for indexing and retrieval with the objective of synthesizing old molecules effectively and discovering new molecules
- Collaborate with the data-mining and knowledge representation team at University of Illinois, Urbana Champaign lead by Dr. Jiawei Han and Dr. Heng Ji to integrate the diagram representation framework

with textual and symbolic embeddings creating a unified database of chemical information from multi-modal sources

Teaching Experience

RIT | TA for Multiple Processor Systems CMPE-655 (Aug 2018 - Dec 2018 | Jan 2019 – May 2019)

- Assist students with class assignments and grade them in a timely manner.
- Liaise with Research Computing to address software problems related to using the HPC cluster for completing assignments.

RIT | TA for Deep Learning CMPE-679 (Jan 2019 - May 2019)

- Created two class assignments related to Image Captioning and GAN's which are still being used.
- Assist students with class assignments and quizzes and grade them in a timely manner.
- Create documentation and instructions for efficiently and responsibly using limited GPU resources in the CE cluster towards completing assignments.
- Liaise with Research Computing to address software problems related to using the CE cluster for completing assignments and present potential solutions or workarounds.

Work Experience

Xerox | Deep Learning Software Engineer Intern (May 2019 - May 2020 | Webster, NY)

- Created a mobile app using CoreML to predict absolute indoor monocular depth in real-time with a range of 0 to 35m and a mean error of less than 5%.
- Development included collecting, pre-processing and annotating ground truth RGB-Lidar data and design of a DNN with a novel cost function. (NDA-Patent application filed)
- Designed and developed a real-time indoor office printer detection app using a MobileNetSSDv2 model that had an inference speed of 25 FPS using the TF-Lite Interpreter. (<https://tinyurl.com/printer-tflite>)

D3 Engineering - RIT | Technical Consultant (Dec 2019 - Feb 2020 | Rochester, NY)

- Implement and deploy deep learning model on Texas Instrument's AM57 chip (FPGA) using TI's **TVM optimizer** and TIDL to compile in **ARM**. The model detected defective objects on a production line with more than **92% accuracy**. (NDA)

Ericsson, India | Network Engineer (June 2016 - Feb 2017 | Kolkata, India)

- LTE network remote optimization and scripting for maintenance, new feature roll-out and integration.
- Played a significant role in solving a legacy fallback and call-drop issue in a rugby stadium in Ireland by reducing network drops by **30%**.

Prior Projects and Research

- **Convex Object Detection** – Master's Thesis on creating a new paradigm of object detection where an arbitrary shaped convex hull is regressed for instead of traditional rectangle boxes. (https://github.com/ad4529/convex_object_detection)
- **Common Vector Space based multi-modal classification**– Designed a novel image-text fusion model for multi-modal classification useful for social media analysis. (<https://github.com/ad4529/multi-modal-classification>)

Skills

Python, TensorFlow, Pytorch, Keras, Horovod (Distributed GPU Training), MATLAB, TF-Lite, TVM (Deep Learning Accelerator for TI FPGA and MCU), OpenCV, Git, Docker