Use Cases in Big Data Software and Analytics

Bloomington, Indiana

Sunday 22$^{\text{nd}}$ October, 2017, 09:31

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Big Data Analysis for Computer Network Defense

Jordan Simmons

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ABSTRACT

Computer security threats and attacks are constantly evolving. Everyday, hackers are creating new techniques to bypass network security for the purpose of malicious attacks. To keep up with the changing intrusion technologies, the technologies that defend these attacks need to constantly evolve also. Modern day technologies use deep learning techniques to monitor network activity, and detect malicious code. We will provide an overview of network security and modern technologies being used to protect computer systems and networks.

KEYWORDS

i523,HID336, Computer Network Security, Big Data Analysis, Deep Learning, Intrusion Detection Systems,

1 INTRODUCTION

Everyday a different computer network is being breached with the intent to cause harm to the system or to steal valuable data. Computer hackers are constantly creating new ways to evade network security and create malicious code that can not be detected by security systems. As malicious technologies continue to advance, the technologies that defend against these technologies need to adapt with these advances. The problem with computer network defence is that the technologies used to breach systems constantly change. Once a solution is created to defend a technology, a new malicious technology could be created the next day. Today many security specialist are using deep learning technologies to monitor network intrusions, and detect malicious code. In order to better understand computer network defense, an overview of modern attacks, network data collection processes, and the technologies used to analyze network data is provided.

2 MODERN NETWORK ATTACKS

3 NETWORK DATA COLLECTION

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4 NETWORK DATA ANALYSIS

5 CONCLUSION

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Big Data for Edge Computing

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ABSTRACT

This paper provides a sample of a LaTeX document which conforms, somewhat loosely, to the formatting guidelines for ACM SIG Proceedings.

KEYWORDS

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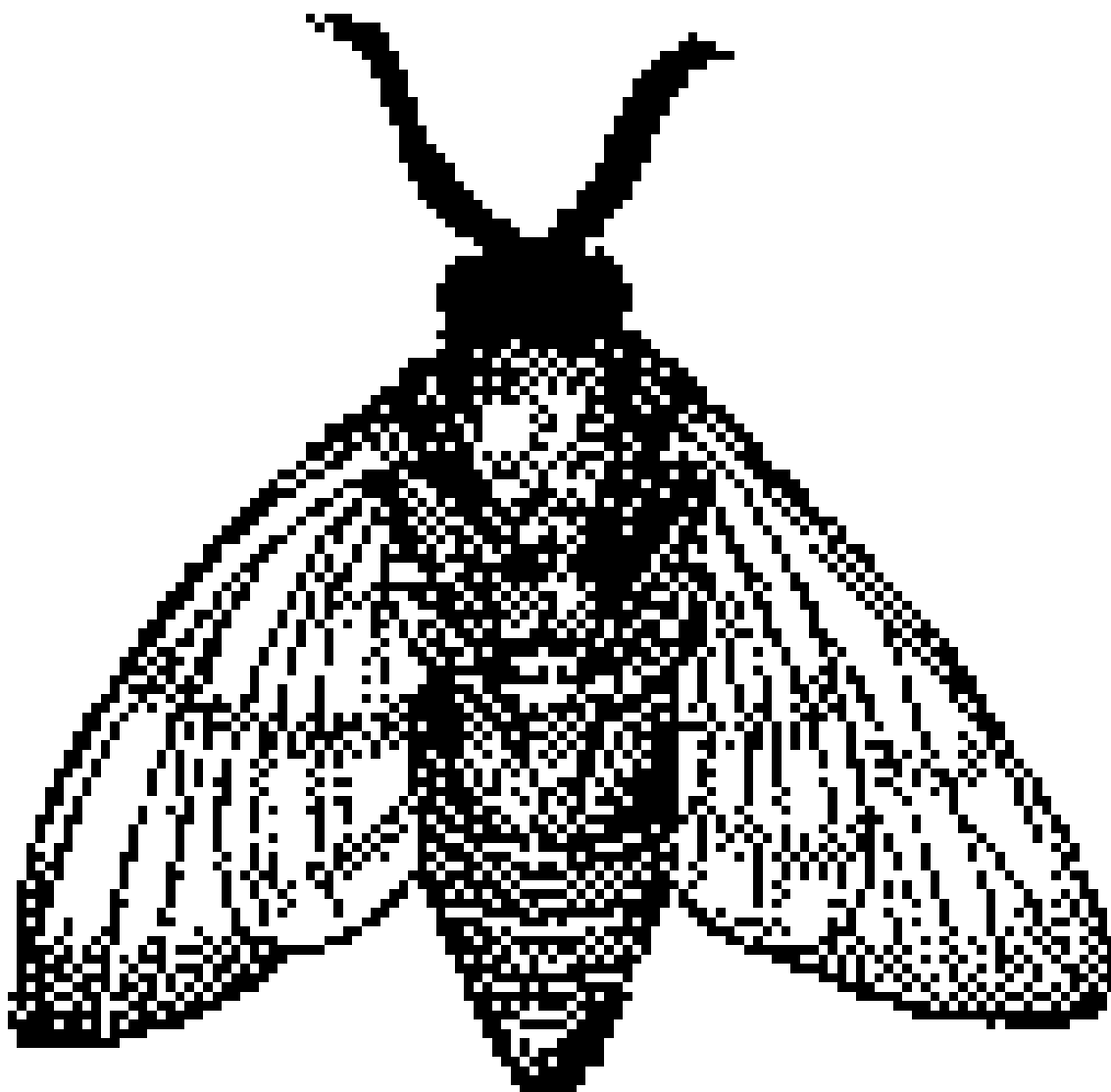**Figure 1: Example caption**

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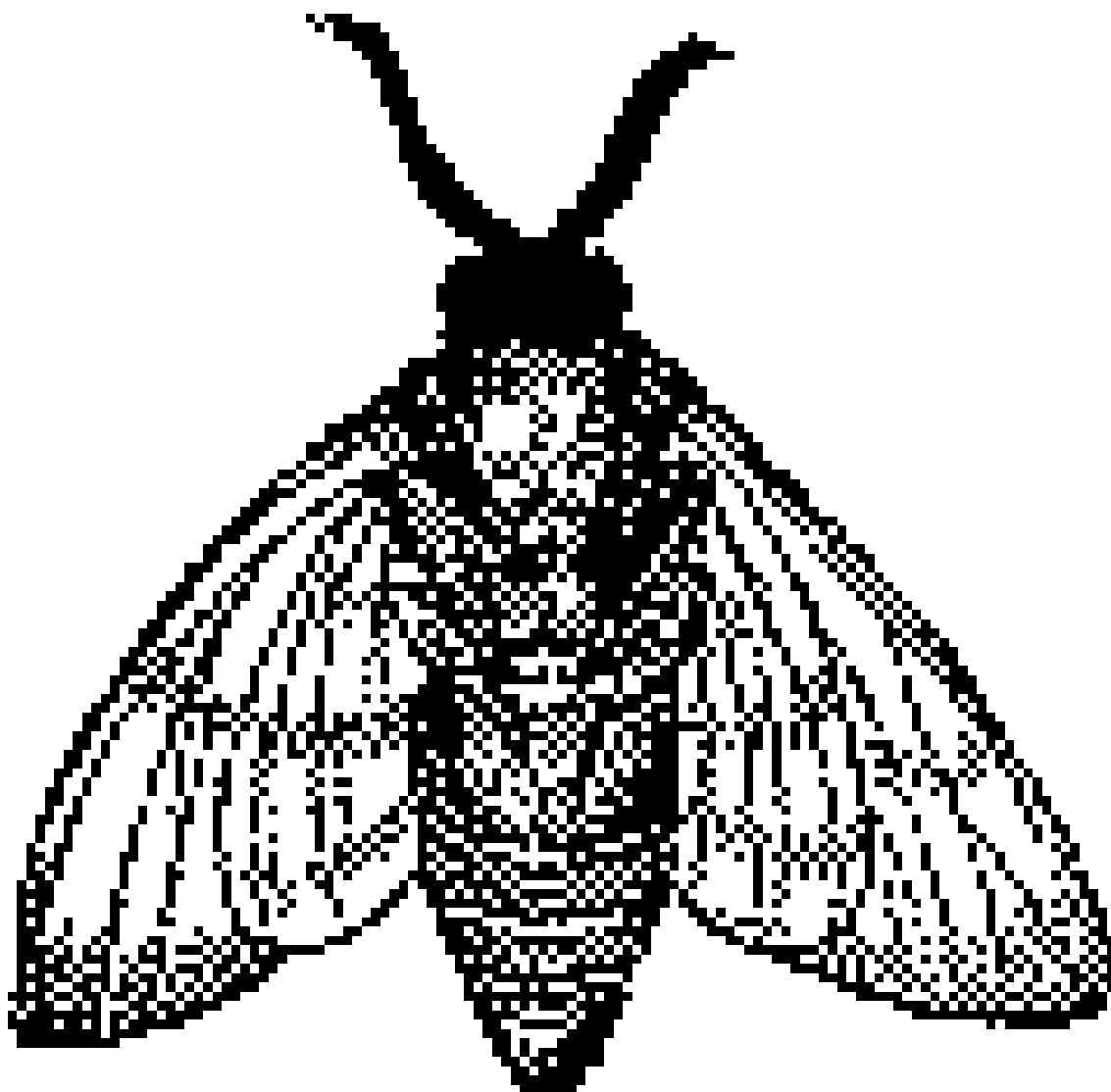LIST OF FIGURES

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6

Big Health Data from Wearable Electronic Sensors (WES) and the Treatment of Opioid Addiction

Sean M. Shiverick
Indiana University Bloomington
smshiver@indiana.edu

ABSTRACT

Wearable electronic sensors (WES) generate to collect vital health data in the treatment of opioid addiction.

KEYWORDS

Big Data Applications, Health Analytics, Wearable Sensors, i535, HID335

1 INTRODUCTION

Wearables and the Internet of Things for Health,

In the increasingly connected digital age, personal electronic devices are generating tremendous volumes of data with important applications for health analytics. Wearable electronic sensors (i.e., *wearables*) and fitness monitors (e.g, FitBit, iWatch) can record our movements and vital physiological measures such as heart rate, temperature, and blood pressure [4]. Consumers are using wearables to self-monitor stress and hypertension. In addition, wearable sensors can be used to help track recovery following medical procedures such as surgery [1]. Emerging forms of personalized health care are arising in which individuals self-monitor and manage their own health in partnership with care providers.

1.1 Drug Addiction as an Illness

For millions of people struggling with substance abuse and dependency in the U.S., addiction and relapse are chronic health conditions [2]. Drug addiction has many similar characteristics to other chronic medical illnesses; however, there are unique challenges to the treatment of addiction illnesses. For example, drug addicted patients undergo intense detoxification in rehabilitation treatment programs, but then are released back into the same environment associated with their drug use. The lack of continuity in the treatment of addiction disorders, leaves addicts in recovery at high risk for relapse into substance use and abuse. Second, individuals with addiction disorders present for care to emergency rooms after acute intoxication, often following law enforcement interventions. Emergency personal and very capable at crisis intervention for drug overdose, but lack resources to evaluate severe addiction disorders or provide follow-up. Furthermore, addicted individuals seeking treatment often relapse at night or on weekends when treatment centers are not open. Various theories of addiction and relapse have been proposed. According to the classical conditioning model, situational cues or events can elicit a motivational state underlying relapse to drug use. A slightly more complex model suggests that addictive behavior can be reinstated after extinction of dependency by exposure to drugs, drug-related cues, or environmental stressors [9]. Understanding that a user's affective response to cues in the environmental can lead to relapse and drug use are key to developing strategies for prevention and treatment.

1.2 Medication Abuse and Opioid Addiction

The nature of the opioid epidemic

Advances in the Psychosocial Treatment of Addiction The Role of Technology in the Delivery of Evidence-Based Psychosocial Treatment [8]

1.3 Mobile Addiction Interventions

Mobile health applications (i.e., apps) have been used for public health education, remote monitoring, data collection, diagnostics, in the treatment of Drug Abuse and Addiction [2].

Wireless Technologies, Ubiquitous Computing and Mobile Health: Application to Drug Abuse Treatment and Compliance with HIV Therapies [2]

Leveraging Technology to enhance addiction treatment and recovery [7]

Contributions of mobile technologies to addiction research [10]

Potential Roles for New Communication Technologies in Treatment of Addiction [6]

A smartphone application to support recovery from alcoholism: A randomized controlled trial [5]

1.4 Wearable Sensors

Real-Time Mobile Detection of Drug Use with Wearable Biosensors: A Pilot Study [3]

1.5 LoRa Backscatter and tattoo sensors

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1.6 Psychosocial Interventions for Addiction Treatment

2 FIGURES

just columwidth that the size of the figure will change to the columnwidth of the paper once we change the layout to final. CHnaging the layout to final should not be done by you. All figures will be listed at the end.

When copying the example, please do not check in the images from the examples into your images directory as you will not need them for your paper. Instead use images that you like to include. If you do not have any images, do not dreate the images folder.

3 TABLES

In case you need to create tables, you can do this with online tools (if you do not mind sharing your data) such as google for them). They even allow you to manage tables as CSV.

Note that the caption is before the tabular environment.

4 LONG EXAMPLE

If you like to see a more elaborate example, please look at report-long.tex.

5 CONCLUSION

Put here an conclusion. Conlcusions and abstracts must not have any citations in the section.

ACKNOWLEDGMENTS

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We include an appendix with common issues that we see when students submit papers. One particular important issue is not to use the underscore in bibtex labels. Sharelatex allows this, but the proceedings script we have does not allow this.

When you submit the paper you need to address each of the items in the issues.tex file and verify that you have done them. Please do this only at the end once you have finished writing the paper. To d this cange TODO with DONE. However if you check something on with DONE, but we find you actually have not executed it correcty, you will receive point deductions. Thus it is important to do this correctly and not just 5 minutes before the deadline. It is better to do a late submission than doing the check in haste.

Natural Language Processing (NLP) to analyze human speech data

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ABSTRACT

Extracting meaningful information from large volumes of unstructured human language is a challenging big data problem.

KEYWORDS

i523, HID333, HID337, Natural Language Processing

1 INTRODUCTION

2 TODO SECTION1

3 TODO SECTION2

4 TODO SECTION3

5 CONCLUSION

ACKNOWLEDGMENTS

REFERENCES

A ISSUES

DONE:

> Example of done item: Once you fix an item, change TODO to DONE

A.1 Assignment Submission Issues

> Do not make changes to your paper during grading, when your repository should be frozen.

A.2 Uncaught Bibliography Errors

> Missing bibliography file generated by JabRef

> Bibtex labels cannot have any spaces, _ or & in it

> Citations in text showing as [?]: this means either your report.bib is not up-to-date or there is a spelling error in the label of the item you want to cite, either in report.bib or in report.tex

A.3 Formatting

> Incorrect number of keywords or HID and i523 not included in the keywords

> Other formatting issues

A.4 Writing Errors

> Errors in title, e.g. capitalization

> Spelling errors

> Are you using *a* and *the* properly?

> Do not use phrases such as *shown in the Figure below.* Instead, use *as shown in Figure 3,* when referring to the 3rd figure

> Do not use the word *I* instead use *we* even if you are the sole author

> Do not use the phrase *In this paper/report we show* instead use *We show.* It is not important if this is a paper or a report and does not need to be mentioned

> If you want to say *and* do not use *&* but use the word *and*

> Use a space after . , :

> When using a section command, the section title is not written in all-caps as format does this for you

`\section{Introduction}` and NOT `\section{INTRODUCTION}`

A.5 Citation Issues and Plagiarism

> It is your responsibility to make sure no plagiarism occurs. The instructions and resources were given in the class

> Claims made without citations provided

> Need to paraphrase long quotations (whole sentences or longer)

> Need to quote directly cited material

A.6 Character Errors

> Erroneous use of quotation marks, i.e. use "quotes" , instead of " "

> To emphasize a word, use *emphasize* and not "quote"

> When using the characters & # % _ put a backslash before them so that they show up correctly

> Pasting and copying from the Web often results in non-ASCII characters to be used in your text, please remove them and replace accordingly. This is the case for quotes, dashes and all the other special characters.

If you see a ffigure and not a figure in text you copied from a text that has the fi combined as a single character

A.7   Structural Issues

Acknowledgement section missing

Incorrect README file

In case of a class and if you do a multi-author paper, you need to add an appendix describing who did what in the paper

The paper has less than 2 pages of text, i.e. excluding images, tables and figures

The paper has more than 6 pages of text, i.e. excluding images, tables and figures

Do not artificially inffate your paper if you are below the page limit

A.8   Details about the Figures and Tables

Capitalization errors in referring to captions, e.g. Figure 1, Table 2

Do use *label* and *ref* to automatically create figure numbers

Wrong placement of figure caption. They should be on the bottom of the figure

Wrong placement of table caption. They should be on the top of the table

Images submitted incorrectly. They should be in native format, e.g. .graffle, .pptx, .png, .jpg

Do not submit eps images. Instead, convert them to PDF

The image files must be in a single directory named "images"

In case there is a powerpoint in the submission, the image must be exported as PDF

Make the figures large enough so we can read the details. If needed make the figure over two columns

Do not worry about the figure placement if they are at a different location than you think. Figures are allowed to ffoat. For this class, you should place all figures at the end of the report.

In case you copied a figure from another paper you need to ask for copyright permission. In case of a class paper, you must include a reference to the original in the caption

Remove any figure that is not referred to explicitly in the text (As shown in Figure ..)

Do not use textwidth as a parameter for includegraphics

Figures should be reasonably sized and often you just need to add columnwidth

e.g.

```
/includegraphics[width=\columnwidth]{images/myimage.pdf}
```

re

2