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Centre for Open and Lifelong Learning

FEEDBACK TUTORIAL LETTER

1ST SEMESTER 2023

ASSIGNMENT 2

INFORMATION TECHNOLOGY IN LOGISTICS

ITL611S

ASSIGNMENT TWO FEEDBACK LETTER

INFORMATION TECHNOLOGY IN LOGISTICS ITL 611S

Feedback on students' performance

Question 1

This question was a favourable question to students. They could easily get information on ethical issues on Traditional ethics in big data, Ethical Big Data Challenges, Trends in Big Data Analytics and How Big Data Analytics work. On these four the students did fairly well. On the fifth point the students just copied from the Study Guide and the Internet. Some students also copied from other students work.

The majority of the students did not reference their work and this led to some students having very high similarity ratios. Some students had as high as 96% similarity ratios.

Question 2

This question was answered very well by almost all the students as it was well covered by the Study Guide. The majority of the students did very well. Students showed a good understanding of RFID, the three main components and the benefits accrued from this technology.. They also had a good understanding of the types of barcodes. As I said this question was answered well but the main problem was that of referencing.

As was in question one the majority of the students did not reference their work and this led to some students having very high similarity ratios.

Below are sample answers to the assignment 2

Marking Guide

QUESTION 1 (25 MARKS)

“The speed of development in Big Data and associated phenomena, such as social media, has surpassed the capacity of the average consumer to understand his or her actions and their knock-on effects. We are moving towards changes in how ethics has to be perceived: away from individual decisions with specific and knowable outcomes, towards actions by many unaware that they may have taken actions with unintended consequences for anyone. Responses will require a rethinking of ethical choices, the lack thereof and how this will guide scientists, governments, and corporate agencies in handling Big Data ...”

Guided by the above insert, use the points provided below to elaborate on the ways Big Data impacts on ethical conceptions. You may cite real or imaginary examples to express your ideas where possible.

- (a) Traditional ethics in big data.
- (b) Ethical Big Data Challenges.
- (c) Trends in Big Data Analytics.
- (d) How Big Data Analytics work.
- (e) Five (5) Key technologies used in Big Data analytics.

(5 marks for elaborating on how Big Data impacts on ethical conceptions. This will also include cite real or imaginary examples)

ANSWER

The field of big data ethics itself is defined as **outlining, defending and recommending concepts of right and wrong practice when it comes to the use of data, with particular emphasis on personal data**. Big data ethics aims to create an ethical and moral code of conduct for data use.

In this context, ethical challenge refers to **the situation whereby every alternative is morally wrong and still one has to make a choice**' [69] p676. 'An ethical challenge occurs when one does not know how to behave and act in the best way...' [14] p93.29 Sep. 2021

a) **Traditional ethics in big data:**

Traditional ethical considerations focused on individual decisions and their consequences. However, with the rapid development of Big Data and associated phenomena such as social media, the complexity of ethical decisions has increased significantly.

Big Data involves processing large amounts of data that are often generated without the explicit consent or knowledge of individuals, leading to potential privacy violations and other ethical concerns.

b) **Ethical Big Data Challenges:**

The use of Big Data also presents several ethical challenges, including:

- **Privacy** relates to how data is protected and exposed, it is difficult to protect sensitive data when it comes to big data because of its volume and velocity which often leads to data leaks and cybercrimes. One example is the data leak that happened to the Chinese social media site Sociallarks, the media site was hacked because the site had an unsecured database. Bias: Big Data algorithms can perpetuate bias and discrimination if they are not designed and tested to mitigate these issues. For example, facial recognition technology has been criticized for producing inaccurate results for people with darker skin tones.
- **Transparency:** The complexity of Big Data analytics makes it difficult for individuals to understand how their data is being used and for what purposes. This lack of transparency can lead to mistrust and further privacy concerns.
- **Accountability:** It can be challenging to assign responsibility for the outcomes of Big Data analytics when the process involves multiple stakeholders and systems. For example, in the case of a self-driving car accident, who is accountable - the car manufacturer, the software developer, or the owner of the vehicle?

c) Trends in Big Data Analytics

The growing application of machine learning (ML) and artificial intelligence (AI) algorithms, the use of cloud computing and dispersed processing, and the fusion of big data with the Internet of Things (IoT) and other cutting-edge technologies are a few trends in big data analytics. These trends have the power to completely alter how businesses gather, analyse, and utilize data.

- d) Big data analytics work by collecting, processing, cleaning, and analysing data for the purpose of operationalizing big data. Firstly, the data is collected and stored, here structured and unstructured information is gathered from a wide range of sources e.g., IOT sensors, cloud storage etc., the data can be stored in data warehouses or in a data lake. Secondly, the stored data should be processed to get right results on analytic queries. There are two processing options namely, batch and stream processing. Batch processing is used to process large data blocks overtime while stream processing is used to process small data blocks at once. Thirdly, the data has to be cleaned to get better results, which is achieved by formatting data correctly and eliminating irrelevant data. Lastly, analytic processes are used to turn big data into big insights. The analytic processes are data mining which sorts through big datasets to identify relationships and patterns, predictive analytics which uses historical data to make future predictions and deep learning which uses artificial intelligence and machine learning to find patterns in complex data (Tableau, n.d.).

e) Five (5) Key technologies used in Big Data analytics

1. Hadoop: A software framework known as Hadoop allows for the distributed processing and storing of big datasets across computer clusters. It is a key technology used in big data analytics.
2. NoSQL databases: Large amounts of unstructured data, like social media streams, sensor data, and log files, can be handled by NoSQL databases. They are used to store and analyse this kind of data in big data analytics.
3. Machine learning algorithms: Machine learning algorithms are used to analyse big data and identify patterns, trends, and insights. They can be used to develop predictive models and inform business decisions.
4. Cloud computing: Cloud computing allows for the scalable storage and processing of big data in remote data centres. It is a key technology used in big data analytics.

5. Data visualization tools: Data visualization tools are used to create charts, graphs, and other visual representations of big data. They are used to communicate insights and findings to business stakeholders and decision-makers.

QUESTION 2 (25 MARKS)

Read the scenario below and answer the following questions:

Barcode and Radio Frequency Identification (RFID) are two examples of most commonly used Automatic Identification and Data Capture systems in the logistics and supply chain management around the globe.

1. Identify and explain three main components of RFID **[9 Marks]**
2. State and explain two different types of barcodes **[6 Marks]**
3. Discuss FIVE benefits of RFID over barcodes. **[10 Marks]**

ANSWER

a) Three main components of RFID

1. RFID Tags: An RFID tag is a tiny gadget with a transmitter and a microchip. The microchip stores information about the object that the tag is attached to, such as its unique identifier, product information, or location. The antenna allows the tag to communicate with an RFID reader via radio waves. Its sometimes referred to as a transponder. **[3 marks]**
2. RFID Reader: An RFID reader is a device that communicates with RFID tags using radio waves. The reader sends out a signal that activates the tag and reads the information stored on the microchip. The reader then sends this information to a computer or other processing device for analysis. Its sometimes referred to as an interrogator. **[3 marks]**
3. RFID Controller/Software: RFID software is the component that manages and analyses the data collected from RFID tags and readers. The software typically includes a database for storing and managing tag data, as well as tools for analysing the data and generating reports. Its sometimes referred to as a host. **[3 marks]**

b) Two different types of barcodes:

- One dimensional barcode- these barcodes are made only from vertical strips or bars, each barcode has its own means of identification, they are distinguished by their symbology, barcode density, valid characters, quiet zone and check digit. [3 marks]
- Two dimensional barcodes- these barcodes store information horizontally and vertically at the same time, they store more data than the one-dimensional barcode. The Two-dimensional barcode is widely known for its quick response code which restores data if some parts are damaged. [3 marks]

c) . Five benefits of RFID over barcodes

1. Higher data capacity: RFID tags can store much more data than barcodes. While a barcode can typically store up to 20 alphanumeric characters, an RFID tag can store up to 2 kilobytes of data or more. This means that RFID tags can contain more detailed information about an object, such as its manufacturing date, expiration date, and location history. [2 marks]
2. Faster read/write speeds: RFID readers can read and write data much faster than barcode scanners. This is because RFID technology does not require a line-of-sight connection between the reader and the tag, as barcodes do. Instead, RFID readers can detect and read multiple tags at once, which makes data collection and inventory management much more efficient. [2 marks]
3. Improved accuracy: Because RFID technology does not require a line-of-sight connection, it is less prone to errors caused by dirty, damaged, or obscured barcodes. RFID tags can also be read from a greater distance and in more challenging environments, such as inside metal containers or in extreme temperatures. [2 marks]
4. Enhanced security: RFID tags can be encrypted and password-protected, which makes them more secure than barcodes. This is particularly important in industries where data security is a concern, such as healthcare, finance, and government. [2 marks]
5. Better inventory management: RFID technology can provide real-time inventory tracking and management, which can help reduce inventory errors, stock-outs, and overstocking. RFID tags can also be used to automate supply chain processes, such as shipping, receiving, and storage, which can lead to significant cost savings and increased efficiency. [2 marks]

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