WRITING THE ARTICLE

Dr. Garrett Dancik

Research Article – Basic Format

- Abstract: mini version of article
- Introduction
  - Background Information
  - Problem statement or hypothesis
  - Significance
- Materials and Methods
  - <u>How</u> was the research carried out?
  - Sufficient detail is provided so study can be <u>repeated</u>
    - All experiments and observational studies are explained
    - Statistical, mathematical or computational methods are explained and referenced if appropriate

Research Article – Basic Format

- Results
  - An unbiased presentation of the results obtained from carrying out the methods
  - Graphs and tables should be used to present results
  - If the paper describes a new method, tool, or program, that would be described here
- Discussion
  - Implications of the results are put into the context of the discipline
  - The significance of the results are discussed
  - Limitations of the study are discussed
  - Possible extensions and future work are discussed

Outline of Hypothetical Example – GD sort vs. quick sort

- ## Introduction
  - ### Background Information
    - Sorting elements alphabetically or by value is a common problem in computer science
    - Common sorting algorithms include….
  - ### Problem statement or hypothesis
    - Slow sorting algorithms can slow down programs and limit analyses that depend on sorting, particularly for large datasets
  - ### Significance
    - The development of a faster sorting algorithm would allow for more rapid sorting of large datasets that currently cannot be sorted in a reasonable time

Outline of Hypothetical Example – GD sort vs. quick sort

- ## Materials and Methods
  - All sorting algorithms are implemented in C++, compiled using Microsoft Visual Studio 2014, and tested on machines running Windows 8.1 with a 4th Generation Intel® Core™ i3-4160 Processor.
  - For quicksort, implementation in library XXX was used
  - Running times are compared using the two-sample t-test.

Outline of Hypothetical Example – GD sort vs. quick sort

- Results
  - Description of GD-sort, with Figure showing pseudocode
  - Theoretical running time of GD-sort is derived
  - Graphs comparing GD-sort with quick-sort
    - On 1 billion randomly generated numbers between -1 million and + 1 million
    - On 1 billion randomly generated character strings of sizes 10-20.
  - In both cases, GD-sort is significantly faster than quick-sort

Outline of Hypothetical Example – GD sort vs. quick sort

- Discussion
  - Theoretical running time shows GD-sort has faster average running time than quicksort
  - Experimental results confirm these findings in the datasets we looked at
  - Related work
    - references indicating quicksort is 'best' or most popular
    - References that quick sort can be improved with multiple pivots (as could possibly GD-sort)
  - Limitations / future work –
    - It remains to be seen how
      - GD-sort performs on nearly sorted datasets
      - Changing the pivot used in GD-sort effects the running time

The FB study

- Introduction
  - Background Information
    - No evidence of social contagions without direct interactions
    - Even then, many studies are observational, not experimental
    - Research suggests that exposure to happiness can be depressing
    - FB must decide what content to show or omit from a person's newsfeed
  - Problem statement or hypothesis
    - Does exposure to positive/negative posts change the emotional content of posts of a user.
  - Significance
    - Emotional states can be transferred to others in the absence of direct interaction

The FB study

- Materials and Methods (paper does not make this explicit)
  - Posts are deemed positive or negative based on Linguisitc Inquiry and Word Count software
  - Experiment:
    - Control – a proportion of posts eliminated at random
    - Treatment – a proportion of positive or negative posts were eliminated at random
- Results
  - Figure showing that
    - Individuals with positive posts reduced post fewer positive words
    - Individuals with negative posts reduced post more negative words
  - Withdrawal effect – users viewing fewer emotional posts were less expressive

The FB study

- Discussion
  - Results contrast with other studies suggesting that viewing positive posts has an adverse effect
  - First experimental evidence of emotional contagion
  - Related work
    - Description of linguistic inquiry and word count tool and studies supporting its accuracy
    - FB content directly effects voter turnout
  - Limitations
    - Emotional content of FB posts do not necessarily reflect emotional status of the poster
    - Effect sizes (changes) are small, but small effect sizes not negligible when social network is so large