![ASU] School of Mathematical and Statistical Sciences
Arizona State University

M E M O R A N D U M

DATE: 01/02/2024

TO: Faculty and Students

FROM: Professor(s) Richard Hahn
Chair/Co-Chairs of Meijia Wang
Defense for the PhD in Statistics
Committee Members

Jingyu He
Robert McCulloch
Shiwei Lan
Shuang Zhou

DEFENSE ANNOUNCEMENT

Candidate: Meijia Wang

Defense Date: Friday, January 26, 2024

Defense Time: 4:00 PM

Virtual Meeting Link: https://asu.zoom.us/j/7549591436   Location: Wexler Hall 307 (Tempe)

Title: Computational Challenges in BART Modeling:
Extrapolation, Classification and Causal Inference

Please share this information with colleagues and other students, especially those studying in similar fields. Faculty and students are encouraged to attend. The defending candidate will give a 40-minute talk, after which the committee members will ask questions. There may be time for questions from those in attendance. Guests are primarily invited to attend as observers and will be excused when the committee begins its deliberations or if the committee wishes to question the candidate privately.

ABSTRACT
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ABSTRACT

This dissertation centers on Bayesian Additive Regression Trees (BART) and Accelerated BART (XBART) and presents a series of models that tackle extrapolation, classification, and causal inference challenges. To handle the issue of extrapolation in tree-based models, I propose a method called local Gaussian Process (GP) that combines Gaussian process regression with trained BART models. This allows for extrapolation based on the most relevant data points and covariate variables determined by the tree's structure. The local GP technique is extended to the Bayesian causal forest (BCF) models to tackle positivity violations in causal inference. Additionally, I introduce the LongBet model, which is based on BCF and can estimate time-varying, heterogeneous treatment effects in panel data. Furthermore, I present a Poisson-based model, with a modified likelihood for XBART to address multi-class classification problems.