

Assignment 1 Innovation & Research.

by Kai Higgins

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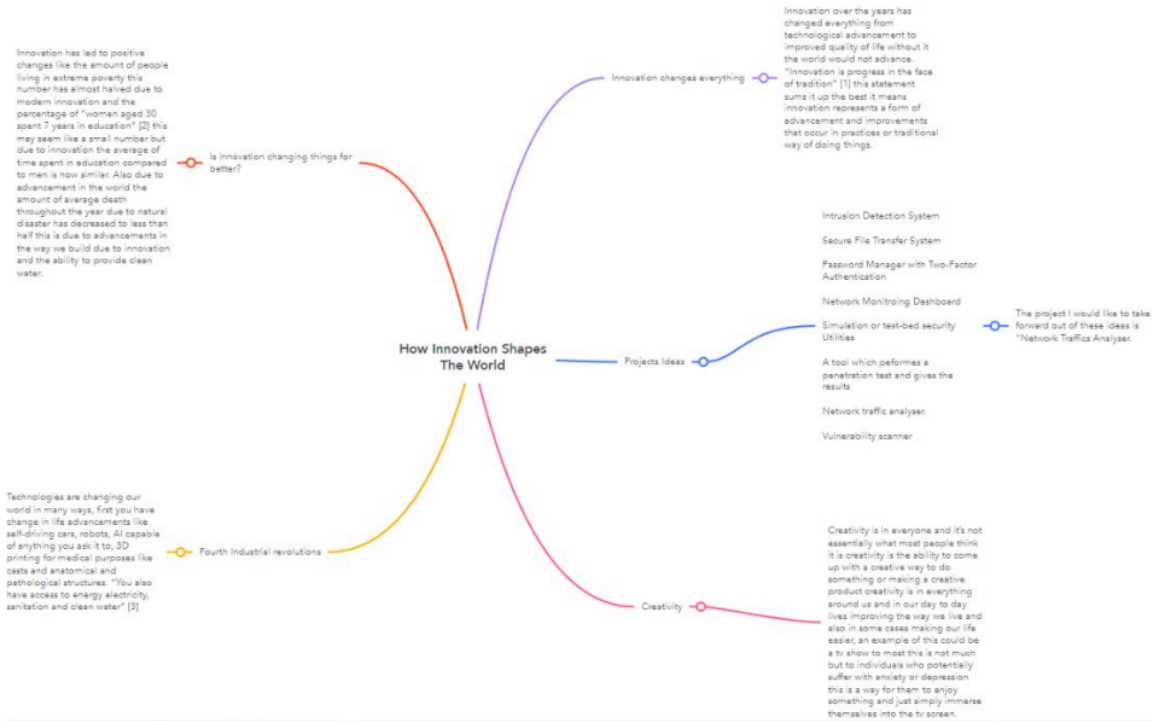
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CM-CVC Assignment 1 | Kai Higgins 2104154 | Changemakers: Creativity and Value Creation

20 July 2023 13:56

Introduction

In this assignment I embark on a journey about a network analyser tool and how to use this, throughout I have to use multiple different research techniques and also write both aim / objectives on the task. I have also been tasked with learning different and unique ways to search for information about the tool. I also learn about survey and certain graphs I could use.



Mind map link due to image being blurry in PDF -
<https://mm.itwapp/imap/3159892451?re=XMSQu311c>

Task 2

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Aim & Objectives for my project.

Aim

Develop a Network Traffic Analyzer to enhance cybersecurity, providing real-time monitoring and analysis for identifying and mitigating potential threats, ensuring a secure and efficient network environment.

Objectives

Document the flow of the network and analyse this information from a cybersecurity perspective identifying any irregular patterns and potential threats.

Implement a real-time monitoring system which can analyse network traffic and achieve the most accuracy possible.

Develop an interface that is easy for most to understand allowing for security and network administrators to use the program and be able to identify any unidentified threats and block them.

Keep the program as updated as possible due to emerging cybersecurity threats becoming more and more complex, and more frequently made.

Research Philosophy for my project.

For the research philosophy I believe that constructivism best suites my approach "Constructivism is the theory that says learners construct knowledge rather than passively take it in [4]" due to the project being focused on creating an actual program which is never the same and always changing.

Constructivism aligns with my project as a good strategy in many ways first the project I have chosen Network traffic analyser this is context dependent, meaning in certain a company that wants to only monitor actual network traffic and not threats, and the other network would rather monitor for security a constructivist approach allows for a nuanced understanding of these subjective elements.

"Constructivist philosophy supports the idea that knowledge evolves overtime" [5] and in the field of cybersecurity this is exactly the case, new threats emerge almost every day and no one knows what the threat is going to be so approaching it from a constructivist approach is the best way to tackle the problem.

Appropriate search tools including some specific research databases to identify research related to your project area and use search strategies to identify relevant research related to your project.

For the research databases I have chosen is "Google Scholar" due to "Google Scholar searching relevant work across the world of scholarly research" [3]. I'm going to also use "UWTSD Online Learning Resource" and finally "IEE Explore".

I am going to first start with "Google Scholar", this is due to it being a very versatile and freely accessible search engine. For the search strategies for Google Scholar, I initially started with keywords and phrases making my search looking something like "Network Traffic Analysis" AND "Cybersecurity" AND "Intrusion Detection" to further refine the search I then made the reply from only 3 years ago. This gave a successful article that came up to help me with my research <https://ieeexplore.ieee.org/abstract/document/9441338>.

Next, I used UWTSD Online and for this search I am going to use the Wildcard search method the idea of a Wildcard search is to "Locate multiple items with similar, but no identical data" [6] meaning it will bring me sources like my search so I can explore more articles and potentially find a different approach to my research.

For this search I used "Network Security * Course" meaning this would bring up various courses related to network security which is essentially what I am needing to research for my project.

And Next I am going to use IEEE this is for a more focused and technical exploration. IEEE is a digital library for IEE (Institute of electrical and electronics engineering) it focuses on engineering and computer science related research.

I used a "Boolean" method for IEEE due to it being such a specific and useful database, first I went for ("Network Traffic Analysis" OR "Traffic Analysis in a Network") AND "Intrusion Detection".

My first part ("Network Traffic Analysis" Or Traffic Analysis") this would give me any document containing either network traffic or traffic analysis, and when I added "AND Intrusion Detection" this would refine the search to include the term "Intrusion detection".

Task 3

14 February 2024 11:50

Research Strategies.

Validity

Work with cybersecurity experts to check if the identified irregularities really show security issues and the results and threat detection are consistent to prove the detection system is trustworthy.

“Employ Cross-validation methods to assess the model's performance using different subsets and networks” confirming that irregularities are detected and a security issue. [7]

Reliability

Making sure that the traffic data on multiple networks is the same when it comes to detection, the way I will monitor this is purposely injecting security threats and if the detection tool is consistent on all networks, it will pass this test this will be done multiple times tested and rested to ensure the results are the same.

“People consistency this is the use of a human to check scores and responses are correct” [8]. I will also run the same test but with other qualified people who are also able to see if the network scanner is working consistent throughout.

Generalizability

Test the tool in different places and networks, also maybe run a test on the tool if a VPN is in use to see if this may create a problem.

Also Test to see if the tool will work not only on pcs in the networks but wireless devices on the network also sending files across.

Ethical Considerations

Making the company aware of the tools role and what it will scan for and make them aware it will scan files across the network, also ensure that it is not possible to see what the files are only the tool will read and both discard of the information, then make the company aware that if the file is malicious they give the tool consent to then sent this information to me who can see if this is a new threat or more common threat to the network and make adjustments or improvements to the tool.

Research Strategies / Data Collection

Experiment

Make Controlled experiments to assess the accuracy and stability of the Network detection system, use multiple scenarios and different types of threats on the network. Then collect the data through Log Files and record the findings to make sure the results are correct.

Survey

Make a survey targeted for cybersecurity professionals and network administrators. The aim of the survey is to ask questions like “Is the program easy to understand” “What would you change in this program” and “Would you use this program in your own network” questions like this would give me a good idea on how to adjust / tweak the program. I would then download all the results from the survey review and then review and adjust accordingly.

Review of Literature

I will use multiple different types of sources on "Network Traffic Analysis" using multiple and importantly reliable pieces of information both online and books within the last 3 years. I will inspect any potential case studies in the research and potential real-life examples of when this was used and how it went / any flaws to look out for. The idea of this literature review is to focus on gaps in my knowledge on this subject and have a complete understanding of how to make this program work. I will then document all my findings as I go along and note down any useful information.

Pilot Data Collection

I will write a survey and give this to a few networking and both cybersecurity experts to review my program.

Survey Response

What do you think of the project idea?

I find the project idea intriguing, especially considering the increasing importance of network security in today's digital landscape.

Do you find it relevant from a networking standpoint?

Absolutely, the project seems highly relevant for improving network security, providing a proactive approach to identifying and mitigating potential threats.

Can you share your impact on how this project idea may help companies?

The project has the potential to significantly enhance companies' cybersecurity posture by providing real-time monitoring and analysis, minimizing the risk of security breaches.

Do you see any issues or challenges with my project?

While the concept is promising, potential challenges might include ensuring seamless integration with existing systems and addressing the diverse needs of different organizations.

Are there any improvements you could suggest for my project?

Consider incorporating user-friendly interfaces and ensuring scalability. Additionally, regular updates to adapt to evolving cybersecurity threats would enhance the project's effectiveness.

Overall, how likely would you be to recommend this project to a company?

I would highly recommend this project to companies seeking robust network traffic analysis solutions. Its potential impact on security makes it a valuable investment.

Peter Siow | 2104217 (Replied to my survey)

Research Strategies

Quantitative Methods

The idea of using numerical data and statistical analyses to measure and both showcase results.

Descriptive

A graph to show the network flow and the amount of successful malicious files intercepted on the network.

Frequency table

A table to show the amount of time a malicious file was purposely injected into the network and the number of times the program detected it successfully noting down a tally of every successful interception.

Qualitative

Survey Research

The advantage of survey research is "Having a large population allows for greater statistical power, the ability to gather large amount of information" [9]. A survey for network admins and cybersecurity professionals

Interview

Interview qualified cybersecurity and networking experts to see if the program performs up to standard and if there are any potential adjustments I could make to the program.

Reference Page

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Unit 1 Topic 1: How innovation shapes the World

12 March 2024 22:33

Reflect : Make a list of 5 things you have used or activities you have engaged in that would not have been around 5 years ago.

Kahoot
Gaming
5G
FaceID
Smart Home

What is the fourth Industrial Revolution?

Revolution	Year	Information	
	1	1784	Steam, water, mechanical production equipment
	2	1870	Division of labour, electricity, mass production
	3	1969	Electronics, information technology, automated production
	4	?	Cyber-physical systems

Reflect

Drag the characteristics to the correct revolution.

Each characteristic will appear one at a time.

Submit

Check

By 2025, what percentage of people are expected to be wearing clothes connected to the internet?

☐ 5% ☒ 10% ☐ 15%

Within the next decade, how many sensors are estimated to be connected in the Internet of Things?

☐ One billion ☐ One million ☒ One trillion

Submit

Defining Creativity

Do you consider yourself to be a creative person?

Personally I feel as though I am not a creative person I tend to follow what everyone else is doing and never have really made anything myself.

In a couple sentences describe an experience from your past where you feel you were discouraged/encouraged to be creative and how this might have affected how you feel about your levels of creativity.

Growing up I was encouraged to be creative by teachers and family members so I feel as though growing up I understood how to be creative but never had the confidence to show my creative sides.

Why is creativity important in your subject area?

Problem Solving

Ability to solve most problems

In Networking threats are always changing so having to figure out creative ways to make a new infrastructure or solve a problem on the fly and to find creative ways to make certain program / code work is key

Unit 1 Topic 2 How do you solve a Problem?

13 March 2024 13:31

Different research philosophies you support.

I support most research philosophies due to the importance of research, I support Exploratory research this the focus on discovery and ideas. You also have descriptive research this is the more common form of research with structured surveys.

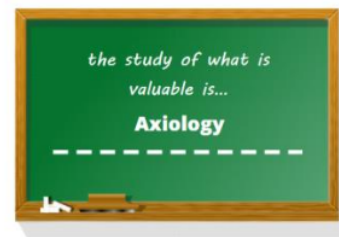
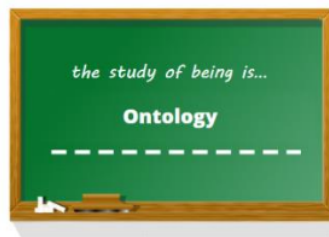
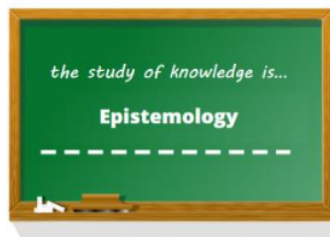
Check Tasks

 **Check**

Using creativity to **avoid stress** is:

- ☐ A contemplation tool
- ☒ A distraction tool
- ☐ A means of self-development to face challenges by building up self-esteem and confidence

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21 / 29

 **Submit**

Unit 1 Topic 3 - Known Knowns.

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Check List

? Check

1. A keyword is like a...

- ☐ A word that unlocks others.
- ☐ A word like a hashtag that summarises the meaning of a sentence.
- ☐ A way of distilling meaning that can be used to search databases.
- ☒ All of the above.

? Check

2. We can locate the keywords in our research by...

- ☐ Asking the library staff
- ☐ Using a piece of software
- ☒ Remove all superfluous words



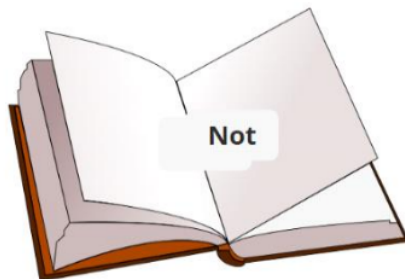
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? Check

3. Drag all the correct common Boolean operations to the book. Drag the incorrect options into the bin.



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Unit 2 Topic 2: Finding a needle in a haystack

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One reflect task where you analysed and evaluated your data collection plan for your research project.

Feedback I asked a cybersecurity professional to look at my project and gave them multiple questions to assess if my program was well written, and the research used was accurate and trustworthy.

Check Tasks

The image displays five screenshots of 'Check' tasks, each showing a question and its options. The tasks are as follows:

- Question 1 of 3:** What do we call it when we reduce the data of the population into a smaller manageable unit? We call it a...
 - ☒ Sample
 - ☐ Snowball
- Question 2 of 3:** Which of the following are relevant reasons for why we have to reduce the data we research into a smaller unit? (Choose which ones you think apply!)
 - ☒ Your time and resources may be stretched
 - ☒ There are limited people who have experiences you are studying
 - ☒ There are limited people/results with the relevance to the area you are studying
- Question 3 of 3:** When you select a sample from the population by picking the names out of a hat, what type of sampling are you conducting?
 - ☐ Unusual sampling
 - ☒ Random sampling
 - ☐ Stratified sampling
- Question 1 of 2:** If you wanted to understand the general characteristics or opinions of a group of people you would use a...
 - ☒ Survey
 - ☐ Interview
 - ☐ Experiment
- Question 2 of 2:** A 'Likert scale' is?
 - ☒ Respondents specify their level of agreement or disagreement on a symmetric agree-disagree scale for a series of statements
 - ☐ A way of confirming the validity of experimental research invented by Donald Likert in 1967

One Network task where you submitted an entry to the forum on how you will account for the Hawthorne effect during data collection

When collecting data clearly communicate the purpose of the network study to users and make them aware how you are using their data

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When I explored the qualitative options in my Network traffic analysis project, I understood how useful and the potential that qualitative data offers in understanding organisational opinions in network security.

I think for my project a time series chart may be useful when I need to compare patterns in network traffic. This will show a perfect visual representation of any irregularities that may occur during due to the chosen graph.

Check Questions

Forum Posts

Quantitative analysis
Accordingly to a vast amount of different sources all say 71% of Earth's surface is covered by water.

My example of a time series chart



Traffic Analyzer graph is clear and informative, capturing fluctuations over time. The labels are well-defined, but a more specific title and colour palette could enhance it. Consider adding annotations for key points. Overall, a solid representation deserving minor tweaks.

Peter Siow | 2104217 (Replied to my graph)

Assignment 1 Innovation & Research.

GRADEMARK REPORT

FINAL GRADE

GENERAL COMMENTS

86/100

Total:	86
1. Engagement with Literature Skills	
T1 Mind Map: + Some good use of citations and references included. T2: + Some good use of citations and relevant references included. T3: + Some use of citations and references included. – Could be extended. + Reference list format. Good.	16
2. Knowledge and Understanding Skills	
T1: + Good Knowledge and understanding of Unit1 topic 1 concepts, supported by citations. T2: + An appropriate research philosophy is defined and documented for the project. T3: + Relevant research strategies for data collection are documented and selected. + Different types of quantitative and qualitative analysis are outlined. + Linked to the project area.	18
3. Cognitive and Intellectual Skills	
T1: + Evidence of relevant concept and project idea analysis is documented. Good. T2: + A single Aim and relevant Objectives have been documented. Good.	17

T3: + Some relevant strategies to enhance validity, reliability, generalisability and ethical considerations are documented. + Related to the project area. – Some additional considerations could be documented with supporting citations.	
4. Practical Application Skills	
T1: + Good use of software to create the Mind-map. Clearly structured. T2: + Appropriate research engines and research databases identified. + Search strategies documented and used to identify some relevant research related to the project area. Very good. - Search strategies could be used to identify some additional sources related to the project area. T3: + Data collection method designed and used to acquire some feedback to improve the focus of the project.	1 7
5. Transferable Skills for Life and Professional Practice	
+ Introduction. + Tasks answers are generally clearly documented and structured. Good. - Some minor grammar errors. + Online content engagement. On-time/Late: OT.	1 8



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