Weekly Report (4.18-4.24)[*]

Yanpei Cai[†]

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During the past week, I continued to work on how to implement BOLFI in the parameter estimations of our smoking contagion model, while in the meantime, I attended the Edinburgh Complexity Symposium on Wednesday.

New Ideas

The Spiral of Silence Theory – Björn Ross

The Spiral of Silence Theory suggests that,

- for individuals,

  - they fear isolation;
  - they keep track of the opinions of others on contentious issues;
  - they become more/less likely to express their opinion if they perceive themselves to be in the majority/minority;

- for groups,

  - they converges towards a consensus over time as (perceived) minority is silenced;
  - they may ultimately accept one opinion as the (perceived) majority opinion.

However, (based on my own experience as a novice joining my cohort/research community) individuals who consider themselves as minority in a group can be very sensitive to other minority individuals in their group and so tend to actively engage with other minority individuals, which, may eventually lead to the emergence of a robust minority group. This kind of "active engagement" between minority individuals, can potentially be represented by (1) adding weight value to the link/edge between them; or (2) a rewiring process on their nodes/vertices (as similar as the Watts-Strogatz model).

Context Congruence and Associative Learning – Monica Tamariz

The Context Congruence and Associative Learning model suggests that,

- learning can be via an expert-to-novice context **and** a peer-to-peer context;

[†]Artificial Intelligence and its Applications Institute, School of Informatics, The University of Edinburgh
Email Address: yanpei.cai@ed.ac.uk
[*]This is a summary of the works was done in the past week.

- onward transmission can be an expert-to-novice context **or** a peer-to-peer context.

Based on what this model suggested, we may potentially establish the smoking contagion across different age groups, while in the meantime, we still keep the facts that smoking contagion is more likely to occur between peers. It might be useful to build up the underlying network structure as a grid with peer-to-peer social groups arranged horizontally and expert-to-novice social groups arranged vertically.

Possible Extensions of Smoking Contagion Model

- Inspired by Björn Ross' work (and the SEIR model), it might be more realistic to introduce a more complex mechanism of how agents perform state change (conformity to neighbours vs. self-confidence level).

- Inspired by Monica Tamariz's work, see last subsection.

- Inspired by the SEIR model, it might be more realistic to introduce another state as agents waver between decisions (just like the "exposed" agents in the SEIR model). Doing this way means that we divide the smokers we currently have into short- and long-term smokers, and there should be more state changes between short-term smokers and quitters in both ways (particularly obvious in the context of vaping).

- How to extend the model to capture both smokers and vapers and the state change mechanism between them ? (for discussion)

Coding

No significant progress in coding has been achieved this week.

Maths

Nothing on mathematical derivation or proof has been done this week.

Plan for Next Week

- **Coding**:

  - **BOLFI** settings to cope with inferences for model parameters given the simulated data obtained from simulations.

  - Testing the **BOLFI** implementation to our smoking contagion model.
    IDEA: First, obtain inference for a single parameter by keeping other model parameters and network generation parameters fixed.