

# Madhavan R.P

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## Education

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### Iowa State University

PH.D - COMPUTER SCIENCE

GPA 3.83/4.00

Ames, Iowa

June 2021 (expected)

### Anna University

BACHELOR OF ENGINEERING - COMPUTER SCIENCE AND ENGINEERING

Chennai, India

May 2011

## Skills

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**Languages/Tools** Java, Python, C++, C, Git, UNIX Shell

**Areas of Proficiency** Graph-Based & Randomized Algorithms, Data Structures

## Experience

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### Iowa State University

GRADUATE RESEARCHER

Ames, Iowa

July. 2017-present

- Researching novel problems on how to maximally spread information in large social networks.
- Designed an approximate algorithm with an additive error for Budgeted Submodular Maximization under a Sub-modular Constraint.
- Created an efficient probabilistic algorithm to spread information to targeted users while avoiding adversaries - Constrained Influence Maximization (CIM) problem
- Designed an algorithm that improved the information spread by 12% while running almost 100 times faster than the existing state of the art solution.
- Programmed the algorithms in C++ to achieve high practical performance on graphs with 1.6 million nodes and 30 million edges.
- Efficiently used data structures to store the graphs allowing for blazing fast implementations of graph traversal algorithms.

### Iowa State University

GRADUATE TEACHING ASSISTANT

Ames, Iowa

2016-present

- Assisted in several courses including Big Data Algorithms, Design and Analysis of Algorithms, Programming in Java.
- Head TA for an Algorithms course consisting of 300 students and managed 10 Teaching Assistants.
- Gave weekly supplementary instruction to sections of 20-30 students.
- Gave lectures on selected topics in probabilistic algorithms to a graduate level course consisting of 50 students.
- Implemented probabilistic data structures such as Bloom Filters, Count Min Sketch and applied it to create Web Crawlers, Information Retrieval Systems which were used as a benchmark for student submissions.
- Created a framework using a combination of Python scripts and Java programs that automatically graded student programs.

### NP Compete Technologies

TECHNICAL STAFF MEMBER

Chennai, India

Oct. 2011-Sept. 2014

- Developed an Android SDK that enabled businesses to detect user actions and make dynamic UI changes to their existing mobile applications in real-time.
- Designed and implemented a comprehensive testing strategy by writing module-level JUnit tests and defining product-level use case scenarios.
- Defined and created a novel Contact Management application that enabled users to easily access and manage their contacts across various social networks and platforms.
- Implemented a Flask web application to collect user's contact information via OAuth and store it in user's Dropbox.
- Technical lead of a team of 4 programmers, managing product features, software design choices, coding standards and continuous integration.
- Implemented a tool in python that processed and categorized emails using Naive Bayes Classification.
- Initiated a team-wide peer code review practice that contributed to accelerated development.
- Utilized experience in iOS and the Android platform to solve project-specific problems for various development teams.

## Relevant Coursework

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### Iowa State University

Ames, Iowa

MACHINE LEARNING, OPTIMIZATION FOR MACHINE LEARNING, ARTIFICIAL INTELLIGENCE

- Learned fundamental machine learning algorithms - Gradient Descent, Support Vector Machines, Linear Regression. Applied techniques on classification problems using Keras, Scikit-learn.
- Performed theoretical analysis on First-Order Methods - Gradient descent, Stochastic gradient descent.
- Designed and implemented several AI agents by employing classic techniques such as A\* search algorithm, Alpha-beta pruning.

## Extracurricular Activity

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### Computer Science Graduate Student Organization

Ames, Iowa

SENATOR AND COMMITTEE MEMBER

Aug. 2017 - May 2018

- Organized a Research Networking Event that enabled new graduate students to connect with research groups/labs.
- Represented the Computer Science Department as a senator in the Graduate and Professional Student Senate.

### Sankalp at Iowa State University

Ames, Iowa

VOLUNTEER

Dec. 2017 - May 2018

- Volunteer for Sankalp, a student organization raising funds to support developmental, educational projects in India to improve social and economic conditions.
- Conducted a fundraising campaign targeted to faculty of the Computer Science Department to support Daawat 2018, an annual dinner hosted by Sankalp.

### National Society of Black Engineers

Ames, Iowa

GRADUATE STUDENT ADVISOR - IOWA STATE UNIVERSITY CHAPTER

Jan. 2019 - May 2020

- Served on the executive council organizing various networking events.
- Served on the graduate student panel of the Iowa State NSBE Chapter's Graduate School information session.
- Mentored undergraduate students, publicised research opportunities to chapter members.

## Publications and Awards

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- 2018 **IEEE BigData**, "Influence Maximization in Social Networks With Non-Target Constraints" (18.9% acceptance)
- 2018 **Atanasoff Award Winner**, In recognition of Academic, Research performance (1 of 193 graduate students)
- 2020 **IEEE ASONAM**, "Measuring the Impact of Influence on Individuals: Roadmap to Quantifying Attitude" (21% acceptance)