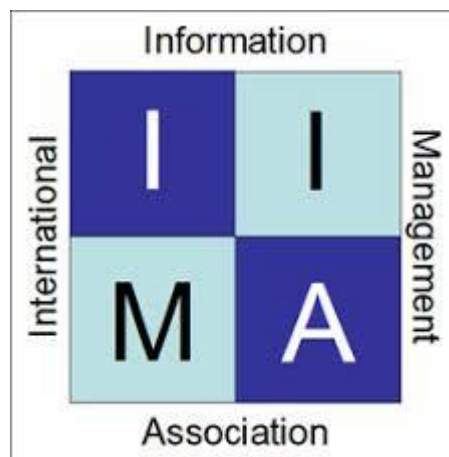# The 30th Annual Conference of the International Information Management Association

New Rochelle, NY, USA

September 23–25, 2019

Editor
Heechang Shin
Iona College
LaPenta School of Business
New Rochelle, NY, USA
E-mail: hshin@iona.edu

PREFACE

The International Information Management Association (IIMA) and Iona College are pleased to present the main results of the 30th Annual Conference of the International Information Management Association, held in New Rochelle, New York, September 23 to 25, 2019, through the proceedings. The 30th annual meeting aims to promote the dynamic exchange of ideas among researchers, educators, developers and practitioners who share their research and disseminate innovations in education, business, and government. This year we had an excellent program consisting of 12 research paper sessions, two panel discussion sessions, and a workshop session with a total of 40 submissions after a rigorous reviewing process by the program committee of IIMA2019. In addition, the program included two keynote addresses. We would like to thank Sarah Hoffman and Eli Tarlow for their keynote addresses on "The Future of Machine Learning" and "AI-BI-CI: What Happens When the Machine Takes Over?" respectively. The success of this annual meeting was a result of the efforts of many people. We would like to extend our appreciation to the Program Committee members and external reviewers for their hard work.

Heechang Shin

ORGANIZATION

Executive Committee

Conference Chairs	Shoshana Altschuller	Iona College
	Oredola Soluade	Iona College
Program Chair	Heechang Shin	Iona College

Organizing Committee

Vincent Calluzzo	Iona College
Charles Cante	Iona College
Kurt Engemann	Iona College
Xin James He	Fairfield University
C. Christopher Lee	Central Connecticut University
Alison Munsch	Iona College
Robert Richardson	Iona College
John Sherlock	Iona College
Ramesh Subramanian	Quinnipiac University
Wei Xiong	Iona College

Program Committee

Abel Usoro	International Information Technology and Economic Development Association
Alison Munsch	Iona College
C. Christopher Lee	Central Connecticut State University
Diana Boekman	University of Applied Sciences Utrecht
Frank Lin	California State University San Bernardino
Gerhard Steinke	Seattle Pacific University
Huei Lee	Eastern Michigan University
Ian Allison	University of Central Lancashire
Jay Lightfoot	University of Northern Colorado
Jim Jenkins	Seattle Pacific University
Namchul Shin	Pace University
Pascal Ravesteyn	Utrecht University of Applied Sciences
Ramesh Subramanian	Quinnipiac University
Robert Richardson	Iona College
Sungjin Yoo	Iona College
Wei Xiong	Iona College
Xin James He	Fairfield University

TABLE OF CONTENTS

PANEL DISCUSSION

CYBER SECURITY

BIG DATA ANALYTICS AND SOCIETAL IMPACT

E-BUSINESS AND USER BEHAVIOR

HEALTHCARE INFORMATICS

RESEARCH-IN PROGRESS

WORKSHOP

PANEL DISCUSSION

IS CURRICULUM

CULTURAL & SOCIETAL IMPLICATIONS OF IS

BIG DATA ANALYTICS AND CYBER SECURITY

THE VALUE OF A TECHNICAL SERVICE BULLETIN INDEX FOR THE CONSUMER

Robert Richardson

Iona College, USA

rrichardson@iona.edu

ABSTRACT

Automobile Technical Service Bulletin Index represents additional information pertaining on the quality of a vehicle. Currently, there is no way for the consumer to evaluate this large amount of information when buying a new car. A Technical Service Bulletin Index is developed as an aid to the consumer to better understand the quality issues related to thirty different car models. When compared to two major existing surveys, the J.D. Power Initial Quality Study and the J.D. Power Vehicle Dependability Study, the Technical Service Bulletin Index proved that it provides new, useful information about automobile quality for consumers to use when making the decision of their next automobile purchase.

Keywords: automobile, index, technical bulletin

A COMBINATORIAL APPROACH TO OPTIMIZING PROCUREMENT COST

Oredola A. Soluade
Iona College New Rochelle, USA
osoluade@iona.edu

ABSTRACT

The classical Optimum Procurement Policy Problem (OPP) involves the minimization of the total cost of procuring items from a given number of vendors. This falls in the category of FIXED CHARGE problems, which can be solved using classical optimization techniques of Linear Programming, Mixed-Integer Programming, or Quadratic Programming. In the classical Fixed Charge problem, it is assumed that all items are available at all vendor locations. In this model, that assumption is removed, and in its place is the cost of initial inquiry to determine the cost of items at a vendor location. This affects the formulation of the objective function as well as the solution technique used to obtain an optimal or near-optimal solution. The solution technique involves partitioning the set of feasible solutions into several subsets. The mean and variance of the cost associated with each subset of feasible solutions is obtained. Then, based on the underlying statistical distribution of each subset, an estimate is obtained by selecting the least of all the minimum costs.

Keywords: combinatorics, location analysis, optimum procurement, mathematical modeling.

SEASONALITY ANALYSIS OF THE U.S. STOCK MARKET

Xin James He
Fairfield University, USA
xhe@fairfield.edu

ABSTRACT

This research analyzes the potential seasonality of U.S. stock market indexes for weekly and monthly seasonal patterns. The main purpose is to provide both analytical and operational insights of the major U.S. stock indexes. Specifically, we analyze the Dow Jones Industrial Average (DJI), S&P 500, NASDAQ, and Russell 2000 (Russ 2K) and try to come up with an additive seasonal factor for each of the indexes, by decomposing each index in terms of a trend, seasonal pattern, and random component for the period January 1986 – March 2019. We found that the U.S. stock market does have seasonal patterns for each of the four indexes, respectively. In addition, we found that the seasonal pattern of the DJI is inconsistent for the period 2008-2019Q1, as opposed to 1986-2019Q1. As a result, we focus our attention on the period of 2008-2019Q1 to reflect more recent changes of the stock market seasonality. Finally, we found that the DJI, S&P 500, NASDAQ, and Russell 2000 have different seasonal patterns for the same period 2008-2019Q1.

Keywords: US stock market, time series decomposition, seasonality, seasonal factors.

INFORMATION SYSTEMS SOURCING STRATEGIES AND ORGANIZATIONAL CYBERSECURITY BREACHES: A CRIMINOGENIC TIERS PERSPECTIVE

He Li
Clemson University, USA
hl3@clemson.edu

Sungjin Yoo
Iona College, USA
syoo@iona.edu

ABSTRACT

Organizations nowadays in various industries are pursing digitalization strategies to achieve competitive advantages. Despite the tremendous benefits of investing in digital technologies, the associated risks of cybersecurity breaches could cause unlimited damage to firms' financial returns and reputation. However, there is a lack of research examining the cybersecurity implications of organizational strategies in the management field. This study investigates the impacts of IT outsourcing strategies on organizations' likelihood of encountering cybersecurity breaches. Drawing on the theoretical lens of criminogenic tiers from the sociology field and the longitudinal empirical analysis of the U.S. hospitals, we obtain that organizations with single sourcing or best of suite (BoS) IT outsourcing strategies are more likely to experience cybersecurity breaches, while those with best of breed (BoB) approaches are less likely to encounter such breaches. This research is expected to provide a theoretical foundation for future cybersecurity research by contextualizing the criminogenic tiers theory to explain cybersecurity issues in the contexts concerning inter-organizational relationships.

Keywords: outsourcing, cybersecurity, criminogenic tiers theory, power, IS integration, inter-organizational dependencies.

LOCATION-AWARE SECURITY ENFORCEMENT UNDER LOCATION UNCERTAINTY

Heechang Shin
Iona College, USA
hshin@iona.edu

ABSTRACT

Location-aware security model takes into consideration of location for better security. For example, when evaluating an access request to confidential company data, the access control engine evaluates not only the subject's credentials but also the location of the subject, i.e., is he currently located in his own desk? The location-aware security model can reject the request if he is not located in his desk. In order for the model to work, it is critical to pinpoint a user's location, but unfortunately, the measured location is imprecise, i.e., GPS's location accuracy is 5 - 10 meters only and that of indoor positioning systems is 1 - 2 meters. This imprecise location may create a bottle neck to the system since the system may continue to measure a user's location until it is certain. Existing research addressed this issue by proposing rectangular spatial filters so that re-evaluation of location is done only when it falls into the uncertain area. This paper extends the previous work by proposing a spatial filter without the uncertain area, which removes the necessity for re-evaluation of location estimation. Therefore, if an object lies within this boundary, it guarantees the correctness of the location evaluation of a security policy.

Keywords: location-based services, access control model, location uncertainty

EVOLUTION OF INFORMATION AND COMMUNICATIONS TECHNOLOGIES (ICTS) IN THE INDIAN RAILWAY SYSTEM – A HISTORICAL STUDY

Ramesh Subramanian
Quinnipiac University, USA
ramesh.subramanian@qu.edu

ABSTRACT

In this paper, I study the evolution of Information and Communications Technologies (ICTs) in the context of the Indian Railway system extending from its earliest days of existence up to the recent past. The Indian Railways can be considered as one of the largest socio-technical systems in the world, and is thus a fascinating and richly rewarding system to study. Over its long history of existence, the Indian Railway system has developed and improved a plethora of technologies, much of them specially adapted to Indian conditions. In this paper I trace the evolution of Indian Railways in Colonial and Post-Colonial India, specifically focusing on the evolution of Information and Communications Technologies (ICTs). In doing so, I extend JoAnne Yates' work (on how communications technologies such as the telegraph have historically changed the US industry and American business structures) to a non-US setting by focusing on how ICTs have shaped and have been shaped by the railways in India. "ICTs" in this context include signaling, telecommunications, and organizational computing systems. This study of the history and evolution of ICTs in the Indian Railways can be compared to the work of Steven Usselman's study of the American Railway system, its efforts to create new technology, and the challenges and disputes that it posed.

Keywords: Indian railways, information and communications technologies, technology evolution, socio-technical system, ICT, history of technology.

FRAMEWORK FOR DEVSECOPS IN CLOUD-ENABLED DELIVERY: FURTHER CLARIFICATIONS

Jim Jenkins
Seattle Pacific University
jimj@spu.edu

ABSTRACT

At the IIMA 2018 conference, a conceptual model of DevSecOps was presented providing a framework for the integration of cybersecurity into a new Software Development Lifecycle (SDLC) termed DevOps. The DevOps SDLC focuses on the flow of code through a continuous integration, continuous deployment (CI/CD) pipeline. The delivery mechanism for the deployment concentrated on cloud delivery and at the time it was clear information security functions were struggling in their transformation, called DevSecOps, primarily due to the velocity of updates through the CI/CD pipeline. Since that presentation, the industry has gained some level of clarity on the framework and in this presentation, we will present a further clarifications to the conceptual framework for organizations to aid in their understanding the subject of 'DevSecOps'. These clarifications further define the process flow, system integration, and communicate requirements for DevSecOps. With these clarifications, this framework will provide additional clarity for organizations embarking on the journey to adopt the DevSecOps approach to their SDLC in cloud-enabled organizations, in addition to aiding research in this new area of cybersecurity.

Keywords: DevSecOps, conceptual model, cloud delivery, deployment, SDLC, DevOps.

STRUCTURING YOUR OWN CLOUD GOVERNANCE FRAMEWORK

Peter Munsch
Fordham University, USA
munschp@gmail.com

EXTENDED ABSTRACT

Many commercial and educational institutions are either planning, implementing or well underway in moving their Information Technology (IT) infrastructure services out of their own datacenters to Public Cloud Providers such as Amazon Web Services (AWS), Microsoft Azure, Google Cloud Platform (GCP) or a plethora of Software as a Service (SaaS) vendors that provide niche services. These organizations are finding that moving to the cloud is not easy and presents many challenges. Due to the sensitivity of data, some applications end up staying behind, creating Hybrid Cloud environments. Hybrid Cloud is defined as a combination of private infrastructure and more than one Public Cloud Provider. Cost becomes an important factor since the Public Cloud Providers make it extremely easy to provision new services, but more complicated to decommission services that have reached their life cycle. Customers are finding their cloud expenses skyrocketing without an effective cost management system.

Enter the Cloud Management Platform (CMP) suite of tools that assist organizations by providing self-service provisioning to break the backlog of traditional IT service provisioning, cost management, security management and governance policy management. This fundamentally changes the culture of an organization that want to adopt Cloud Management Platform tools, requiring their personnel to learn new skills and recreate their job descriptions. It also changes the way traditional IT organizations interact with each other. Specifically, the change would reflect a move towards a more agile structure that would force the Security department, Development teams and the Operational teams to realign their efforts into a more of a collaborative relationship between Development, Security and Operations (DevSecOps) teams.

This organizational transformation creates an opportunity for Security and IT departments to review their existing policies and retrofit them into a Cloud Governance Framework. If executed correctly, the new framework can incorporate the existing polices (such as Data Classification) with new policies for the new capabilities for self-service provisioning with the creation of a personalized, organizational Service Catalog. Now the Cloud Management Platform tools can allow anyone with IT budget to provision IT infrastructure leveraging Infrastructure as Code (IaC). Organizations looking to adopt self-service provisioning need to consider how new environments should be architected, and what guardrails must be incorporated into the new deployment workflows to ensure new services are provisioned in alignment with security and operational policies.

PROPOSED MODULAR APPROACH

This study will explore how any commercial or academic institution can create their own Cloud Governance Framework using a modular approach constructed on the following attributes; the organization's Data Classification policy, target audience (Private Networks or Public Internet),

location and environmental inputs. The hypotheses should prove that specific profiles can be created from the combination of these input attributes, and then the proper security controls and operational services can be assigned to each profile. The Cloud Governance Framework will then facilitate
- the automation of Cloud Service provisioning via Infrastructure as Code (IaC)
- extending self-service provisioning to new customers and departments
- the customer's clear understanding of the expected service delivery from a security and operational perspective
- security concerns can be addressed in a more efficient manner via built in approvals with pre-negotiated capabilities and documentation tracking.

Therefore, this study will explore the following research questions:
- ***Primary Research Question:*** *–Can organizations; commercial or academic, leverage the Proposed Modular Approach referenced above to structure their own Cloud Governance Framework?*
- ***Secondary Research Question:*** *– How can organizations; commercial and academic, integrate their new Cloud Governance Framework with their existing security policies, provisioning processes and operational service offerings?*

METHODOLOGY

An availability sample of IT professionals that are responsible or influential for their organization's process for provisioning new IT services, specifically Infrastructure as a Service (IaaS), Platform as a Service (PaaS) or Software as a Service (SaaS) from Public or Managed Cloud Providers will be surveyed. The survey will be administered online. **Expected Outcomes:** Once the data is collected, the research is expected to reveal that this modular approach can work for most organizations. The framework will highlight the gaps and provide direction for fulfilling the missing pieces. The research will show that the completed Cloud Governance Framework will then provide the direction to implement Cloud Management Platform processes for the organization.

Keywords: cloud computing, emerging technology innovations, organizational impacts of information systems, cloud management platform, infrastructure as code, cloud governance, public cloud providers, DevSecOps.

MOTIVATING FACTORS FOR THE ADOPTION OF MOBILE GOVERNMENT (M- GOVERNMENT): A CASE STUDY OF M-GOVERNMENT USERS IN NIGERIA

Abel Usoro
Ritman University, United Kingdom
able.usoro@gmail.com

AnietieEkanem
Federal Ministry of Science and Technology, Nigeria
anietiese@yahoo.com

Santiago Matalonga
wilsonadejo@yahoo.com
University of the West of Scotland,   United Kingdom

ABSTRACT

M-government is a relatively new phenomenon especially in developing economies like Nigeria. The recent astronomical expansion in the availability of mobile devices has made its use for to access government services far outstrip research into enabling factors. Reasons why m-government should be encouraged include affordability and reachability of government services to citizens as well as timely information delivery and bridging of the digital divide. Thus, this study used desk research to develop a conceptual model that relates seven factors to adoption of m-government. The model was operationalized into a 46-item Likert scale questionnaire that was randomly distributed to a cross section of the Nigerian society. 126 questionnaires were returned out of 122 where used for analysis. This paper reports on the 78 users who answered the Part A of the questionnaire. Perceived usefulness, influence, facilitating conditions and attitude had significant relationships with use whereas perceived ease of use, compatibility and self-efficacy did not. This paper present implications and recommendations to system developers and the administration. A next study should report on the 44 non-users and even compare them with the users. There is also the need to perform the study on a much bigger sample. This study should provide some foundation for such a wider study.

Keywords: m-government, technology acceptance, technology adoption, mobile devices

EVALUATING THE DEVELOPMENT FACTORS FOR INFORMATION SYSTEMS FOR MOBILE DEVICES IN MEXICO ABSTRACT

Juan Manuel Gomez Reynoso
Universidad Autonoma de Aguascalientes, Mexico
juan.gomez@edu.uaa.mx

Lizeth Itziguery Solano Romo
Universidad Autonoma de Aguascalientes, Mexico
lizeth.solano@edu.uaa.mx

ABSTRACT

The use of mobile devices (MD) presents a very important opportunity for end users. By using these devices, they can perform tasks on-the-move as well as keep contact with organizations, customers, and clients, among other things. Consequently, developers of mobile applications (MA) for such devices should put special attention into overcoming any potential negative impacts in the user's perception. Around the world, MDs are becoming one of the most important technologies used by organizations and individuals as well. We believe that information systems developers for this type of device must be aware of the critical factors that could affect the adoption of this technology. We conducted a study in a financial institution that has presence in all of the Mexican territory using an exploratory factorial analysis and a reliability analysis. Nine factors were identified. In addition, using such factors we instantiate a MA that was tested in order to understand whether understanding and using such factors would deliver better acceptance in comparison to a traditional approach. This part was conducted using a quasi-experimental design. Results show that in 33 out of 35 aspects is better for developers to take into account such factors.

Keywords: end-users behavior, mobile devices, end-user interface, critical development factors, cognitive absorption.

A FRAMEWORK OF BLOCKCHAIN TECHNOLOGY

Frank Lin
California State University, San Bernardino, USA
flin@csusb.edu

Danny Chung
California State University, San Bernardino, USA
006185474@coyote.csusb.edu

Conrad Shayo
California State University, San Bernardino, USA
cshayo@csusb.edu

Francisca Beer
California State University, San Bernardino, USA
FBeer@csusb.edu

ABSTRACT

With the introduction of Bitcoin by Satoshi Nakamoto, came a key underlying technology that holds great disruptive promise to many crucial industries: Blockchain. The nature of a decentralized, distributed ledger will truly change the way we currently trade and interact through its clear transparency and high integrity. Based on trust, Blockchain allows various parties to be involved in transacting with each other without the need to know each other. The purpose of this paper is to provide a framework for Blockchain by focusing on how Blockchain technology can be integrated and implemented into real world applications. As this secure, robust and flexible technology can be applied to numerous industries with a plethora of applications and use cases, Blockchain for business can tremendously save costs, save time and mitigate risk. In particular, we will explore how the premise of provenance in traceability and tractability will affect our supply chains of today and tomorrow. We will also discuss the technological limitations, the regulations and the social challenges that revolve around Blockchain and its adoption. In addition, we aimed to examine the interaction of between Blockchain and various relevant and pertinent emerging technologies such as artificial intelligence, quantum computing, 5G, IoT and among others. Further, we identify the conceivable implications – such as the effect on the workforce, among other concerns – both positive and negative, and how these would affect us in both the short term and the long term. Lastly, we investigate how and where Blockchain would evolve in the near and far future.

Keywords: Bitcoin, blockchain, supply chain

DETERMINING CRITICAL SUCCESS FACTORS FOR REALIZING INNOVATIVE IT SOLUTIONS IN HIGHER EDUCATION

Anton Meijer

HU University of Applied Sciences Utrecht, The Netherlands

anton.meijer@focusopnatuur.nl

Pascal Ravesteijn

HU University of Applied Sciences Utrecht, The Netherlands

pascal.ravesteijn@hu.nl

ABSTRACT

There is much research on Critical Success Factors when implementing novel IT solutions in different industries and contexts. However, for the domain of higher education the amount of studies is limited. This is partially due to the fact that what is considered higher education is different across countries. Universities, Universities of Applied Science, Vocational Universities, Polytechnics and related (research) institutes both have similarities and differences. The purpose of this study is to determine the CSFs that contribute the most to the implementation and adoption of (innovative) IT in higher education in an international context. First, a literature study was conducted on critical success factors which provided the foundation to a conceptual research model. Second, using a Delhi study the model was elaborated upon by 32 international experts from the field of higher education. The experts determined the relevance and applicability of the CSFs which then resulted in a final model. Triangulation of the result was carried out by an independent expert who looked at possible real-life applications of the model. Adding this model to the field of knowledge will benefit the development of innovative IT in higher education.

Keywords: higher education, innovation, IT, Delphi study, critical success factors.

PLAY MY GAME. A GAMIFIED APPROACH FOR CREATING SURVEYS.

Tamilla Triantoro
Quinnipiac University, USA
tamilla.triantoro@qu.edu

Ram Gopal
Indian Institute of Management, India
ram.gopal@iimu.ac.in

Raquel Benbunan-Fich
Baruch College, USA
rbfich@baruch.cuny.edu

ABSTRACT

User self-reported data influence various areas of business decision making, such as marketing campaigns, product development and design, social media strategy and job offers. For this study, we created two survey-based gamified data collection instruments. The first survey was created in an online survey platform Qualtrics. The second survey was a web-based instrument built for this purpose in HTML. The focus of the study was on the impact of game elements on data quality of user self-reported data. We used test/retest methodology to evaluate the time required to complete the survey and the consistency of user answers. We found that users in a more gamified condition spent less time on a survey, and submitted less consistent answers. We also found that the type of survey and the duration of the survey in test condition were significant predictors of the consistency of answers. More specifically, when users spent more time on a survey, and the survey was less gamified, users produced more consistent answers over time. This study paves the way for future research investigating whether and to what extent gamification is an appropriate tool to improve the design of existing surveys and the quality of user self-reported data.

Keywords: gamification, data quality, online survey.

CODE CONTROL: DEVELOPING A SERIOUS GAME TO REINFORCE INTRODUCTORY CODING CONCEPTS

Devorah Kletenik
The City University of New York, USA
dkletenik@gmail.com

Deborah Sturm
The City University of New York, USA
deborah.sturm@csi.cuny.edu

ABSTRACT

We report on the development of a 3D serious game to teach and reinforce fundamental coding concepts. An innovative feature allows instructors to create customized programming challenges that students solve in the context of the game. The game was designed to engage and motivate all students, with a special focus on women and underrepresented groups in Computer Science. A preliminary evaluation of the game at three colleges in the City University of New York indicates promise in the use of the game as a teaching tool.

Keywords: serious games, programming, coding, e-learning.

IDENTIFICATION AND ATTRIBUTION IN THE DIGITAL AGE

Smiljana Petrovic
Iona College, USA
spetrovic@iona.edu

Lubomir Ivanov
Iona College, USA
livanov@iona.edu

Thomas Ruggio
Iona College, USA
truggio@iona.edu

ABSTRACT

Identifying the author/creator of a particular artifact – a text, a painting, a musical piece – is an important and challenging issue. The challenges stem from a variety of sources – the age of the artifact, deliberate obfuscation, multimedia replication, structural (dis-)similarity to other artifacts, etc. However, the latest developments in machine learning and the ever-increasing computational power allow data mining analysis to be performed with a growing accuracy, providing a stronger hypothesis to the practitioners in these fields. This panel will discuss methods used for identifying information sources in various fields – literature, music, and the visual arts. Authorship attribution deals with the identification of the writer of a text of an unknown or disputed authorship. The task can be formulated as a text mining problem where, based on a set of stylistic features (e.g. function words, n-grams, etc.), the methodology attempts to classify the authorship of the given text using an ensemble of machine learning classifiers. Similar mechanisms can be adopted for attributing/identifying musical and visual arts artifacts. Authorship and attribution of paintings is an important area of research that extends from analyzing the canvas or wood surface and the pigments used by the artist to the digital analysis of painter's characteristic brushwork. In music, the structure of the musical piece (phrasing, harmonies, etc.), its tempo, loudness, rhythm, as well as the instrument selection can be used to identify not only the composer, but also specific performers and their styles. Natural language processing techniques have been adapted to identifying individual instruments in a musical ensemble. The panelists will explore some aspects of those modern technologies, focusing on specific areas of their research interests and expertise.

ORGANIZERS AND PARTICIPANTS

Smiljana Petrovic, Ph.D., Computer Science Department, Iona College
Dr. Petrovic works on authorship attribution of historical texts. Her methodology for combining attribution methods was actively used for authorship of 18th Century political writings, with special attention to the work of Thomas Paine.

Lubomir Ivanov, Ph.D., Computer Science Department, Iona College

Dr. Ivanov's primary expertise is in natural language processing (NLP) with applications to authorship attribution and serious game development. He has applied NLP techniques to recognizing the unique sounds of different types of guitars and is interested in developing techniques for attributing performer playing styles.

Thomas Ruggio, MFA, Fine and Performing Arts Department, Iona College
Professor Ruggio is an artist, art historian and curator. His interests include the work of the 15th18th century old masters. In 2017, he co-curated the exhibition "Peter Paul Rubens and the Flemish 17th Century" at the Brother Kenneth Chapman Gallery at Iona College and also co-authored the exhibition catalog.

PURPOSE, GOALS, EXPECTED OUTCOMES AND CONTRIBUTION TO THE CONFERENCE THEME

With "information increasingly taking center stage", as pointed in the conference call, it is important to correctly identify and confirm the source of various artifacts. Such identification can have an important social, economic, and ethical impact on modern society. The panelists will demonstrate that similar algorithms and methodologies could be applied to a variety of topics, bringing awareness of research and results achieved in different areas through case studies and examples. The panelists will also point to variety of available software, discuss limitations and concerns, explore future directions, and most importantly, invite the audience to share their concerns and experience.

Keywords: author attribution, music/art attribution, machine learning, data mining.

CYBER SECURITY AND DIGITAL FORENSICS – EVALUATING MEDIA AND MEMORY FORENSICS – AN ANALYSIS OF CYBER-ESPIONAGE

Emmanuel Opara
Prairie View A&M University, USA
euopara@pvamu.edu

Oredola A. Soluade
Iona College, USA
osoluade@iona.edu

Ithabeleng CBoloka
University of Cape Town, South Africa
Bolitha.sa@ gma il.com

ABSTRACT

In an intrusion attack, understanding between abnormal and normal systems applications is often the difference between positive and false positive results. Cyber security professional objectives are to identify suspicious artifacts in order to verify potential intrusions. Organizations encounter numerous challenges when dealing with the new reality of cyberattacks. Some reasons for these challenges are that attacks are no longer as visible as they once used to be. While hacktivists in the past, employ methods such as distributed denial of service [DDoS] attacks, they now employ more advanced stealth methodologies such as zero day. Shell shock and advanced persistent attacks that does not have an immediate patch mechanism to counter such attacks. Detecting threats are essential part of data security, but it's only one step. Trying to defend organizational data solely with detection software is like trying to make a stool stand upright with only one leg. Memory forensics as the study will show, has come a long way in just a few years. Digital, memory and media forensics can be extraordinarily effective at finding evidence of worms, rootkit technologies in network, sockets, URLs, IP addresses, open files etc. The study will show how digital, memory, and media forensics technology are employed to identify abnormal behaviors such as memory artifacts, code injection and rootkit behavior, suspicious network activities, unknown services, unusual OS artifacts, and evidence of persistency while finding evil within the cyber platform. The study will conclude by recommending pragmatic solutions to incident responders by exposing injection and hooking techniques that would otherwise remain undetected. These analyses will be performed to get more information that are not available through static analytical process of a system.

Keywords: memory, media, digital espionage, cyber security, abnormal, evil.

CYBER SECURITY BEHAVIORS: A REVIEW OF THE LITERATURE

Jim Jenkins
Seattle Pacific University, USA
jimj@spu.edu

Gerhard Steinke
Seattle Pacific University, USA
gsteinke@spu.edu

ABSTRACT

Technologies in cybersecurity are experiencing a rapid uplift in the breadth of their capabilities and depth of their coverage. Even with an accelerating rate of adoption for these more capable systems, organizations continue to experience greater frequencies of large scale cyber compromise and data exfiltration. The financial impact of these losses has increased 62% over the past 5 years with no signs of slowing as the cybersecurity industry continues its growth towards a projected $300 billion market size by 2024. One significant challenge that remains unaddressed in today's more challenging environment are the mistakes made by people within organization that lead toward compromise. Clicking a phishing link, misconfiguring a system, slowness in addressing vulnerabilities – these are all examples of ways poor cybersecurity behaviors can negatively impact an organization. Much needs to be learned about cyber behaviors and how they impact decision making activities. In this review, we examine the definitions of cybersecurity behaviors as a psychological construct with the intention of constructing a framework to leverage in research the impact of cyber behavior interventions.

Keywords: cybersecurity, cybersecurity behaviors framework, behaviors intervention framework

TOPICS DISTRIBUTION OF CYBERSECURITY TAXONOMIES: A SURVEY OF SURVEYS AND A CONTENT ANALYSIS

Shaoyi He
she@csusb.edu
California State University, San Bernardino, USA

Frank   Lin
California State University, San Bernardino, USA
flin@csusb.edu

Jake Zhu
California State University, San Bernardino, USA
jzhu@csusb.edu

EXTENDED ABSTRACT

Concepts and terms are always considered to be most critical for a fundamental understanding of the theories and practices of information technology in cybersecurity communities in both professionals and academics. The concepts and terms used for information technology (IT) in cybersecurity communities are dynamic with changing vocabularies over time. So, there is an ongoing need for building and updating taxonomies for different applications and implementations of information technology in cybersecurity, because they enable clearer communication and common understanding of cybersecurity terms, through the use of language and annotations on the definitions. Developing a taxonomy for a specific subject area has been a common practice in both natural science and social science, because a taxonomy could provide a consistent categorization of terms and concepts across multiple sources and channels. Taxonomies were useful and helpful for librarians to define and organize and retrieve information content effectively and efficiently.

Many scholars and researchers have done interesting works in this area. For example, Arvisson (2018) built a taxonomy of the computer security incident related terminology. Buch & Bhatt (2018) compiled a taxonomy on cloud computing security issues at virtualization layer. Chen et. al. (2018) studied Internet-of-Things security and vulnerabilities in terms of taxonomy, challenges and practice. Gupta and Badve (2017) built a taxonomy of DoS and DDoS attacks and desirable defense mechanism in a cloud computing environment. Hansman (2003) developed a taxonomy of network and computer attack methodologies. Jakobsson (2017) built a threat taxonomy as a working framework to describe cyber attacks. Zheng, et al. (2018) studied cybersecurity research datasets for taxonomy and empirical analysis. Harris and Pattern (2015) did a very interesting project of using Bloom's and Webb's taxonomies to integrate emerging cybersecurity topics into a computing curriculum.

Furthermore, scholars and researchers have conducted surveys on taxonomies developed for different topics in various areas of cybersecurity. Ahmad et. al. (2012) have done a survey on taxonomies of attacks and vulnerabilities in computer systems. Joshi, Singh and Tarey (2015)

offered a detailed review of significant work done in development of taxonomies of attacks and vulnerability present in computer and network system. Naeimi, et. al. (2012) conducted a survey on the taxonomy of cluster-based routing protocols for homogeneous wireless sensor networks.

As shown by the examples above, these scholars and researchers have done very well in surveying and analyzing specific taxonomies developed for a certain area in cybersecurity. But, few of them have paid attention to survey as many taxonomies as possible. Such a lack of work calls for a survey of surveys to study the development of taxonomies in a variety of cybersecurity areas, from the very specific areas such as "hardware trojan" and "DDoS attacks" to very general areas such as "cyber-attacks" and "security threats". Based on the above literature review, this proposed study conducts a survey of surveys of existing cybersecurity taxonomies, presents a comparative content analysis on the topic distribution of the surveyed taxonomies via articles and papers dealing with a variety of subject areas, and provides a better understanding of cybersecurity terminology management for both business practitioners and academic educators.

By identifying and categorizing these subject areas and topics, this paper will answer the following questions:
1) How many cybersecurity taxonomies have been developed?
2) What are the topics covered by the developed cybersecurity taxonomies?
3) Which topics are more popular in the cybersecurity taxonomies?
4) Which topics are less popular in the cybersecurity taxonomies?
5) What topics are not covered by the present cybersecurity taxonomies, and need to be developed in the future?
6) What kind of complementary taxonomies for cybersecurity education in universities and colleges are needed?

In order to answer the above research questions, we would adopt the following steps as our research methodology:
- Firstly, we collected articles and papers that are specifically deal with cybersecurity taxonomies.
- Secondly, we identified all the cybersecurity topics covered in the collected taxonomies.
- Thirdly, we identified the cybersecurity topics that are more popular in the taxonomies.
- Fourthly, we identified the cybersecurity topics that are less popular in the taxonomies.
- Finally, we compare these cybersecurity topics with the CAE-CD Knowledge Units (KUs) and NICE framework (NICCS, 2019).

Based on the answers to the above questions, this research will make some recommendations on how to develop a comprehensive taxonomy for cybersecurity education covering both fundamental terms and concepts and practical skills that meet the needs of employers in the real world. The significance of this research is two-fold: it not only provides the first-hand findings on how many cybersecurity taxonomies have been developed, and what are the more or less popular cybersecurity topics in the developed cybersecurity taxonomies, but also presents a better understanding of cybersecurity terminology management for both business practitioners and academic educators in cybersecurity.

REFERENCES

Ahmed, M., & Litchfield, A. T. (2018). Taxonomy for identification of security issues in cloud computing environments. Journal of Computer Information Systems, 58(1), 79-88.

Chen, K., Zhang, S., Li, Z., Zhang, Y., Deng, Q., Ray, S., & Jin, Y. (2018). Internet-of-Things Security and Vulnerabilities: Taxonomy, Challenges, and Practice. Journal of Hardware and Systems Security, 2(2), 97-110.

Buch, B. & Bhatt, H. (2018). Taxonomy on Cloud Computing Security Issues at Virtualization Layer. International Journal of Advanced Research in Engineering and Technology (IJARET), 9(4), 50-76.

Gupta, B. B., & Badve, O. P. (2017). Taxonomy of DoS and DDoS attacks and desirable defense mechanism in a cloud computing environment. Neural Computing and Applications, 28(12), 3655-3682.

Harris, M. A. & Pattern, K. P. (2015). Using Bloom's and Webb's Taxonomies to Integrate Emerging Cybersecurity Topics into a Computing Curriculum. Journal of Information Systems Education, 26(3), 219-234.

Jakobsson, M. (2017, July 24). The Threat Taxonomy: A Working Framework to Describe Cyber Attacks. Retrieved May 14, 2019, from https://www.agari.com/email-security-blog/threat-taxonomy-framework-cyber-attacks/

Joshi, C., Singh, U. K., & Tarey, K. (2015). A Review on Taxonomies of Attacks and Vulnerability in Computer and Network System. International Journal of Advanced Research in Computer Science and Software Engineering, 5(1).

Naeimi, S., Ghafghazi, H., Chow, C. O., & Ishii, H. (2012). A survey on the taxonomy of cluster-based routing protocols for homogeneous wireless sensor networks. Sensors, 12(6), 7350-7409.

NICCS (National Initiative for Cybersecurity Careers & Studies). (2019, February 21). Explore Terms: A Glossary of Common Cybersecurity Terminology. Retrieved May 14, 2019, from https://niccs.us-cert.gov/about-niccs/glossary

Tehranipoor, M., & Koushanfar, F. (2010). A survey of hardware trojan taxonomy and detection. IEEE design & test of computers, 27(1), 10-25.

Zheng, M., Robbins, H., Chai, Z., Thapa, P., & Moore, T. (2018). Cybersecurity research datasets: taxonomy and empirical analysis. In 11th {USENIX} Workshop on Cyber Security Experimentation and Test ({CSET} 18).

Keywords: cybersecurity, taxonomy, survey, content analysis, topic distribution, knowledge units.

THE IMPACT OF COLLEGE AND UNIVERSITY ADVERTISING EXPENDITURES ON KEY PERFORMANCE INDICATORS USING BUSINESS ANALYTICS MODELING

Alison Munsch
Iona College, USA
amunsch1@earthlink.net

Jason Diffenderfer
Iona College, USA
jdiffenderfer@iona.edu

Charles Cante
Iona College, USA
ccante@iona.edu

EXTENDED ABSTRACT

Marketers in the 21st century now more than ever face a competitive business environment. The battle for marketers to capture value from customers across a variety of verticals in the form of brand equity and sales is as fierce as it has ever been. This is because customers have numerous choices partially driven by the access and information provided by the internet (Solomon, 2017). As such, consumers are exposed to a plethora of alternative products and services more than ever as compared to the past. As such, consumers apply a high level of effect in the market about several aspects of brand attributes. These aspects include but are not limited to quality, services, and price. Therefore, it is very important for marketers of products and services to meet customers' needs and remind customers' and potential customers of their ability to meet those needs in order to stay competitive.

Advertising and sales promotion as a part of an integrated marketing plan are influential in attracting the attention of the customer and influential in building brand equity, encouraging sales (Myers, 2003). Advertising and sales promotion are the main tools of an integrated marketing plan to communicate brand benefits. Advertising and sales promotions are highly effective influencers of consumer purchase decisions of a brand (Solomon, 2017). In increasingly competitive markets, companies recognize that they must improve and strengthen their brands' communication of brand benefits regularly in order to sustain consumer value for a long period of time. (Sedaghat, Sedaghat, Moakher, 2012).

The literature provides evidence of the relationship between advertising expenditures and positive response amongst the target audience on key performance indicators (KPI) in terms of brand equity and sales effects (Palazon-Vidal, M., DelgadoBallester, 2005). This has been seen in many categories including but not limited to consumer products and services and business to business products and services. The impact of advertising expenditures on key performance indicators (KPIs) in higher education such as class size and class quality has not been explored extensively in the literature.

U.S. colleges and universities demonstrated an increase in paid advertising. It is now at an all-time high of $1.65 billion in 2016 (Brock, 2017). This represents a growth of 18.5% over 2015 expenditures and a surge of 22% since 2013. This increase in paid advertising spending in higher education has occurred despite declines in advertising in the for-profit educational sector of higher education that has experienced trouble in recent years (College Board, 2018). Nevertheless, the increasing advertising investments coincide with steady declines in overall higher education enrollment over the past six years. Since 2011, U.S. fall enrollment in colleges and universities has decreased by 7.9%, according to the National Student Clearinghouse Research Center (2018). The factors that are contributing to this trend include flat and declining high school graduate populations in many regions of the country, continuing increases in the rate of employment (with many prospects choosing a job instead of college), rising costs of a college education, and signs that there has been a trending loss of public confidence in the value of traditional college credentials (The College Board, 2018).

PROBLEM STATEMENT RESEARCH QUESTIONS

The main purpose of this research (that is currently in progress), is to analyze the link between advertising expenditures with college success factors to include college and university admission metrics, quality metrics and college university financial health. The paper will provide an assessment on the nature of the relationship existing between these variables. Hence, the primary research question for this paper is:

Does advertising spending at the college and university level, influence college success factors in terms of class size and quality?

The secondary research question is:

Is there evidence that colleges and universities that spend more on advertising achieve increases in college success factors in terms of class size and class quality?

The third question is:

Is there evidence that colleges and universities that spend more on advertising achieve improvements in their financial health?

METHODOLOGY

To explore these research questions, the tools of business analytics leveraging technology innovations to include statistical analysis and information systems will be used. In terms of data sources, Kantar Media (2018) a worldwide leader in advertising and expenditure monitoring will be used. Kantar tracks the largest range of media, across more than 20 traditional and digital channels, with comprehensive product categories and accurate rate information. The information collected by Kantar has a proven track record of providing a very clear picture of which brands have what share of voice in the market place. Kantar collects this information in the higher education sector across an inclusive list of colleges and universities engaging in paid advertising. This data source will be analyzed amongst a competitive set of colleges and universities to Iona College as indicated by the Office of Institutional Effectiveness and Planning at Iona College. The

data for the college success factors of quality, size and financial health will be gathered using data publicly available within the Integrated Postsecondary Education Data System (2018) (IPEDS), The National Center for Education Statistics (2018), The College Board (2018) and The National Research Clearing Center (2018).

EXPECTED OUTCOMES

Once the data is collected and a statistical business analytical model has been developed and executed, the research is expected to reveal the relationship between paid advertising expenditures in higher education, class size, class quality and the financial health among colleges and universities within Iona College's higher education segment.

REFERENCES

Aaker, D. A. (1991). Managing brand equity. New York: Free Press. Aaker, D. A. (1996). Building Strong Brands. New York: Free Press. Balaji, M. S. (2011).

Brock, B. (2017, October, 5). College advertising at all time high. Retrieved from https://emgonline.com/2017/10/collegeadvertising-at-all-time-high/.

Kantar. (2018). Retrieved from https://kantar.com/.

Myers, C. (2003). Managing brand equity: a look at the impact of attributes. Journal of Product & Brand Management, 12(1), 39-51. https://doi.org/10.1108/10610420310463126.

Palazón-Vidal, M., & Delgado-Ballester, E. (2005). Sales promotions effects on consumer based brand equity. International Journal of Market Research, 47(2), 179-204.

Solomon, M. (2017). Consumer behavior: Buying, having and being (11th ed.). Saddle River, NJ: Prentice Hall.

Sedaghat, N., Sedaghat, M., & Moakher, A. K. (2012). The impact of promotional mix elements on brand equity. American Journal of Scientific Research, 43, 5-15.

The College Board. (2018). Retrieved from https://research.collegeboard.org/.

The Integrated Postsecondary Education Data System. (2018). Retrieved from https://nces.ed.gov/ipeds/.

The National Center for Education Statistics. (2018). Retrieved from https://nces.ed.gov/.

National Research Center. (2018). Retrieved from https://nscresearchcenter.org/

WHAT IS CAUSING THE RISE OF ROBOTICS?

Jacob Vincent Goulas
Central Connecticut State University, USA
jakegoulas@gmail.com

C. Christopher Lee
Central Connecticut State University, USA
christopher.lee@ccsu.edu

ABSTRACT

This study explores what factors affect each country's robotic automation. We developed a regression model in which the robotic index serves as the dependent variable, while seven predictors were tested: education, manufacturing, unemployment, labor force shortage, democracy index, technology accessibility, and gross domestic product. The results from a data analysis of 30 nations show that education, labor force shortage, technological accessibility, democracy index and GDP per capita contribute to a country's increasing use of robotic automation.

Keywords: robotics index, education, labor force shortage, technological accessibility, democracy index, GDP per Capita.

CASE BASE MODEL IN SITUATION-AWARE DECISION SUPPORT FOR DISASTER MANAGEMENT

Nuka Nwiabu
Nigeria Rivers State University, Nigeria
nwiabu.nuka@ust.edu.ng

Ian Allison
University of Central Lancashire, United Kingdom
iallison@uclan.ac.uk

Babs Oyeneyin
Robert Gordon University, United Kingdom
b.oyeneyin@rgu.ac.uk

ABSTRACT

Disaster management (DM) is an on-going process of mitigating or preventing, preparing, responding, and recovering for and from a disaster. Situation-aware (SA) applications try to detect situations and react to them, being particularly useful to support disaster management. There are many disaster databases that collect data concerning previous disasters used in building SA applications but there is a lack of standardization on how to describe a disaster, and each database has its own disaster model. Successful or unsuccessful processes that have been used to manage previous disasters are usually recorded in unstructured ways. In order to provide situation awareness of good practices for disaster management inspired from previous experiences, this paper introduced a framework for case-based situation-aware disaster management. The framework is used for the design of applications for storing information about past disasters that helps in managing ongoing disasters in real time. The paper also discusses how Case-based Situation-aware Decision Support for Disaster Management can assist at the prevention phase of DM. The work is implemented in drilling operation for early detection of a kick to prevent blowout disaster. Case-based Reasoning (CBR), a problem solving method of drawing from experiences of past situations in order to solve new problems improves situation awareness and accurate problem solving methods in disaster management.

Keywords: situation awareness, disaster management, decision support, early kick detection, drilling, case-based reasoning.

GAUGING ADA COMPLIANCE IN THE 21ST CENTURY BUSINESS INTERNET: A PILOT STUDY

Daniel McDonald
Georgia College & State University, USA
daniel.mcdonald@gcsu.edu

Tanya Goette
Georgia College & State University, USA
tanya.goette@gcsu.edu

Hannah Petoia
Georgia College & State University, USA
hannah.petoia@bobcats.gcsu.edu

ABSTRACT

This paper explores issues of accessibility in Web design, including the applicability of various federal statutes such as the Americans with Disabilities Act of 1990 (ADA) and Section 508 of the Rehabilitation Act of 1973. A pilot study of six private sector websites is completed to gauge the effectiveness of current accessibility standards as interpreted from the ADA and Section 508. Evaluating these sites shows that even after 25 years, sites still have accessibility issues.

Keywords: web accessibility, Americans with Disabilities Act, ADA, web design, accessibility standards, WCAG 2.0, HTML Section 508 checklist.

THE ECONOMIC VALUE OF THE WEB AND SOCIAL MEDIA FOR NONPROFIT ORGANIZATIONS

Namchul Shin
Pace University, USA
nshin@pace.edu

ABSTRACT

This research empirically analyzes the economic value created from the use of the Web and social media by using 100 nonprofit organizations ranked by the ratings on web traction measures, including Facebook Likes and Twitter Followers. Our findings demonstrate the traction of supporters on the Web and social media is associated with an increase in nonprofit organizations' level of donations. However, the results also show that the impact of economic factors, such as price and fundraising, on charitable giving is much greater than the impact of web traction. These results suggest that the effect of social media and the Web on donations is significant, but still relatively smaller than the impact of economic factors, such as price and direct fundraising expenses.

Keywords: nonprofit organizations, economic value, web traction, social media, fundraising, donations.

AN EXPANDED DELONE AND MCLEAN MODEL FOR COLLABORATIVE COMMERCE SERVICES: A STRUCTURAL EQUATION MODEL

C. Christopher Lee
Central Connecticut State University, USA
christopher.lee@ccsu.edu

Hyoun Sook Lim
Central Connecticut State University, USA
hlim@ccsu.edu

Pankaj Nagpal
Central Connecticut State University, USA
yxd.werke@gmail.com

Rebecca Lee
Central Connecticut State University, USA
rebeccal@my.ccsu.edu

Laura Dutil
Central Connecticut State University, USA
laurapizarro@my.ccsu.edu

Youngseon Kim
Central Connecticut State University, USA
ykim@ccsu.edu

ABSTRACT

The research on collaborative commerce is limited. This study intends to provide additional empirical evidence about the factors affecting collaborative commerce usage intention and platform loyalty. DeLone and McLean model serves as a framework for this study. We expanded the model. We investigated how perceived value, relationship quality, and service quality affect the usage intention and platform loyalty in the collaborative commerce service industry. Survey data (N = 295) was collected and analyzed to answer the research questions. Structural equation model showed that perceived value and platform quality were the best predictors to platform loyalty, which in turn, predicts usage intention.

Keywords: collaborative commerce, platform loyalty, usage intention, perceived value, relationship quality, platform quality, DeLone and McLean model, structural equation model.

IMPACTS OF ELECTRONIC MEDICAL RECORD SYSTEMS ON HOSPITAL EFFICIENCY

C. ChristopherLee
Central Connecticut State University, USA
christopher.lee@ccsu.edu

Caroline Klimm
Central Connecticut State University, USA
klimmc@my.ccsu.edu

Christopher Palmero
Central Connecticut State University, USA
chrispalmero@my.ccsu.edu

Stephanie Hughes
Central Connecticut State University, USA
stephaniehughes@my.ccsu.edu

ABSTRACT

The main objective of this study is to gain insight on if hospitals that have implemented EMR systems across the United States are more efficient than hospitals who have not implemented EMR systems, as well as if any other factors could lead to a hospital's efficiency. The voluntary survey was distributed all 6,300 hospitals, both AHA members and non-members, that have been identified by the American Hospital Association as an open and operating hospital. We used the inputs of number of hospital beds, operating expenses, number of physician FTEs, and number of registered nurse FTEs. We used the outputs of operating revenue, operating margin, number of outpatient visits and number of inpatient visits. We used the control variables of location type, teaching hospital status, ownership control and region. DEA was used for measuring the efficiency of hospitals using electronic medical record systems. We grouped the data into two groups to see which group was more efficient than the other. Group 1 includes hospitals with no EMR implementation. While Group 2 includes hospitals with a partial or full implementation. The evidence showed that, in regard to each variable, hospitals with larger bed counts, hospitals in metropolitan areas, teaching hospitals, non-governmental institutions, for-profit organizations, and hospitals in the Northeast with partial or full EMR systems are more efficient than the other groups. This research provides insight on how hospitals efficiency can be increased based on an EMR system as well as what factors are most likely to be efficient.

Keywords: EMR systems, electronic health record systems, hospital efficiency, size, location, teaching status, ownership control, region.

SHORT TEXT CLASSIFICATION: DETECTING DEPRESSION FROM TWEETS

Sarah Zelikovitz

College of Staten Island of CUNY, USA

Sarah.Zelikovitz@csi.cuny.edu

Claudia Bergeron

College of Staten Island of CUNY, USA

claudia.bergeron@cix.csi.cuny.edu

ABSTRACT

Short text classification has challenges because there is not much information in each piece of data to determine correct categorization. Often creative methods of categorization or augmentation of short text with other information can help solve this problem. Twitter can provide a huge amount of unlabeled short text data, which can be grouped together by various features. In this work, using supervised machine learning we create a model that classifies Twitter posts that contain the word *depression* into two categories -- those indicating depression in the author and those that do not. By manually categorizing the tweets in the training sets using crowd sourcing, we are able to get multiple people of varying demographics to provide training set classification. Although the use of manually classified training set limited the quantity of the data set, it gives our classifiers a distinct advantage.

Keywords: Twitter, classification, depression

OPIOID ADJUNCT DRUG THERAPY: EVALUATING EFFECTIVENESS USING TEXT ANALYTICS OF REAL WORLD DATA

Michael A. Veronin

The University of Texas at Tyler, USA

mveronin@uttyler.edu

Robert P. Schumaker

The University of Texas at Tyler, USA

rschumaker@uttyler.edu

EXTENDED ABSTRACT

Opioid analgesics continue to be the mainstay of pharmacologic treatment of moderate to severe pain. An adjunct is a drug that in its pharmacological characteristic is not identified primarily as an analgesic, but that has been found in clinical practice to have either an independent analgesic effect or additive analgesic properties when used with opioids. By using an adjunct to maximize the level of analgesia, the required opioid dosage may be reduced, together with concomitant adverse effects.

BACKGROUND

Real World Data (RWD) refers to data that describe observations in normal clinical practice obtained by any non-interventional methodology, such as Randomized Controlled Trials (RCTs). The U.S. Food and Drug Administration (FDA) maintains one of the largest government databases in the country, the FDA Adverse Event Reporting System (FAERS). It is comprised of adverse event reports submitted to the FDA through the "MedWatch" reporting program and contains a plethora of Real World Data: thousands of case reports on opioids and adjunct drugs, comprised of unstructured textual data. The objective of this study is to identify the therapeutic effectiveness of adjunct drugs with opioids by examination of narrative text in MedWatch cases.

METHODS

This project follows the traditional approach of knowledge discovery in databases, comprised of five steps: 1) Data selection, 2) Pre-processing, 3) Transformation, 4) Data mining and 5) Interpretation. The strategy employed will transform the narrative text data into an organized and concise summary of key endpoints. An appropriate sample (500 to 1,000 relevant patient cases) that describe opioids and adjunct drugs will be included in the case report data set.

Key task 1: Data selection and pre-processing (Steps 1,2). MedWatch narratives of patient cases that describe the types of opioid and adjunct drug combinations used in real-life clinical settings will be obtained from the FAERS database. Key task 2: Data transformation and mining (Steps 3,4). Cases will be organized in a Structured Query Language (SQL) database. A lexicon of words

and terms clinically or theoretically related to opioid and adjunct drug therapy will be developed, which will serve as a reference for analysis of the text. Using Natural Language Processing (NLP) techniques, textual data will be transformed into n-grams using a MySQL n-gram parser. N-gram extraction will identify notes containing n-grams matching terms from the theory-and expert-derived lexicon. Categories will be formed from the most frequently identified n-grams and their total frequency.

RESULTS (PROJECTED)

Key task 3: Evaluate and interpret results (Step 5) and compile the information into a useful format for healthcare providers. The most commonly extracted n-grams will be identified by category, then frequency, and displayed in tabular format. N-gram analysis of the corpus of case reports reveals the frequency with which and adjunct drug was used with an opioid, and indicate impact on analgesic effect. Completion of key tasks provides evidence on the associated outcomes of treatment; whether the adjunct drug therapy indicates treatment success or failure.

CONCLUSION

Findings of this project will add to the existing body of knowledge on opioid adjunct therapy for analgesia and may corroborate or refute other existing evidence for adjunct drug therapeutic effectiveness derived from case reports or clinical trials.

Keywords: real world data, opioid, adjunct drug, Food and Drug Administration, FAERS database, MedWatch, natural language processing.

A PRELIMINARY MACHINE LEARNING MODEL FOR EXTENDED COMPARATIVE MARKET ANALYSIS

Binu Jacob
Pace University, USA
bj47819p@pace.edu

Charles Tappert
Pace University, USA
ctappert@pace.edu

ABSTRACT

A comparative market analysis is an analysis that is provided to most of the prospects and customers as part of real estate sales. Currently, the market analysis typically includes only nearby properties and is rather superficial. Furthermore, in the case of an investor, the list of properties in the analysis should include properties beyond nearby areas. In this study, clustering, classification, and recommendation models were explored with the aim of producing a larger and more detailed list of properties to resolve these issues.

Keywords: machine learning, Python, Keras, Tensorflow, classification, clustering, recommendation, market analysis, deep learning.

BUSINESS DATA ANALYTICS APPLICATIONS TO ON-LINE PRODUCT REVIEWS AND NATIONALISM

Charles C. Willow
Monmouth University, USA
cwillow@monmouth.edu

ABSTRACT

This paper investigates the data analytics between consumer on-line reviews, relative to a set of multi-attributes. The attributes are comprised of nationalism and consumer preference, to be correlated with product sales/ forecast using Big Data Analytics.   By far, a small fraction of studies has sought to correlate nationalism and ethnocentrism with Big Data Analytics to date. Globally accepted generic products are selected to expedite the process of data engineering. Two sets were arranged; passenger automobiles for transportation with an estimated $9 trillion global market and the smart phone, boosting its market size of approximately $5 billion .   Both products provide minimized cultural, linguistic, gender, age, and/or custom barriers of entry for prospective digital consumers, thereby allowing relatively unrestricted engagement with online reviews and purchases. A series of hypothesis tests indicates that there is a positive correlation between nationalism and automobiles, while a negative correlation for ethnocentrism.   As to smart cell phones, however, both nationalism and ethnocentrism had nominal control factors.   Multi-variate analytics were performed by using R and Tableau Public.

Keywords: big data, data analytics, digital business, electronic commerce, on-line reviews, nationalism, ethnocentrism.

HOW TO DECREASE THE ADMINISTRATION AND REGISTRATION LOAD WITHIN THE DUTCH CARE SECTOR CONTINUOUSLY

Arjen Maris

HU University of Applied Science, The Netherlands

arjen.maris@hu.nl

Henny Van Gaalen

HU University of Applied Science, The Netherlands

henny.vangaalen@han.nl

ABSTRACT

Currently, within the Netherlands there is a major need for care personnel and research shows that the workload of care personnel is increasing every year. The effect is that the through-flow of employees is relatively short. Care personnel suggest a reduction of the administration and registration load to reduce the trough-flow effect. Undertaken initiatives to reduce the administration and registration load mostly had a focus on internal affairs. These initiatives did have some effect on the administration and registration load, but not continuously. The stakeholders of the care sector are constantly changing the 'rules of the game' by renewing the national care regulation. The reasons of these game changers are related to the (financial) results of the sector. This looks like a vicious circle, but research to confirm this is not found yet. Therefore our research question is stated: *"How can we decrease the administration and registration load of care personnel within the Dutch care sector continuously?"* In this short research proposal we point out our practical and scientific research trigger and our proposed research method for the first part.

Keywords: Dutch care sector, administration load, registration load, continuous reduction, public governance, process management, information management

USING FINANCIAL DATA TO SUPPORT SUPPLY-CHAIN-NETWORK RESEARCH.

Penina Orenstein
Seton Hall University, USA
penina.orenstein@shu.edu

ABSTRACT

In commerce, supply-chain management implies the management of the flow of goods and services, and the movement and storage of raw materials, work-in-process inventory, and finished goods from point of origin to point of consumption. By contrast, a supply-chain network (SCN) is an evolution of a basic supply chain. Due to rapid technological advancement, organizations with a basic supply chain can develop this chain into a more complex structure involving a higher level of interdependence and connectivity between more organizations, which constitutes a supply-chain network.

Unfortunately, supply chain networks are usually complex and often proprietary, and as such, it is not always possible to analyze supply chain networks without access to the underlying data and the dependencies that link them into a SCN. Researchers need to look towards alternate sources of data in order to build an understanding of a company's supply chain network and to identify the underlying processes that contribute to the supply chain end-to-end. It has become increasingly critical in today's world to adopt a data-driven approach in order to continue to build and enhance the supply chain networks of the future.

The successful management of the supply chain activities in a single firm often tie into its financial systems, and can in some instances, affect a firm's competitive advantage. For a supply chain network, there are multiple interactions, both between and across firms that would need to be analyzed. We would like to explore the crossover of using financial data to examine supply chain networks and their dependencies, which appears to be a relatively new avenue of research.

In this workshop, we first provide a brief overview of how financial data has been used to aid supply chain management research and then identify which financial concepts are needed specifically to facilitate supply chain network research. We demonstrate some key concepts via financial databases such as Bloomberg and FACTSET and conclude with a discussion on the advantages and limitations of using each database.

Keywords: supply chain network, data analytics, financial data

BUSINESS ANALYTICS: OPPORTUNITIES/CHALLENGES IN THE PRESENT BUSINESS ENVIRONMENT AND AN EXPLORATION OF FUTURE TRENDS

Alison Munsch
Iona College, USA
amunsch1@earthlink.net

ABSTRACT

The main purpose of this panel is to have an open discourse with industry professionals involved with business analytics to explore the meaning, opportunities and challenges of the function and discuss future trends from their unique perspectives. The panel discussion will be approximately 90 minutes in length. Many areas of discussion will be probed to include but not limited to:

- Technical skills and tools needed with employees for business analytics (BA);
- Acceptance issues of BA within the organization;
- Data security and maintenance considerations associated with BA;
- BA data integrity issues;
- Delivering relevant information in the given time for actionable business decision making;
- BA's ability or inability to address complex issues;
- Costs involved in implementing BA;
- Investment of staff time in implementation of BA;
- Strategic challenges to implementing BA;
- The future of BA.

ORGANIZERS AND PARTICIPANTS

Maria Jaime, Senior Analytics Manager, Merit Direct
Maria Jaime works as a Senior Analytics Manager in Merit Direct's Business Intelligence and Analytics Solutions. Throughout her career, she's been involved in a wide variety of multi-channel analytical projects including creating multi-channel attribution models, media mix models, revenue forecasting, circulation management and Paid Search testing. She is a graduate from Manhattanville College with a double-major in Mathematics & Business Management.

Yu Wong, Executive Director, Morgan Stanley
Using data derived from business analytics, Yu Wong provides creative and editorial direction for producing and publishing original content to the firm's digital channels, including its flagship global website, social media, newsletters, client-facing platforms and brand campaigns. Yu defines a framework for user-centric storytelling to support specific business content in service of the core brand narrative. Yu is a graduate of Harvard University.

Joseph Panzarella, Director of Analytic, Rokkan
Joseph Panzarella is a senior data analyst professional with over 20 years' experience in the advertising industry. He's also been an adjunct professor at universities including CUNY, Columbia University, NYU's School of Professional Studies, University of Florida and Yeshiva University. He's taught in multiple modes: face-to-face, online and a combination of both. Additionally, Joseph has designed data analytics and digital marketing courses for undergraduate,

graduate, and mid-career professionals. Joseph holds a Master's Degree from Syracuse University in Communications and a Bachelor's Degree from Stony Brook University.

Ronjan Sikdar, Senior Vice President, Product & Tech, Nielsen
Ronjan Sikdar leads the Product & Technology organization within Media Analytics at Nielsen, and his team of engineers, designers, developers, and product leaders develop and deploy analytics solutions to help clients in the media ecosystem make better decisions in today's fragmented, multi-screen world. He's a 15-year veteran at Nielsen whose prior roles have included sales, product development, and data science functions. Ronjan is a graduate of the 2013 class of Nielsen's Diverse Leadership Network and he is the Executive Sponsor of the Asian Affinity Link resource group. He attended Carnegie Mellon University and graduated with a Bachelor's Degree in Business Administration with a minor in Statistics.

Patrick Travers, Data Scientist, MetLife
Patrick Travers is a Data Scientist with a wide range of analytics experience in US Government as well as private industry. He has been a hands-on professional statistician and analyst as well as an analytics manager leading teams and projects conducting research and optimizing operations using data and advanced analytics. Patrick has also consulted independently with on-line and direct marketing companies. Patrick has a Bachelor's Degree in Philosophy from the University of the Philippines and an MBA from the Anderson School of Management, University of California, Riverside.

Alison Munsch, Assistant Professor, Iona College
Alison Munsch is an Assistant Professor of Statistics at Iona College and founder and principal owner of Insights for Actions Research, a marketing and research consulting organization. She has worked in the capacity of research professional in premier organizations including The Gillette Company, Pepsi Cola Company, Kraft Foods and MetLife. Alison Munsch holds a Bachelor's Degree in Psychology with a minor in Economics from City College of The City University of New York and a Master's Degree in Applied Research from Queens College of The City University of New York. She is a Psychology PhD from Saybrook University with a Certificate in Organizational Consulting. Alison Munsch is an experienced RIVA© trained moderator and a Synecticsworld© trained facilitator.

GOALS

A primary goal of the panel discussion is to hear from a cross section of industry professionals to discuss the methods for making business decisions using BA, and bring to light the challenge of collaborating with decision makers that are still comfortable trusting their gut feeling for making strategic decisions. An additional goal of the discussion is to enlighten attendees on applied trends in BA to inform research, pedagogy and business practice.

EXPECTED OUTCOMES AND CONTRIBUTION TO THE CONFERENCE THEME

Panel attendees will become more aware of the contemporary issues in the area of BA. Panel attendees will also be inspired to incorporate the knowledge gained in the session in their research, pedagogy and business practices. This panel discussion contributes to the conference theme by providing practitioner perspectives on BA.

IMPACT OF ACTIVE LEARNING SPACE DESIGN FEATURES ON STUDENT LEARNING OUTCOMES: A SURVEY AND A CONTENT ANALYSIS

Shaoyi He
California State University, San Bernardino
she@csusb.edu

Michael Chen
California State University, San Bernardino
MChensa@csusb.edu

Jake Zhu
California State University, San Bernardino
jzhu@csusb.edu

EXTENDED ABSTRACT

Active learning and active learning space design have become more and more important in American education at all levels from kindergarten to university (Beichner, 2014; Brooks, 2011; Gormley et. al., 2016; Kolb & Kolb, 2005; Oblinger, 2005; Park & Choi, 2014; Zimmermann, et. al., 2018). There have been many studies on various aspects of active learning space design, such as active learning spaces with technology tools (Cardullo, Wilson & Zygouris-Coe, 2018; Chiu, 2016; Resta, & Laferrière, 2007), e-learning (Chu, et. al., 2011; Stromie & Baudier, 2017; Xu & Wan, 2006), and student learning outcomes (Cole, Johnson & Eickholt, 2017; Blackmore, et. at., 2011; Dusenbury & Olson, 2019). There are also studies on the impact of space design features on teaching and learning (Bligh & Crook, 2017; Brown & Long, 2006; Chism & Bickford, 2002; Rands & Gansemer-Topf, 2017). In order to have a better understanding of active learning and active learning space design, this study conducts a survey on a group of students that have taken classes in newly designed and implemented active classrooms, and conduct a content analysis on the data collected from the survey, focusing on the impact of active learning space design features on student learning outcomes. This paper aims to answer the following research questions:

1) What are the most important features of the active space design that made the most impact on students' learning outcomes?
2) What are the least important features of the active space design that made little impact on students' learning outcomes?
3) What are the most important connections between active learning space design and student learning outcomes?
4) What features of the active space design are closely related to information technologies and could impact student learning outcomes?

The significance of this paper is two-fold: It would not only provide answers to the research questions that reveal the actual features of active learning spaces design that impact student learning outcomes, but also provide a content analysis for a better understanding of the most important connections between active learning space design and student learning outcomes.

REFERENCES

Beichner, R. J. (2014). History and evolution of active learning spaces. New Directions for Teaching and Learning, 2014(137), 9-16.

Blackmore, J., Bateman, D., Loughlin, J., O'Mara, J., & Aranda, G. (2011). Research into the connection between built learning spaces and student outcomes. Department of Education and Early Childhood Development, East Melbourne, Australia.

Bligh, B., & Crook, C. (2017). Learning spaces. In Technology Enhanced Learning (pp. 69-87). Springer, Cham.

Brooks, D. C. (2011). Space matters: The impact of formal learning environments on student learning. British Journal of Educational Technology, 42(5), 719-726.

Brown, M., & Long, P. (2006). Trends in learning space design. In D. Oblinger, (Ed.), Learning Spaces. EDUCAUSE. Retrieved June 22, 2018, from https://www.educause.edu/research-and-publications/books/learning-spaces/chapter-9-trends-learning-space-design.

Cardullo, V. M., Wilson, N. S., & Zygouris-Coe, V. I. (2018). Enhanced student engagement through active learning and emerging technologies. In Student Engagement and Participation: Concepts, Methodologies, Tools, and Applications (pp. 399-417). IGI Global.

Chism, N., & Bickford, D. (Eds.). (2002). The importance of physical space in creating supportive learning environments. New Directions for Teaching and Learning, 92, 91-97.

Chiu, P. H. P. (2016). A technology-enriched active learning space for a new gateway education programme in Hong Kong: a platform for nurturing student innovations. Journal of Learning Spaces, 5(1).

Chu, W., Zinkevich, M., Li, L., Thomas, A., & Tseng, B. (2011, August). Unbiased online active learning in data streams. In Proceedings of the 17th ACM SIGKDD international conference on Knowledge discovery and data mining (pp. 195-203). ACM.

Cole, Q., Johnson, M., & Eickholt, J. (2017, September). Creating Economy Active Learning Classrooms for IT Students. In Proceedings of the 18th Annual Conference on Information Technology Education (pp. 77-82). ACM.

Dusenbury, M., & Olson, M. (2019). The Impact of Flipped Learning on Student Academic Performance and Perceptions. The Collegiate Aviation Review International, 37(1).

Gormley, C., Glynn, M., Brown, M., & Doyle, J. (2016, October). Mobile learning spaces for a mobile generation: redesigning the classroom. In ECEL 2016-Proceedings of the 15th European Conference on e-Learning (pp. 239-248). Academic Conferences and publishing limited.

Kolb, A. Y., & Kolb, D. A. (2005). Learning styles and learning spaces: Enhancing experiential learning in higher education. Academy of management learning & education, 4(2), 193-212.

Oblinger, D. (2005). Leading the transition from classrooms to learning spaces. Educause quarterly, 28(1), 14-18.

Park, E. L., & Choi, B. K. (2014). Transformation of classroom spaces: Traditional versus active learning classroom in colleges. Higher Education, 68(5), 749-771.

Rands, M. L., & Gansemer-Topf, A. M. (2017). The room itself is active: How classroom design impacts student engagement. Journal of Learning Spaces, 6(1), 26.

Resta, P., & Laferrière, T. (2007). Technology in support of collaborative learning. Educational Psychology Review, 19(1), 65-83.

Scott-Webber, L., Strickland, A., & Kapitula, L. R. (2013). Built environments impact behaviors: Results of an active learning post-occupancy evaluation. Planning for Higher Education, 42(1), 28.

Stromie, T., & Baudier, J. G. (2017). Assessing Student Learning in Hybrid Courses. New Directions for Teaching and Learning, 2017(149), 37-45.

Xu, X., & Wan, J. (2006, September). Towards a p2p-based active e-learning space. In International Conference on Collaboration and Technology (pp. 262-269). Springer, Berlin, Heidelberg.

Zimmermann, P. A., Stallings, L., Pierce, R. L., & Largent, D. (2018). Classroom Interaction Redefined: Multidisciplinary Perspectives on Moving beyond Traditional Classroom Spaces to Promote Student Engagement. Journal of Learning Spaces, 7(1), 45-61.

Keywords: active learning spaces, design features, active classroom, student learning outcomes, user feedback, student engagement, content analysis.

USING CONTENT ANALYSIS IN THE CLASSROOM TO STUDY BITCOIN

Kevin Lee Elder
Georgia College & State University, USA
kevin.elder@gcsu.edu

Tanya Goette
Georgia College & State University, USA
t.goette@gcsu.edu

David Bender
david.bender@bobcats.gcsu.edu
Georgia College & State University, USA

Ron MacKinnon
rmackinn@georgiasouthern.edu
Georgia Southern University, USA

ABSTRACT

If you have been teaching for the most part of the last twenty years you have seen a change in the attitude of the students we are teaching. Yet, most professors are still trying to teach the same way they did twenty years ago. In this paper we present how we have researched new technologies in our Master's programs for Management of Information Systems and how we have used this research method (content analysis) to transform the classroom experience for the students in our undergraduate MIS program as they are part of the research collection of data this current semester. We detail the methodology used so that you can use the same methodology in your classrooms.

Keywords: bitcoin, financial infrastructures, content analysis, IS pedagogy.

ASSESSMENT OF NORTH CAROLINA CPAS' VIEWS ON THE DESIGN OF AN UNDERGRADUATE ACCOUNTING INFORMATION SYSTEMS CURRICULUM

Sathasivam Mathiyalakan
Winston-Salem State University, USA
mathiyalakansa@wssu.edu

Leslie Weisenfeld
Winston-Salem State University, USA
weisenfeldl@wssu.edu

George E. Heilman
Winston-Salem State University, USA
heilmang@wssu.edu

ABSTRACT

In today's highly interconnected, globalized, and technologically oriented business environment, firms of all sizes require professionals who can use Information Technology (IT) in a variety of ways ranging from supporting operations to gaining competitive advantages through data manipulation and analysis. Accounting profession is also no exception. As a response to the need for accounting professionals who can work productively in the new environment, academic institutions have revamped their curriculum to include technologically oriented courses that are generally described as "Accounting Information Systems." Other than the need for widespread use of Microsoft Excel, there is no agreement on the type and extent of the use of technology within Accounting Information Systems courses. Over the last two decades there has been growing interest in exploring the topics that should be included in undergraduate Accounting Information Systems courses to ensure that graduates of such courses have the skills needed to productively use the increasingly diverse set of IT within the workplace. In this study, we report on the results of data collected from a survey of North Carolina CPAs on the type and importance of IT skills that CPAs think should be included within an AIS curriculum. This research attempts to overcome previous studies' shortcomings by surveying CPAs who are not working primarily in public accounting, in particular, "Big Four" accounting firms. Another strength of this study is that we identify technologies that have not been examined in previous studies.

Keywords: accounting information systems, information technology skills, practitioner views, undergraduate education.

GLOBAL PROJECT MANAGEMENT - CHINESE AND AMERICAN CULTURAL DIFFERENCES

Ko-Hsin Chen
Seattle Pacific University, USA
chenk1@spu.edu

Gerhard Steinke
Seattle Pacific University, USA
gsteinke@spu.edu

ABSTRACT

This paper investigates cultural differences between Chinse and American project managers in the IT industry through a pilot study of interviewing six professional project managers with qualitative and quantitative questions. The interview questions were developed to compare core Chinese values and cultural styles with American cultural styles. The results found that Chinese and American project managers in the IT industry have similar ideas regarding resistance to corruption but have differences toward the idea of trustworthiness, harmony, avoiding confrontation, and non-competition.

Keywords: global project management, cultural differences, Chinese cultural style, American cultural style

BUSINESS. ETHICS. INEVITABLE DILEMMAS OF MULTICRITERIA DECISIONS

Susanna Cahn
Pace University, USA
ecahn@pace.edu

ABSTRACT

Rational *business* decisions rely on measures of success: profit, market share, cost, quality. *Ethical* decisions sustain right behavior and moral obligation based on outcome/consequences or process/principles, often multiple relevant measures. Where measures conflict or create ambiguity, setting priorities aids choice among mutually exclusive alternatives. Business-ethics decisions involve both business and ethics measures, inherently multi-criteria. The simplest case with one business and one ethics measure, yields three possibilities: both measures indicate success, one measure indicates success while the other indicates failure, both measures indicate failure. More measures—more possibilities. Such complex decision situations require more than just knowing what is right. They are *dilemmas*: rational choice alone is insufficient. Responsibility for selecting decision criteria and priorities, with ensuing consequences, inhere to the decision maker. Decision scientists recognize ethics as a factor, but no universal optimum or standard framework. How to program autonomous vehicles for potential accidents is a business-ethics dilemma. Who are the preferred victims? All options are bad yet one of them will happen. Fully automated algorithms create distance between priority setter and consequences. In an imperfect world (the real world we live in) separation from responsibility can be dangerous. Human-machine systems are more responsible than fully automated systems, and more efficient than fully human systems.

Keywords: business ethics, multicriteria, dilemma

SKILLS TO SURVIVE IN THE RISE OF THE FOURTH INDUSTRIAL REVOLUTION

Frank Lin
California State University, San Bernardino, USA
flin@csusb.edu

Yi-Ting Chang
California State University, San Bernardino, USA
006699414@coyote.csusb.edu

Yuan-Ning Yu
California State University, San Bernardino, USA
006178584@coyote.csusb.edu

Ying Wei
Yunnan Normal University, China
weiying861@163.com

ABSTRACT

We are writing this paper to help people understand the impact of the Fourth Industrial Revolution, the most desired job skills needed, and the things that higher education, business, and government can do to survive with the upcoming impact. To find out the most desired job skills in industry, we utilized text mining techniques to examine a large collection of job descriptions from industry to perform analysis. We not only concluded the top 10 desired job skills throughout business and technology industries but also found some actionable information in the analysis that can help education, business, and government to make informed decisions to positively impact communities.

Keywords: job skills, fourth industrial revolution, text mining

ONLINE THREATS AND SECURITY CHALLENGES FOR SMART CITIES

Emmanuel Opara
Prairie View A&M University, USA
euopara@pvamu.edu

Oredola A. Soluade
Iona College, USA
osoluade@iona.edu

EXTENDED ABSTRACT

Digital and Media security view of a smart city identifies a holistic component of the security landscape within a smart city in places such as Prairie View, Hempstead, Brenham, Waller, Pine Island, Hockley etc. These will pinpoint the security threats and provide insight into the digital investigation to protect the smart cities concept. Smart Cities are made up of diverse and interconnected network components that are easily hacked and compromised by various bad actors. These components include Smart Grids, Smart vehicles with enabling Internet of Things [IoT], the Cloud platform etc. With the increase of IoT, threats and criminal misuse in these smart cities are exploding exponentially while the remedies to mitigate these concerns are lacking. When a breach involving critical component of the smart city infrastructure happens, measures must be implemented to mitigate evidence to facilitate the forensic investigation process. Digital and media forensic preparedness and solutions from best practices from past forensic analysis will curtain and help protect affected smart cities against future attacks.

Since smart cities services extend into several IOT domains including health, home energy management, smart environment – smart grids; smart living – the building of automation systems; smart mobility – unmanned aerial vehicles or smart vehicles, etc., any mishap of smart city vulnerability, when exploited by a hostile or malicious actor, can jeopardize city projects. In cases of a smart power grid, protection is needed because of its interconnected components. Some of these components include smart meters that record energy consumptions which relays data to power companies in the rural area. If these are not protected, vicious actors can sniff for data which can be used to profile home users. Malicious actors can attack vulnerable rural infrastructures by jamming the signal of smart meter transmissions. These could trigger impair demand-response on household in targeted vicinities. Vicious cyber actors can launch distributed denial-of-service [DDoS] attacks on unwitting rural dwellers thereby hampering the supply of critical services to their homes. Another area of concern is the smart cities that use intelligent transportation system to resolve traffic management systems that are used to communicate with the police and law enforcement agencies. The Apps used can be hacked there-by generating false positive reports. The transport systems can be infected with ransomware thereby generating negative consequences.

METHODOLOGY

Survey questionnaire will be distributed to individuals in the sampled population area of Prairie View, Hempstead, Brenham, Waller, Pine Island, Hockley . Questions will include current challenges -driving forces – problems to be addressed for building smart cites. These will pertain to the following:

1. Population – to include managing growth, aging population,
2. Resources – to include water shortage, managing energy,
3. Economy – to include economic slowing down,
4. Safety and security – to include content protection, and data privacy
5. Health and well-being – to include health monitoring system, health support system and accessibility
6. Communication to include internet connectivity, network speed, easy network setup.

An understanding of critical infrastructure requirements and risk management strategies are an important part of developing a smart approach to the implementation of this technology. Doing so is critical to overcoming urban security challenges.

These six steps can provide a smart starting point: This study of digital media forensics is not just the art of finding deleted or hidden data within a smart city environment, but smart technology gives city agencies an opportunity to increase operational efficiency and improve the quality of life.. The study will present scientifically valid information to rectify any breach. Network and digital media forensics is a growing science that governmental agencies have long practiced, and smart cities in the rural areas especially, will benefit tremendously with the technology.

TOOLS FOR INVESTIGATION

This study will use forensic and detection tools to analyze the methods of identifying and analyzing vulnerabilities of smart cities. These will include the smart cities procedures, resources, stand-alone computers, workstations, servers for network and online media. An Intrusion detection system [IDS], Wireshark, Nmap, Mataspoit, Nikto, Rekall, Volatility Memory Forensic, Memorize Fire Eye, Redline, DumpIT and FTK Imager.

Keywords: smart cities, threats, challenges

HOW DOES HOMECOURT ADVANTAGE IN THE NATIONAL BASKETBALL ASSOCIATION DIFFER PER TEAM DEPENDING ON EACH TEAM'S OVERALL STRENGTH?

Jonathan Liu
University of Chicago, USA
jliu2367@uchicago.edu

Chang Liu
Northern Illinois University, USA
cliu@niu.edu

ABSTRACT

If one has no knowledge of the National Basketball Association (NBA) and must bet between two teams playing a game against each other, which team should that person choose? The home team is the better choice. Previous literature has found that overall, home teams win more games than road teams in the NBA. However, do certain teams benefit more from homecourt advantage than others? In particular, how does homecourt advantage in the NBA differ per team depending on each team's overall strength? This study hypothesizes that average teams benefit more from homecourt advantage than below average and above average teams. However, the results of this study found that a team's overall strength does not significantly impact how much it benefits from homecourt advantage. The effect of homecourt advantage was found to be relatively the same in below average, average, and above average teams.

Keywords: big data, business analytics, gaming, NBA.