**CSC-450: Understanding Abstracts**

**Group Members:** add group members here

**Directions:** Breakdown the structure of **4** (out of 5) of the abstracts below. Each sentence will describe one or more of the following:

1. Relevant *background* required to understand the purpose or nature of the study
2. The *significance* of the project, the *problem* being addressed, the *objective*, or the *hypothesis* (question) under investigation
3. The *methods* used to address the problem, meet the objective, test the hypothesis, or answer the question.
4. *Results* obtained by following the methods (which may or may not be directly stated) of the investigation.
5. *Not relevant* at all to the project at hand.

In the table below, state whether the sentence describes *background, significance,* an *objective,* or *hypothesis, methods*, or *results* (a sentence may describe more than one). A good abstract will contain at least one sentence corresponding to (1-4). When you are finished, *one* person from your group should e-mail me the assignment.

**1) Human genomes as email attachments**

The amount of genomic sequence data being generated and made available through public databases continues to increase at an ever-expanding rate. Downloading, copying, sharing and manipulating these large datasets are becoming difficult and time consuming for researchers. We need to consider using advanced compression techniques as part of a standard data format for genomic data. The inherent structure of genome data allows for more efficient lossless compression than can be obtained through the use of generic compression programs. We apply a series of techniques to James Watson’s genome that in combination reduce it to a mere 4MB, small enough to be sent as an email attachment.

Christley, S., Lu, Y., Li, C. & Xie, X. Human genomes as email attachments. *Bioinformatics* **25,** 274–275 (2009).

|  |  |
| --- | --- |
| The amount of genomic sequence data being generated and made available through public databases continues to increase at an ever-expanding rate. |  |
| Downloading, copying, sharing and manipulating these large datasets are becoming difficult and time consuming for researchers. |  |
| We need to consider using advanced compression techniques as part of a standard data format for genomic data. |  |
| The inherent structure of genome data allows for more efficient lossless compression than can be obtained through the use of generic compression programs. |  |
| We apply a series of techniques to James Watson’s genome that in combination reduce it to a mere 4MB, small enough to be sent as an email attachment. |  |

**2) Experimental evidence of massive-scale emotional contagion through social networks**

Emotional states can be transferred to others via emotional contagion, leading people to experience the same emotions without their awareness. Emotional contagion is well established in laboratory experiments, with people transferring positive and negative emotions to others. Data from a large real-world social network, collected over a 20-y period suggests that longer-lasting moods (e.g., depression, happiness) can be transferred through networks [Fowler JH, Christakis NA (2008) BMJ 337:a2338], although the results are controversial. In an experiment with people who use Facebook, we test whether emotional contagion occurs outside of in-person interaction between individuals by reducing the amount of emotional content in the News Feed. When positive expressions were reduced, people produced fewer positive posts and more negative posts; when negative expressions were reduced, the opposite pattern occurred. These results indicate that emotions expressed by others on Facebook influence our own emotions, constituting experimental evidence for massive-scale contagion via social networks. This work also suggests that, in contrast to prevailing assumptions, in-person interaction and nonverbal cues are not strictly necessary for emotional contagion, and that the observation of others’ positive experiences constitutes a positive experience for people.

Kramer, A. D. I., Guillory, J. E. & Hancock, J. T. Experimental evidence of massive-scale emotional contagion through social networks. *PNAS* **111,** 8788–8790 (2014).

|  |  |
| --- | --- |
| Emotional states can be transferred to others via emotional contagion, leading people to experience the same emotions without their awareness. |  |
| Emotional contagion is well established in laboratory experiments, with people transferring positive and negative emotions to others. |  |
| Data from a large real-world social network, collected over a 20-y period suggests that longer-lasting moods (e.g., depression, happiness) can be transferred through networks [Fowler JH, Christakis NA (2008) BMJ 337:a2338], although the results are controversial. |  |
| In an experiment with people who use Facebook, we test whether emotional contagion occurs outside of in-person interaction between individuals by reducing the amount of emotional content in the News Feed. |  |
| When positive expressions were reduced, people produced fewer positive posts and more negative posts; when negative expressions were reduced, the opposite pattern occurred. |  |
| These results indicate that emotions expressed by others on Facebook influence our own emotions, constituting experimental evidence for massive-scale contagion via social networks. |  |
| This work also suggests that, in contrast to prevailing assumptions, in-person interaction and nonverbal cues are not strictly necessary for emotional contagion, and that the observation of others’ positive experiences constitutes a positive experience for people. |  |

**3) Measuring User Confidence in Smartphone Security and Privacy**

In order to direct and build an effective, secure mobile ecosystem, we must first understand user attitudes toward security and privacy for smartphones and how they may differ from attitudes toward more traditional computing systems. What are users’ comfort levels in performing different tasks? How do users select applications? What are their overall perceptions of the platform? This understanding will help inform the design of more secure smartphones that will enable users to safely and confidently benefit from the potential and convenience offered by mobile platforms. To gain insight into user perceptions of smartphone security and installation habits, we conduct a user study involving 60 smartphone users. First, we interview users about their willingness to perform certain tasks on their smartphones to test the hypothesis that people currently avoid using their phones due to privacy and security concerns. Second, we analyze why and how they select applications, which provides information about how users decide to trust applications. Based on our findings, we present recommendations and opportunities for services that will help users safely and confidently use mobile applications and platforms.

Chin, E., Felt, A. P., Sekar, V. & Wagner, D. Measuring User Confidence in Smartphone Security and Privacy. in *Proceedings of the Eighth Symposium on Usable Privacy and Security* 1:1–1:16 (ACM, 2012). doi:10.1145/2335356.2335358

|  |  |
| --- | --- |
| In order to direct and build an effective, secure mobile ecosystem, we must first understand user attitudes toward security and privacy for smartphones and how they may differ from attitudes toward more traditional computing systems. What are users’ comfort levels in performing different tasks? How do users select applications? What are their overall perceptions of the platform? |  |
| This understanding will help inform the design of more secure smartphones that will enable users to safely and confidently benefit from the potential and convenience offered by mobile platforms. |  |
| To gain insight into user perceptions of smartphone security and installation habits, we conduct a user study involving 60 smartphone users. |  |
| First, we interview users about their willingness to perform certain tasks on their smartphones to test the hypothesis that people currently avoid using their phones due to privacy and security concerns. |  |
| Second, we analyze why and how they select applications, which provides information about how users decide to trust applications. |  |
| Based on our findings, we present recommendations and opportunities for services that will help users safely and confidently use mobile applications and platforms. |  |

**4) Towards detecting influenza epidemics by analyzing Twitter messages**

Rapid response to a health epidemic is critical to reduce loss of life. Existing methods mostly rely on expensive surveys of hospitals across the country, typically with lag times of one to two weeks for influenza reporting, and even longer for less common diseases. In response, there have been several recently proposed solutions to estimate a population's health from Internet activity, most notably Google's Flu Trends service, which correlates search term frequency with influenza statistics reported by the Centers for Disease Control and Prevention (CDC). In this paper, we analyze messages posted on the micro-blogging site Twitter.com to determine if a similar correlation can be uncovered. We propose several methods to identify influenza-related messages and compare a number of regression models to correlate these messages with CDC statistics. Using over 500,000 messages spanning 10 weeks, we find that our best model achieves a correlation of .78 with CDC statistics by leveraging a document classifier to identify relevant messages.

1.

Culotta A. Towards Detecting Influenza Epidemics by Analyzing Twitter Messages. In: Proceedings of the First Workshop on Social Media Analytics [Internet]. New York, NY, USA: ACM; 2010. p. 115–22. Available from: <http://doi.acm.org/10.1145/1964858.1964874>

|  |  |
| --- | --- |
| Rapid response to a health epidemic is critical to reduce loss of life. |  |
| Existing methods mostly rely on expensive surveys of hospitals across the country, typically with lag times of one to two weeks for influenza reporting, and even longer for less common diseases. |  |
| In response, there have been several recently proposed solutions to estimate a population's health from Internet activity, most notably Google's Flu Trends service, which correlates search term frequency with influenza statistics reported by the Centers for Disease Control and Prevention (CDC). |  |
| In this paper, we analyze messages posted on the micro-blogging site Twitter.com to determine if a similar correlation can be uncovered. |  |
| We propose several methods to identify influenza-related messages and compare a number of regression models to correlate these messages with CDC statistics. |  |
| Using over 500,000 messages spanning 10 weeks, we find that our best model achieves a correlation of .78 with CDC statistics by leveraging a document classifier to identify relevant messages. |  |

# 5) Counterflow model for agent-based simulation of crowd dynamics

Agent-based crowd models describe pedestrians as autonomous interacting agents. Current models take into account the physical contact forces occurring in a crowd, but the description of many behavioural actions is still a challenge. This paper presents a model for agents’ behaviour in counterflow situations, where they try to avoid collisions with oncoming agents. In the model, the agents observe the walking directions of the agents in front of them and choose their own actions accordingly. We implement the model to the widely used social force model, which describes the motion of each agent in a Newtonian manner. Nevertheless, the basic idea of the counterflow model can be used with various modelling platforms. We study the effects of the model’s parameters with Monte Carlo simulations and justify our selection of their values. Simulation results are compared with previously published experimental data and the results match well.1.

1.

Heliövaara S, Korhonen T, Hostikka S, Ehtamo H. Counterflow model for agent-based simulation of crowd dynamics. Building and Environment. 2012 Feb;48:89–100.

|  |  |
| --- | --- |
| Agent-based crowd models describe pedestrians as autonomous interacting agents. |  |
| Current models take into account the physical contact forces occurring in a crowd, but the description of many behavioural actions is still a challenge. |  |
| This paper presents a model for agents’ behaviour in counterflow situations, where they try to avoid collisions with oncoming agents. In the model, the agents observe the walking directions of the agents in front of them and choose their own actions accordingly. |  |
| We implement the model to the widely used social force model, which describes the motion of each agent in a Newtonian manner. |  |
| Nevertheless, the basic idea of the counterflow model can be used with various modelling platforms. |  |
| We study the effects of the model’s parameters with Monte Carlo simulations and justify our selection of their values. |  |
| Simulation results are compared with previously published experimental data and the results match well. |  |