Vita

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Universities
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Zhejiang Gongshang University (2017)
Bachelors of Science in Economics

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Masters of Science

Detecting Boundary Errors with Spatial Random Forests

UNIVERSITY OF NEW BRUNSWICK

THESIS DEFENCE AND EXAMINATION

in Partial Fulfillment

of the Requirement for the Degree of
Master of Science

by

Chongfu Huang

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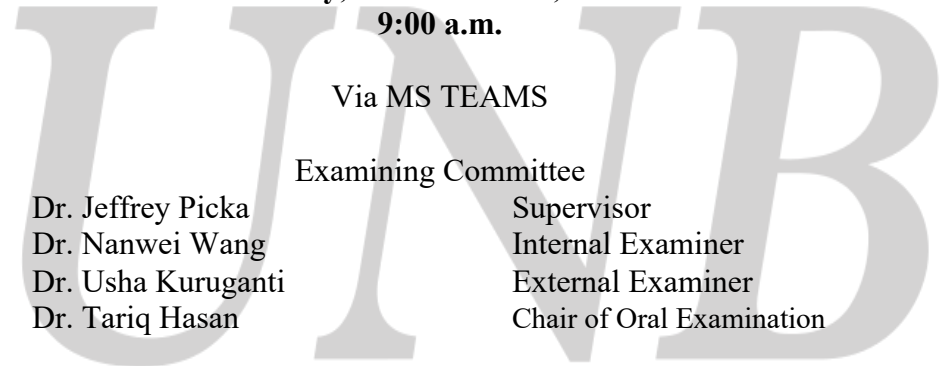
U.N.B., Fredericton, N.B.

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Via MS TEAMS

Examining Committee

Dr. Jeffrey Picka	Supervisor
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Abstract

When observing data at different geographical locations, some categorical variables which define region membership maybe encountered. However, regional boundaries may be hard to correctly define. When using models for responses which are dependent on spatial location and region membership, the mis-specification of region boundaries may have a serious impact on model performance. Diagnostics for detecting issues with mis-specified regional boundaries would be useful in this case. It may be useful to try to amplify these issues by simulating extra observations by some methods that do not rely on a model, but which can choose to make estimates based on some (but not necessarily all) local information. Spatial random forests may be able to do this and we expect they can help us to identify boundary errors. We tried them on simulated data which contains a wrong version of boundaries and a true version of boundaries. The diagnostic performance was investigated by looking for unusual patterns in simulated results of interpolations of those extra unobserved locations. Unfortunately, this approach based on spatial random forests failed to detect boundaries issues.