July 2017
Complexity Community Sharing Session

11 July (Tue) 11.00am – 1.00pm

Seminar Room 102

Blk 1 Innovation Centre, Level 1 (opposite The Hive)
16 Nanyang Drive, Singapore 637722, NTU

Dr. Tak Fung

Temporal Environmental Variability and Patterns of Biodiversity in Tree Communities

Tree communities in forests are buffeted by a variety of environmental disturbances, such as storms, fires and pest outbreaks. How does this temporal environmental variability interact with tree community dynamics to produce emergent patterns of biodiversity? On the one hand, greater temporal environmental variability may result in greater stochastic extinction risk arising from larger fluctuations in species abundances. On the other hand, it may enable temporal niches that confer an advantage on rare species, thus helping to promote the coexistence of species. To examine when each of these two effects predominate, I constructed a stochastic model describing the abundance dynamics of a community of tree species, competing for finite resources in a randomly fluctuating environment. The model predicts that the expected number of species initially increases with greater temporal environmental variability, but then declines. Therefore, the greater stochastic extinction risk posed by increased environmental variability eventually dominates any positive effects on coexistence arising from temporal niche partitioning. I subsequently analysed a global tree dataset to show that tree species richness typically declines with temporal environmental variability. This suggests that real tree communities occupy the declining part of the predicted richness–environmental variability relationship.

Overall, the results demonstrate that future work on patterns of biodiversity needs to consider destabilizing effects of temporal environmental variability on species populations, not just stabilizing effects that form the focus of traditional niche theory.

Dr Tak Fung *works as a postdoc at the National University of Singapore, in Ryan Chisholm's Theoretical Ecology and Modelling Lab. His work mainly involves applying dynamical systems theory to better understand the mechanisms underlying patterns of biodiversity observed in nature. To this end, he has used models to examine the dynamics and patterns of biodiversity in coral reef, marine shelf and now forest ecosystems. Previously, he has worked at University College London and Queen's University Belfast.*

Mr. Łukasz Augustyniak

Extraction of Aspect Hierarchies in Sentiment Analysis

Sentiment analysis of texts means assigning a measure on how positive, neutral or negative the text is. Currently, existing solutions for sentiment annotation offer mostly analysis on the level of entire documents, and sometimes they may go deeper to the level of individual product features (called aspects). Moreover, during the aggregation of aspects the crucial part consists of understanding relations between different aspects, e.g., which aspect is a sub-aspect of another. In my research, I deal with such problems and provide methods to extract and build a hierarchy of aspects. I use Rhetorical Structure Theory and additional resources such as concepts, WordNets and other external data sources to construct, improve and validate derived hierarchies.

Łukasz Augustyniak *is a Research Assistant in Computer Science at the Institute of Informatics, Wroclaw University of Science & Technology (WUST), Poland. He received his MSc in Computer Science from WUST in 2013 with distinction and started his PhD in Computer Science at WUST in 2013. Received an MA in Law from WUST in 2014, his research publications are available in Google Scholar (https://scholar.google.pl/citations?user=o3apDSYAAAAJ&hl=en&oi=ao). His PhD thesis deals with Sentiment Analysis, Machine Learning and Deep Learning. He is the co-founder & CEO of 8thlab – an AI Recommendation Engine. In 8thlab, he and his team fuse different data sources with machine learning to discover and predict hyper-personalised sales recommendations – right person, right place, right time*
During his secondment at NTU, he wants to work on aspect-based sentiment analysis to compare and visualize how the attitude of selected aspects changes over time. Currently, he is working on both opinion (Amazon Data) and press data (such as from EventRegistry system - http://eventregistry.org). Aspects could be not only concepts but also persons/countries/organisations etc. For example, he analysed sentiment on David Cameron and Angela Merkel in Brexit data. It would be great to work with the http://sentic.net team.

NANYANG TECHNOLOGICAL UNIVERSITY SINGAPORE

Organized by: Complexity Institute