Senior Thesis Proposal

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Advisors My advisors will be Professor Sara Mathieson and Professor Dianna Xu.

Background Studying inheritance can help us understand how certain traits

It's important to understand inheritance, and one of those ways uses Identical By Descent Segments, segments that can only be inherited from the ancestors instead of Identity by State, which is popular in the population.

Endogamy populations present a unique challenge when it comes to Identical By Descent segments

so much in-group marriages and

shared IBD among founders

Problem Statement have been previous works designed for populations without not much in-group marriages

Motivation maybe these inheritance stuff can lead to bipolar disorder or mood disorder?

Our Contribution what is bonsai: an algorithm that is designed to handle this for population without endogamy.

adopt the bonsai background ibd algorithm to handle endogamy (related individuals)

identify a strategy to select sub groups of families to input into this algorithm.

Works Built Upon IBD algorithm bonsai, use hypothesis testing and probability multiplication from there

thread algorithm and computing probabilities in an endogamous pedigree

phasedibd for detecting shared ibd segments

Risks And Mitigation challenge: implement the probability calculation, but has probabilities functions implemented in another work.

challenge 2: how to pick which individuals? case study first, but hopefully will have a strategy to pick in the future.