MURI 2013 Review

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Overview

development of simulation framework,

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- intra-MURI projects,

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- Experimental options restricted
- So: want simple tool to simulate mechanics

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 - plus computational concerns (e.g., IO, cluster computation)

Simulation Framework Progress

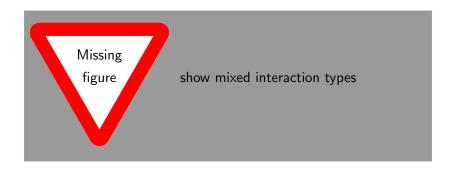
- pprox initial graph generation (on-going work w/ Ed/Edo re correlated interaction types)
- dynamic graph evolution
- √ "message" passing and observation model
- √ agent-to-agent behavior
- agent-to-broadcast (and vv.) behavior
- interventions
- pprox plus computational concerns (e.g., IO, cluster computation)

Results Reported at Sunbelt

Worked w/ Edo & Ed to prepare basic simulated communications

- simple graph generation:
 - mixed interaction types
 - households into communities
 - clandestine manager + cliqued groups of subordinates
- simple message passing "Good" vs. "Bad", time-independent probabilities

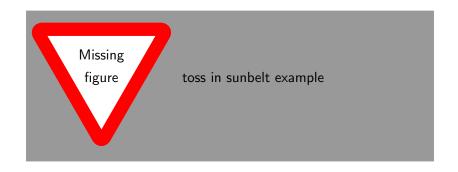
Sample Population Graphs



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Sample Results Analysis



Aside on Results

Measured strategies as TPR and FPR (sensitivity and 1 - specificity) over time, with fixed strategy criteria. ROC could capture TPR vs FPR over criteria – measure ROC scalar (e.g., discrimination) time evolution? Even more complicated surface with several internal setpoints

Intra-MURI Projects

- Airoldi / Kao implement more sophisticated conditional tie generators
- Lazer et al. simulate firm-induced vs background political donations
- ► Shapiro identification with evolving SIMs, and using telephony data to parametrize graph generation

Intra-MURI Project: Lazer et al. Collaboration

Brief Detailed Note

sample a size distribution for firms,

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Brief Detailed Note

- sample a size distribution for firms,
- until desired population size generated
- randomly assign political preferences (A vs. B)¹

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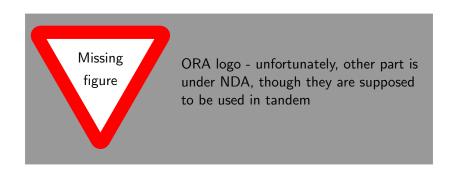
Extra-MURI Projects

- ▶ D. Bright, UNSW agent/process-based models of meth production
- K. Carley, CMU adding broadcast/mean-field perspectives to agent-models
- SAIC/L. Gerdes, USMA geo-temporal hashing, specifically estimating between-observation distribution
- N. Roberts and S. Everton, NPGS dynamic growth of Noordin network
- Assorted EPI cryptic infections (equivalent to rumor spreading source ID), using large Montreal WiFi access metadata

Extra-MURI Projects, David Bright



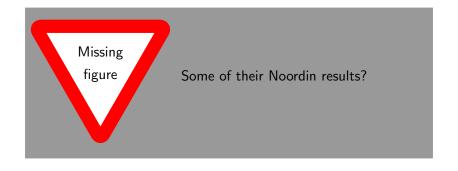
Extra-MURI Projects, Kathleen Carley



Extra-MURI Projects, SAIC/Luke Gerdes



Extra-MURI Projects, Nancy Roberts & Sean Everton



Extra-MURI Projects, EPI

Mostly focused on large, anonymized data set of Montreal municipal WiFi access.

Tracking spread of cryptic pathogen analogous to tracking rumor to source