AUTOMATIC DETECTION OF CYBER SECURITY EVENTS FROM TURKISH TWITTER STREAM AND TURKISH NEWSPAPER DATA

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# ABSTRACT

AUTOMATIC DETECTION OF CYBER SECURITY EVENTS FROM TURKISH TWITTER STREAM AND TURKISH NEWSPAPER DATA

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May 2019, XX pages

Thesis Abstract – max 250 words

Everyday, security experts face a growing number of security events that affecting people

well-being, their information systems and sometimes the critical infrastructure. The sooner they

can detect and understand these threats, the more they can mitigate and forensically investigate

them. Therefore, they need to have a situation awareness of the existing security events and their

possible effects. However, given the large number of events, it can be difficult for security analysts

and researchers to handle this flow of information in an adequate manner and answer the following

questions in near real-time: what are the current security events? How long they last? In this thesis,

we will try to answer these issues by leveraging social networks that contain a massive amount

of valuable information on many topics. However, because of the very high volume, extracting

meaningful information can be challenging. For this reason, we propose SONAR: an automatic,

self-learned framework that can detect, geolocate and categorize cyber security events in near real

time over the Twitter stream. SONAR is based on a taxonomy of cyber security events and a set

of seed keywords describing type of events that we want to follow in order to start detecting events.

Using these seed keywords, it automatically discovers new relevant keywords such as malware

names

to enhance the range of detection while staying in the same domain.

SONAR could efficiently and effectively detect, categorize and monitor cyber security related

events before getting on the security news, and it could automatically discover new security

terminologies with their event. Additionally, SONAR is highly scalable and customizable by

design; therefore we could adapt SONAR framework for virtually any type of events that experts

are interested in.

Keywords: xx, yy, zz… (max 5 keywords)

# ÖZ

TÜRKÇE TWITTER AKIŞI VE TÜRKÇE GAZETE VERİLERDEN SİBER GÜVENLİK OLAYLARININ OTOMATİK TESPİT EDİLMESİ

Ural, Özgür

Yüksek Lisans, Siber Güvenlik Bölümü

Tez Yöneticisi: Yrd. Doç. Dr. Cengiz Acartürk

Mayıs 2019, XX sayfa

Tez özeti – en fazla 250 kelime

Sizinle yaptığımız son görüşmemizde belirlemiş olduğumuz kelimelerin (siber saldırı, ddos, hacklendi gibi) Türkçe tweetlerde kullanım sıklığı frekansını belli periyotlarda karşılaştırarak kelimelerin kullanım sıklığının artması ile siber güvenlik olayları arasında bir korelasyon olup olmayacağının araştırılması ile ilgili geliştirdiğim yazılımın demosunu yapmıştım.

Anahtar Sözcükler: xx, yy, zz… (en fazla 5 anahtar kelime)

# DEDICATION

To My Family

# ACKNOWLEDGMENTS

First of all, I would like to express …..

Besides my supervisor, I would like to thank …..

I would also like to thank all of colleagues from …..

To my wife, …..

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# LIST OF ABBREVIATIONS

|  |  |
| --- | --- |
| **BART** | Balloon Analog Risk Task |
| **BIAS** | Behavioral Investment Allocation Strategy |
| **CCT** | Columbia Card Task |
| **CGT** | Cambridge Gambling Task |
| **DLPFC** | Dorso-Lateral Pre-Frontal Cortex |
| **DMPFC** | Dorso-medial Pre-Frontal Cortex |
| **DOSPERT** | Domain Specific Risk Taking |
| **EEG** | Electro-Encephalography |
| **EV** | Expected Value |
| **fMRI** | Functional Magnetic Resonance Imaging |
| **fNIRS** | Functional Near-Infrared Spectroscopy |
| **GLM** | General Linear Model |
| **GUI** | Graphical User Interface |
| **HCI** | Human-Computer Interaction |
| **HMM** | Hidden Markov Model |
| **IGT** | Iowa Gambling Task |
| **ISI** | Inter-Stimulus Interval |
| **LC** | Locus Coeruleus |
| **m-BART** | Modified Balloon Analog Risk Task |
| **NA** | Noradrenaline |
| **NAcc** | Nucleus Accumbens |
| **OFC** | Orbito-Frontal Cortex |
| **PET** | Positron Emission Tomography |
| **POG-VOG** | Photo-Video Oculography |
| **rTMS** | Repetitive Transcranial Magnetic Stimulation |
| **SCR** | Skin Conductance Response |
| **SDK** | Software Development Kit |
| **SMH** | Somatic Marker Hypothesis |
| **VMPFC** | Ventro-medial Pre-Frontal Cortex |
| **WCST** | Wisconsin Card Sorting Task |

**CHAPTER 1**

CHAPTER

# INTRODUCTION

Every day, …

Study of …

In the particular, … see (Fellows, 2004; Ernst & Paulus, 2005; Paulus, 2005)).

A subset of …(see Table 1 for definitions in decision making terminology that is referenced here). Several experimental paradigms (tasks) were proposed and used to study particular aspects of it (see (Schonberg, Fox, & Poldrack, 2011; Figner & Weber, 2011; Platt & Huettel, 2008) for …

Table 1: Decision Making Terminology

. This table comprises of some of the important terminology in the context of cognitive science, and their short definitions.

|  |  |
| --- | --- |
| Decision making | The mental process of … |
| Reward | Choices in … |
| Risk taking | When the …. |
| Uncertainty | If a …. |
| Learning | In a … |

The variation of … (risk taking for short[[1]](#footnote-1)).

Utilization of ….

However, ….

## Contributions of the Thesis

Decision,.

However,.

The aim of

In a decision making task under uncertainty;

## Outline

Xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

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**CHAPTER 2**

# TITLE

## What is an Information Security Analyst?

An information security analyst is someone who takes measures to protect a company's sensitive and mission-critical data, staying one step ahead of cyber attackers. They do this by coming up with innovative solutions to prevent critical information from being stolen, damaged or compromised by hackers.

Note the differences between a Security Analyst and a Security Administrator:

* Security Analysts - are responsible for analyzing data and recommending changes to higher ups, but do not authorize and implement changes. Their main job is keeping attackers out.
* Security Administrators - ensure that systems are working as designed by making changes, applying patches and setting up new admin users. Their main job is keeping systems up.

## What does an Information Security Analyst do?

## What is Natural Language Processing?

## Why do we need Natural Language Processing?

## Sample Tweets Related with a Security Incident

## Why is NLP Hard?

## Twitter Api

## Turkish Newspapers as a Data Source

**CHAPTER 3**

# TITLE

## Title

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# APPENDICES

# APPENDIX A

**TITLE**

xxx

# APPENDIX B

**TITLE**

xxx

1. Risk taking is, in common sense, independent of uncertainty. Even though everything about the selection criteria is known, one can claim that the person is taking a risk in every choice. However, [↑](#footnote-ref-1)