

Curriculum Vitae

Jinqiang Yu

PhD Candidate at Monash University

Email: yuekamkeung@gmail.com

I am passionate about data science and AI areas, in particular Explainable AI. My experience cultivates IT skill as well as further improves my enthusiasm for data-relevant areas. I am currently participating in my PhD project at Monash University in February, supervised by Prof. Peter J. Stuckey and Dr. Alexey

Education / Research Experience

Feb 2021 - Aug 2024

Doctor of Philosophy

*Data science / AI department, Faculty of IT
Monash University, Australia*

Thesis topic

Explainable AI with the Use of Formal Reasoning

Description

Recent years have witnessed rapid advances in Artificial Intelligence (AI) and Machine Learning (ML) algorithms revolutionizing all aspects of human lives. In this project, we focus on developing approaches to generating interpretable ML models, e.g. decision trees, decision sets and decision lists, as well as computing correct and succinct explanations for ML predictions. Many recent works on XAI applied the state-of-the-art SAT and MaxSAT technique, which have proven to be a powerful approach to many practical applications. Therefore and building on the recent advances in the development of incremental reasoning engines, this project applies the state-of-the-art SAT, MaxSAT and SMT solvers to the aforementioned problems arising in the area of XAI.

Principle supervisor
Associate supervisor

Prof. Peter J. Stuckey
Dr. Alexey Ignatiev

Mar 2019 - Dec 2020

Class: H1

Core units

Master of Information Technology

Monash University, Australia

- FIT5202 Data procession for big data
- FIT5211 Algorithm and data structure
- FIT5197 Statistical data modelling
- FIT5149 Applied data analysis
- FIT5216-18 Master minor thesis

Thesis topic

Computing optimal decision sets and lists with SAT

Thesis supervisors

Prof. Peter J. Stuckey, Dr. Alexey Ignatiev, Dr. Pierre Le Bodic

Thesis description

Arguably, the most explainable machine learning models use decision rules. The project focuses on decision sets and decision lists. The study provides the advanced approach to determine minimum-size decision sets and decision lists that achieve minimum empirical risk and then investigate sparse alternatives where we trade accuracy for size. By finding optimal solutions, we show we can build the classifiers that are almost as accurate as the best heuristic methods, but far more concise, and hence more explainable.

Work Experience

Jul 2016 - Mar 2018

Hong Kong Huayi Design Consultants Co., Ltd
Shenzhen, China

Position

Junior Architect

Outline

The two-year experience enabled me to become mature and self-disciplined as well as cultivate my self-study ability. Apart from that, my analytic skills and communicational skills are also further improved. In these two years, I strated to realise the importance of a long-term plan and I found I am particularly interested in IT. Therefore, I decided to quit the job and study at Monash University for getting involved in my interested area, i.e., IT.

Responsibilities

Architectural design, architectural analysis, data processing, instructing interns to complete proposals, proposal presentation

Publication

[CP-2020] **Computing Optimal Decision Sets with SAT**

26th International Conference on Principles and Practice of Constraint Programming (CP 2020)

Jinqiang Yu, Alexey Ignatiev, Peter J. Stuckey, Pierre Le Bodic

Best Paper Award in CP/ML Track

[CoRR-2020] **Optimal Decision Lists using SAT**

CoRR abs/2010.09919

Jinqiang Yu, Alexey Ignatiev, Pierre Le Bodic, Peter J. Stuckey

[JAIR-2021] **Learning Optimal Decision Sets and Lists with SAT**

Journal of Artificial Intelligence Research, 72, 1251-1279, 2021

Jinqiang Yu, Alexey Ignatiev, Peter J. Stuckey, Pierre Le Bodic

[AAAI-2023] **Eliminating The Impossible, Whatever Remains Must Be True**

37th AAAI Conference on Artificial Intelligence (AAAI 2023), 2023

Jinqiang Yu, Alexey Ignatiev, Peter J. Nina Narodytska, Joao Marques-Silva

Scholarship and Awards

2021 - 2025

**Faculty of Information Technology
Research Scholarship**

The scholarship covers living expenses in the whole PhD program.

2021 - 2025

**Faculty of Information Technology
International Postgraduate
Research Scholarship**

The scholarship includes course fees and Overseas Student Health Cover (OSHC) in the whole PhD program.

Aug 2020

Best Paper Award

Our paper 'Computing Optimal Decision Sets with SAT' has been selected for the Best Paper Award for the CP/ML Track of CP 2020.

Professional skills

Proficient in Python, Java, R, SQL and machine learning.

Familiar with Spark, MongoDB, MATLAB, MiniZinc and C++