

Progress Report

Matt Smith

April 20, 2013

Abstract

This project provides a proof-of-concept agent-based model for the problem of how social networking impacts on the behaviour of smoking cessation. By attempting to build a basic model of human smoking behaviours and defining interactions, this model allows for simulations using, in theory, any number of autonomous entities. Through simulations, it appears that the quantity and social location of humans in networks significantly impacts their effect within the graph and, by extension, the quantity of smokers present. Generally, the model shows promise as a proof-of-concept for further development both in the areas of quality of implementation and production of results.

Contents

1	Introduction	2
1.1	Project Overview	2
1.2	Project Rationale	2
2	Research & Literature Review	3
2.1	Overview	3
2.2	Social Networking	3
2.3	Smoking Cessation & Health	3
2.4	Agent-Based Modelling	3
2.5	Similar Work	3
2.6	Summary	3
3	Model Development & Implementation	4
3.1	Overview	5
3.2	Technologies & Tools	5
3.2.1	Repast Symphony	5
3.2.2	JUNG	5
3.2.3	Java	5
3.2.4	Gephi	5
3.3	Model Description	5
3.3.1	Platform	5
3.3.2	Social Network	5
3.3.3	Agent	5
4	Simulation Results & Model Analysis	6
4.1	Overview	6
4.2	Simulation Analysis	6
4.2.1	Simulation Parameters & Agent Attributes	6
4.2.2	Decision Tree Analysis	6
4.2.3	Sampled Networks	6
4.3	Model Analysis	6
4.3.1	Commercial Analysis	6
4.3.2	Model Analysis	6
4.3.3	Further Improvements	6
5	Conclusion	7

Chapter 1

Introduction

1.1 Project Overview

1.2 Project Rationale

Chapter 2

Research & Literature Review

2.1 Overview

2.2 Social Networking

2.3 Smoking Cessation & Health

2.4 Agent-Based Modelling

2.5 Similar Work

2.6 Summary

Chapter 3

Model Development & Implementation

3.1 Overview

3.2 Technologies & Tools

3.2.1 Repast Symphony

3.2.2 JUNG

3.2.3 Java

3.2.4 Gephi

3.3 Model Description

3.3.1 Platform

Input & Output

Simulation Monitoring

Statistics & Constants

3.3.2 Social Network

Representation

Influence

Graph Generation & Sampling

Graph Stability

3.3.3 Agent

Attributes

Action Overview

Neighbourhood Actions

Decision Tree Actions

Connection Reconfiguration Actions

Chapter 4

Simulation Results & Model Analysis

4.1 Overview

4.2 Simulation Analysis

4.2.1 Simulation Parameters & Agent Attributes

4.2.2 Decision Tree Analysis

4.2.3 Sampled Networks

4.3 Model Analysis

4.3.1 Commercial Analysis

4.3.2 Model Analysis

4.3.3 Further Improvements

Chapter 5

Conclusion

Bibliography