

UNIVERSITY OF WESTMINSTER

TRENDS IN COMPUTER SCIENCE

4C0SC008C

COURSE WORK 2- PORTFOLIO

REFLECTIVE WRITING

**1) IMPACT OF CURRENT TRENDS IN COMPUTING ON
EMPLOYABILITY AND CAREER PLANNING**

B.R.M.I.U RATHNAYAKE

UoW NUMBER- 19532174

IIT NUMBER- 20220357

CONTENTS

1. INTRODUCTION

2. IMPACT OF COMPUTER SCIENCE ON MY CAREER PLANNING

3. POTENTIAL SPECIALISMS I SHOULD CONSIDER AS A PART OF MY FUTURE CAREER

4. FURTHER STEPS I SHOULD NEED TO TAKE PREPARE FOR FUTURE CAREER

5. CONCLUSION

REFERENCES

1. INTRODUCTION

Computer science is the discipline that seeks to build a scientific foundation for such topics as computer design, computer programming, information processing, algorithmic solutions of problems, and the algorithmic process itself. It provides the underpinnings for today's computer applications as well as the foundations for tomorrow's computing infrastructure.

(Brookshear and brylov ,2020)

Computer science field has continuously undergone with various trends, which decided the way how future computer technologies will stand out and it has opened gates for various new researches and career paths. Being a relatively new field containing vast amount of sub parts and technology attributes, computer science field has been a perfect opportunity for those who are seek something new apart from traditional career paths.

There for around last decade many employees have changed their career paths and have chosen computer science and technology field.

So, in this reflective writing, I am going to evaluate how computer science and its trends have impacted on my future career planning

This is a reflective writing. There for contents in this writing are mainly my ideas and also there will be information that are cited from books, journal, conference papers etc... all credits and rights of those contents are belonged to original creators

2. IMPACT OF COMPUTER SCIENCE ON MY CAREER

PLANNING

while the world is becoming automated computerized day by day, computer science related career paths are considered as one of the most engaging career paths in recent times. New trends of computing are gradually taking control of job markets and that makes most of the fresh beginners follow computer science and information technology related career paths.

Me, personally has taken an important decision to learn computer science for my higher studies and, for taking that decision new trends of computing and the way how careers and job markets have changed in recent times are heavily impacted.

At the beginning of my advanced level studies, I decided to follow arts stream to study geography and follow geography related career path. But after completing advanced level exams I realized that learning computer science and build up related career path has more potential value than following arts stream. so, I took a decision to follow computer science and that decision will surely change my future career planning as well.

When taking that decision, I considered the fact that computer science field with its new trends has spread across a large area and there is possible chance that I can reach a long way in this field if I have commitment and determination.

This is just the beginning of my journey in computer science field and I'm sure with new trends technologies that will introduce to this field, my career path will change even more across computer science field in a favourable manner

3. POTENTIAL SPECIALISMS I SHOULD CONSIDER AS A PART OF MY FUTURE CAREER

As the field of computer science grows, so does the number of its applications. If you decide to learn computer science, the fields of study in which you can specialize include software engineering, computer engineering, artificial intelligence and machine learning, human-computer interaction, the theory of computation, quantum computing, cyber security and many other fields.

Out of those specialized paths, I prefer to follow specialization in artificial intelligence and machine learning. Because those are core subjects of computer science and AI and machine learning field is rapidly evolving, there for new exciting opportunities are always found within that field.

4. FURTHER STEPS I SHOULD NEED TO TAKE PREPARE FOR FUTURE CAREER

Being computing students, we have so many chances to prepare ourselves for our future careers. Apart from the education we take from our institutes, we take several steps to prepare for future career.

We must keep our skills up to date. The thing about technology is it changes so fast. The skills we taught at few years ago may be out of date by now. Therefore we should always be updated with latest technology and skills.

Other thing we should do is practice continuously. In computing field, you can't gain success by just theory knowledge. We must practice hard. More we practice, more good results we take.

With those skills and practice, most importantly we should have the ability to think creatively and solve a problem. That is the most important skill for any career. Also, we should develop our social skills and communicating skills too.

5. CONCLUSION

So, I have stated how computer science has impacted my future career planning, potential specialized paths I should consider to follow and further steps I should take to prepare for my future career. Now it's the time conclude the outcome of this reflective writing.

From all the facts I have mentioned, I can conclude that computer science field and its current trends have made a significant change in the way how my future career path was laid on and I think computer science field will give me sufficient number of chances to build my career. So, I have to work hard and grab those opportunities.

(Word count- 828 words)

REFERENCES

1) Brookshear.G. J, Brylov.D

(2020). Computer Science- An overview.

Pearson Education Limited

UNIVERSITY OF WESTMINSTER

**TRENDS IN COMPUTER SCIENCE
4C0SC008C**

**COURSE WORK 2- PORTFOLIO
REPORT WRITING**

2) QUAMTUM COMPUTING

B.R.M.I.U RATHNAYAKE

UoW NUMBER- 19532174

IIT NUMBER- 20220357

CONTENTS

1. INTRODUCTION

1.1) WHAT IS QUANTUM COMPUTING

2. QUANTUM COMPUTINGS vs COVENTIONAL COMPUTING

3 NEW OPPORTUNITIES AND BENEFITS OF QUANTUM COMPUTING

4. IMPACT OF QUANTUM COMPUTING ON COMPUTER SECURITY

5. CONCLUSION

REFERENCES

1. INTRODUCTION

Quantum computing is one of the latest technologies introduced to computer science field.

This technology uses the principles quantum physics which are explaining about the nature of atomic and sub atomic particles. Purpose of this report is to provide a brief overview about what is quantum computing, quantum computing vs conventional computing, new opportunities and benefits of quantum computing and impact of quantum computing on computer security.

This report includes author's own ideas and contents browsed from books, journals, articles, conference sheets etc... All the credits and rights of those contents belong to original creators.

1.1. WHAT IS QUANTUM COMPUTING

Quantum mechanics, the subfield of physics that describes the behaviour of very small particles, provides the basis for a new paradigm of computing. Quantum computing was first proposed in the 1980s as a way to improve computational modelling of the very small physical systems. (Grumbling and Horowitz, 2019)

Quantum computing is mainly based on few basic concepts such as superposition and entanglement. They enable quantum computers to perform tasks at rates that are exponentially faster than those of traditional computers while using a fraction of the energy.

“The most striking feature of quantum mechanics is the existence of superposition states, where an object appears to be in different situations at the same time.” (Isart. O.R, Juan.I.M, Circa I.J, 2010)

Entanglement basically means that particles in quantum state are linked with each other despite of the distance between them. That indicates that they have a single, shared quantum state.

2. QUANTUM COMPUTINGS vs COVENTIONAL COMPUTING

from the start of computing since 19th century, the way of computing has been developing immensely at a continuous rate. But all those developments have occurred in a certain fixed conventional path. There for this type of computing is called as conventional computing.

But the way of computing took a significance change in 1980s when quantum computing was introduced. From there on conventional computing and quantum computing took separate paths and there are comparable differences between these 2 computing methods.

The main difference between quantum computing and classical computing is the data types they use for store information. Quantum computers use special data structures known as qubits (quantum bits) for operations. Basically, it is the quantum version of classical binary bits. A quantum bit can exist in multiple states at once. It can exist as a 1, 0 or 1 and 0 at the same time. But in conventional computing use bits as usual. Bits cannot exist in multiple states at same time.

Other differences are quantum computers are expensive and need special conditions to set up them while conventional computers are less expensive and do not need special conditions for setup. Also, quantum computers have high error rates because they cannot be disturbed by external waves. But conventional computers have less error rates. Quantum computers are best appropriate for special tasks like data analysis and problem-solving conventional computers can be used for daily activities.

3. NEW OPPORTUNITIES AND BENEFITS OF QUANTUM COMPUTING

Introduction of quantum computing has been a boost for many sectors. Specially in sectors where large number of computations have to be done.

Financial field is one such area. The idea of applying quantum mechanics to finance is not a new one: some well-known financial problems can be directly expressed in a quantum-mechanical form. Even the entire financial market can be modelled as a quantum process, where quantities that are important to finance, such as the covariance matrix, emerge naturally (Orús.R, Mugel.S, Lizaso.E, 2020)

Big data analysis is another sector. Quantum computing is capable of administering large data sets at much faster speeds and can supply data to AI technologies to analyse data at a more granular level to identify patterns and anomalies. Quantum computing also can help integrate data by running comparisons between schemas to quickly analyse and understand the relationship between two counterparts. (Provost.B, Luo, 2022)

4. IMPACT OF QUANTUM COMPUTING ON COMPUTER SECURITY

Along with many opportunities and advantages, there are also some concerning facts about using quantum computing. Specially regarding computer security.

Here is one such potential security concern. At present public key encryption is one of most reliable cybersecurity techniques. It is almost impossible break a public key encrypted program from a normal computer. But with quantum computers' super positioned qubits there is a strong possibility that an attacker can break encryptions from using quantum computing

5. CONCLUSION

By referring contents of this report, can conclude that quantum computing is one of the latest and most important introductions to computing field. There are noticeable differences between quantum computing and conventional computing and there are many benefits of quantum computing. Quantum computing is still at the primary stage of its development. But at a certain point quantum computing can be used for activities that have potential risks. Computing Community should be cautious and take necessary steps to avoid those acts.

(Word count-814 words)

REFERENCES

1. Grumbling. E, Horowitz. M

(2019). Quantum computing: Progress and Prospect

The national academies press

2. year = {2010},

month = {mar},

volume = {12},

number = {3},

pages = {033015},

author = {Oriol Romero-Isart and Mathieu L Juan and Romain Quidant and J Ignacio Cirac},

title = {Toward quantum superposition of living organisms},

journal = {New Journal of Physics}

Doi = {10.1088/1367-2630/12/3/033015}

3. Román Orús, Samuel Múgel, Enrique Lizaso,

Quantum computing for finance: Overview and prospects,

Reviews in Physics,

Volume 4,

2019,

100028,

ISSN 2405-4283,

<https://doi.org/10.1016/j.revip.2019.100028>.

4. provost, lu. J

(2022) Quantum Computing and The Future of Big Data

ISG ONE

UNIVERSITY OF WESTMINSTER

**TRENDS IN COMPUTER SCIENCE
4C0SC008C**

**COURSE WORK 2- PORTFOLIO
REPORT WRITING**

**3) INTERNET OF THINGS AND ITS CYBER SECURITY
IMPLICATIONS**

B.R.M.I.U RATHNAYAKE

UoW NUMBER- 19532174

IIT NUMBER- 20220357

CONTENTS

1. INTRODUCTION

1.1) WHAT IS INTERNET OF THINGS

2. INTERNET OF THINGS vs TRADITIONAL INTERNET

3 CHALLENGES IOT CREATES FOR CYBERSECURITY

4. HOW TO OVERCOME THOSE CHALLENGES

5. CONCLUSION

REFERENCES

1. INTRODUCTION

The Internet of Things (IoT) is an important topic in the engineering, politics, and technology industries and has made headlines in both specialized and general media. As a result of improvements in computer power, electronics downsizing, and network connectivity, this technology is implemented in a wide range of networked goods, systems, and sensors that provide new capabilities that were not before feasible.

Purpose of this report is to provide a brief overview about what is Internet of things, internet of things vs traditional internet, challenges IoT creates for cybersecurity and how to overcome those challenges.

This report includes author's own ideas and contents browsed from books, journals, articles, conference sheets etc... All the credits and rights of those contents belong to original creators.

1.1) WHAT IS INTERNET OF THINGS

The term Internet of Things generally refers to scenarios where network connectivity and computing capability extends to objects, sensors and everyday items not normally considered computers, allowing these devices to generate, exchange and consume data with minimal human intervention. There is, however, no single, universal definition.

(Rose, Eldridge, Chapin, (2015))

The widespread use of IoT devices has the potential to drastically alter many facets of how we live. Consumers are inclined toward an idea of the "smart home," which offers more security and energy efficiency, thanks to emerging IoT items including Internet-enabled appliances, home automation components, and energy management gadgets. The way healthcare services are provided is changing as a result of other personal IoT devices including network-enabled medical equipment and wearable fitness and health monitoring gadgets.

2. INTERNET OF THINGS vs TRADITIONAL INTERNET

There are obvious and notable differences between internet of things and traditional internet. The first and most grasped difference between the traditional Internet and the [IoT](#) is the identity of the content creation. the content in the traditional Internet is consumed by request; that is, one has to ask a query, issue a search or send a request for a web service in order to consume the content. On the contrary, in the IoT, the content is typically consumed through pushing the technology as a notification or triggering an action when a situation of interest is detected. (Etzion, (2015))

There is also a difference in the value to the consumer. In the traditional Internet, value is found in providing an answer to a query given by the user, frequently while they are looking for information or using a service.

In the traditional Internet, the connection is done through physical links between web pages. In the IoT, the combination of data is required for situation detection.

3 CHALLENGES IOT CREATES FOR CYBERSECURITY

As a platform where thousands of components connected together, IoT provides platform for some cybersecurity vulnerabilities. “As we increasingly connect devices to the Internet, new opportunities to exploit potential security vulnerabilities grow. Poorly secured IoT devices could serve as entry points for cyberattack by allowing malicious individuals to re-program a device or cause it to malfunction.” (Rose, Eldridge, Chapin, (2015))

To further complicate matters, living in a hyperconnected environment will probably make it harder for us to carry out daily tasks without the aid of Internet-enabled equipment or systems. In reality, because certain manufacturers only produce linked gadgets, it is become more and more impossible to obtain some devices that are not Internet-connected. We really need safe IoT devices since we are becoming more connected and rely on them for basic functions.

4. HOW TO OVERCOME THOSE CHALLENGES

It's critical to realize that these gadgets' security isn't fool proof. Security for IoT devices is not guaranteed. IoT security is better thought of as a spectrum of device vulnerabilities. The spectrum includes extremely secure systems with several layers of security measures as well as completely unprotected devices with no security features. This will give users an idea about the security status of the devices they are using and they can use the devices as they desire. As new security risks emerge, device makers and network operators must constantly react to counter them.

5. CONCLUSION

by referring contents of this report, can conclude that internet of things is one of the most promising new technologies. IoT is noticeably different from traditional computing and IoT has made peoples' lives easier. But there are also various cybersecurity issues that have risen due to use of IoT. It is important understand those problems and find ways to overcome those issues.

(Word count= 795 words)

REFERENCES

1) Rose, Eldridge, Chapin, (2015)

internet of things, an overview

internet society

2) Opher Etzion (2015)

Differences between the IoT and Traditional Internet

RT insights

3) Rose, Eldridge, Chapin, (2015)

internet of things, an overview

internet society

