COS80023 Big Data – Lab 1

Lab 1: Pass Task 1 – Opportunities and Challenges

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1. What makes big data so interesting to organisations? Give at least three reasons and explain with the help of one or more examples.

Big Data helps organisations understand customers in more detail.

By combining information from different sources, they can get a 360° view of a person's needs. For example, if someone buys a motorbike, social media may show they are planning a road trip. This could lead to offers for gear like pannier bags, tents, etc. from online sites being suggested to them.

Sometimes data from multiple places can be linked to create new opportunities. For instance, if it is known that a person's birthday is coming and their sister is expecting a baby boy, ads for both birthday gifts and baby products can be shown.

Big Data supports automation, where algorithms can send suggestions or ads without manual work.

It is also used for business intelligence. Organisations can analyse the data to find out what is happening.

For example, Descriptive analysis looks at what has happened. Predictive analysis estimates what might happen. Prescriptive analysis suggests what actions to take.

Some organisations sell their data to others. Companies like Google, Facebook, WhatsApp, Telstra, and TomTom collect and sell large amounts of data.

It is also important in research, such as studying health, environment, or transport patterns. Big Data comes from people's online activity, organisations' business records, and devices such as sensors.

These sources together give businesses and researchers a wide range of useful information. It also allows companies to react faster to market changes by analysing trends in real time.

In competitive industries, using Big Data well can be the difference between gaining or losing customers.

2. Finding useful information in big data has its challenges. Name 5 challenges and explain how organisations can address them.

One challenge is storing large amounts of data while keeping it secure, fast, and able to grow. Using cloud systems and distributed storage can solve this.

Another challenge is combining data from different formats such as text, images, and numbers. ETL tools and data integration processes can align these formats.

A third challenge is interpreting data. Words may have similar meanings, different meanings, or spelling mistakes. Machine learning and natural language processing can help correct and interpret them.

A fourth challenge is deciding what to keep. Keeping too much takes up space, increases costs, and may create privacy risks. Clear rules for filtering and removing data are needed. The bulk of the data also makes it hard to process everything quickly.

A fifth challenge is protecting privacy and following laws like GDPR. This includes collecting minimal data, using it only for the original purpose, de-identifying personal information, keeping data in the same region, giving people access to their data, and reporting breaches quickly.

Poor data quality is another common challenge, as incomplete or inaccurate data can lead to wrong conclusions. Organisations can address this by setting up data validation checks and regular quality audits.

3. Explain the concepts of IoT and the connection between IoT and Big Data.

The Internet of Things (IoT) is a network of devices, machines, or objects that can send data over the internet without direct human input.

Basically, IoT provides the raw data, and Big Data provides the tools to store, process, and analyse this information to find patterns and useful insights to make decisions.

Examples include wearable fitness trackers, smart meters, and industrial sensors.

IoT creates a constant flow of data about usage, behaviour, and the environment.

Big Data systems store and process this information to find patterns and support decisions.

In aged care, IoT sensors can detect unusual movement and alert carers if someone might have fallen.

Air conditioners can use body temperature, room temperature, and past data to set the best temperature automatically.

This connection allows organisations to improve efficiency by monitoring systems remotely and acting before problems occur.

Together, they enable predictive maintenance, where problems can be fixed before they cause failures or downtime.

4. Explain how social media contributes to the opportunities of Big Data

Data types

Social media produces large amounts of data from posts, comments, likes, and shares. This helps organisations learn about people's interests, habits, and networks.

Targeted Marketing

When combined with other data sources, it can be used for targeted marketing. For example, knowing someone's birthday is coming and that their family member is expecting a baby allows ads for gifts and baby products to be shown.

Public Opinion, Trend Tracking and Brand Monitoring

Social media data can also track public opinion, trends, and customer feedback. It is used for brand monitoring and market research.

It also helps organisations test how audiences react to products or campaigns by analysing engagement and feedback.

Real Time Insights

Since social media is constantly updated, it is a continuous source for Big Data analysis. It also provides real-time insight into emerging topics, allowing organisations to respond quickly to public conversations.