

Oyendrila Dobe

GRADUATE STUDENT RESEARCHER

✉ oyendrila.dobe@gmail.com | 🏠 <https://oyendrila-dobe.github.io/> | 📧 oyendrila-dobe | 📄 oyendrila-dobe-400430103/ | 📄 Papers & citations

Summary

I'm a 4th year PhD student researching on **formal verification of hyperproperties on probabilistic systems**. I am interested in designing and implementing algorithms that ensure security and correctness guarantees of systems by automatically reasoning about them.

Education

Michigan State University (Transferred from Iowa State University in 2020)

East Lansing, Michigan, US

PURSuing PHD IN COMPUTER SCIENCE GPA: 3.66/5

2018 - Present

- Taken courses in **Formal methods**, ML, Graph Theory, **Program analysis**, Theory of computation, Algorithms, Computer security.
- **Volunteer in Spartan Girls Who Code** - introducing coding to 6th grade students.
- Have been a **Grace Hopper Scholar** in 2019, 2021.
- Hold position as **graduate student representative** in department and play in Michigan State Badminton team.

MAKAUT

Kolkata, India

BTECH IN COMPUTER SCIENCE AND ENGINEERING GPA: 8.9/10

2013 - 2017

- Have pursued **research in classification and detection of brain tumors** from MRI scans under Dr. Amiya Halder.
- Have published the theory and results in ICACCI'16, ICACCI'17, IICCS'19.

Research

Statistical model checking of Probabilistic hyperproperties on Non-deterministic systems

August 2020 - Current

JOINT WORK WITH INRIA, DUKE UNIVERSITY, TU-WIEN

- Statistical model checking provides a near-accurate result but in less time as compared to exhaustive model checking.
- The challenges in this problem is to **resolve non-determinism**, and to **minimize the number of traces** needed for verification.
- We are currently working on **implementing a solution** to solve this problem by extending existing tool Plasma.

Verifying Probabilistic Hyperproperties on Non-Deterministic & Probabilistic systems

April 2020 - Current

JOINT WORK WITH RWTH-AACHEN, TU-WIEN

- The main challenge here is that it becomes undecidable when trying to resolve non-determinism.
- I have been involved in **creating the algorithm** for the solution and have solely **implemented** it using Python and Z3.
- Our **tool HyperProb** is the only one that can handle alternation of quantifiers and verify probabilistic hyperproperties.
- The tool paper appeared in the proceedings of **FM 2021**.
- We have published the theory for the work in **ATVA 2020** and special issue of **Information and Computing'21** (under review).

Parameter Synthesis of Probabilistic Hyperproperties on Probabilistic systems

November 2019 - March 2020

JOINT WORK WITH RWTH-AACHEN, TU-WIEN

- We tried to **synthesize values for unknown parameters** given a DTMC and a probabilistic hyperproperty it satisfies.
- The challenge lies in the generation of complicated constraints that capture all aspects of the system and the specification.
- I have been involved in **brainstorming the algorithm** for the solution and have solely **implemented** the solution using Python and Z3.
- We have published our theory and results in **LPAR'21**.

Work Experience

Teaching Assistant

COURSES TAUGHT: OBJECT-ORIENTED PROGRAMMING, DATA STRUCTURES, DISCRETE MATH.

Fall'18, Spring'19, Fall'20

Conducted **recitations, and office hours** to help students improve their understanding.

Research Assistant

PROGRAM ANALYSIS RESEARCH LABORATORY (IOWA STATE UNIVERSITY)

Summer'19

- **Explored case studies** to prove the applicability of demand-driven algorithm to generate minimum size executable of c++/c codes.
- Wrote python scripts to **automate testing** across docker containers and VM.

Infosys Limited

Mysore, India

SYSTEMS ENGINEER

October 2017 - May 2018

- Underwent training of object-oriented programming in python, and SAP ABAP.
- Solely handled **implementation of leave system** for new subsidiary of the company using ABAP, directly under team leader.