FACULTY: MALAYSIA-JAPAN INTERNATIONAL INSTITUTE OF TECHNOLOGY (MJIIT)

SEMESTER 2-2024/25

TECHNOLOGY AND INFORMATION SYSTEM

COURSE CODE: SECP1513; SECTION – 16

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DESIGN THINKING

TEMA: BIG DATA AND ARTIFICIAL INTELLIGENT NEW INNOVATION

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1.0 Introduction

This report explores how Design Thinking can be used to create innovative solutions in the fields of Big Data and Artificial Intelligence (AI). Design Thinking is a problem-solving approach that focuses on understanding user needs, generating creative ideas, and developing practical solutions. When combined with the powerful capabilities of Big Data and AI, it can help address real-world challenges in a way that is both effective and user-friendly.

We going to highlights how this approach ensures that innovations are not only technically advanced but also meaningful and accessible to people. By focusing on empathy, collaboration, and continuous improvement, Design Thinking can guide the development of AI and Big Data technologies that truly make a difference in industries such as healthcare, business, education, and more.

2.0 Design Thinking Process

Key Stages of Design Thinking:

<Figure 1.0>
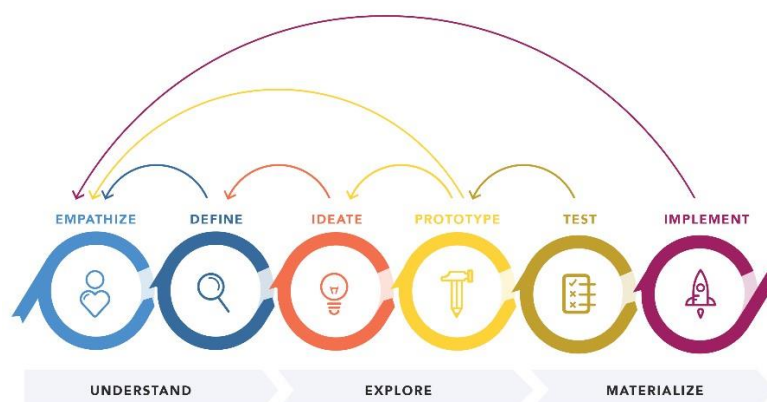
By using Design Thinking, you can create Big Data and AI innovations that are not just technically advanced but also meaningful, ethical, and user-focused. Here is the stages and examples of it:

<Table 1.0>

Design Thinking Stage	Description	Examples
Empathize: Understanding User Needs	Big Data and AI innovations are only valuable if they address real-world problems effectively.	- Identify target audience (e.g., businesses, researchers, healthcare professionals) - Conduct interviews, surveys, or field observations - Explore pain points such as data overload or difficulty interpreting AI-generated insights
Define: Framing the Problem	Clearly articulate the problem your Big Data and AI innovation aims to solve.	- Example Problem Statement: "Users find it difficult to derive actionable insights from massive datasets due to complexity and lack of intuitive AI tools."
Ideate: Generating Creative Solutions	Use brainstorming techniques to explore innovative ideas that leverage Big Data and AI.	- AI-powered dashboards for real-time data visualization - Predictive analytics systems tailored for specific industries - Tools that simplify complex datasets using natural language processing - Encourage diverse thinking within the team
Prototype: Creating Early Models	Develop prototypes to test ideas quickly and cost-effectively.	- Build a mockup of an AI-powered interface or a simple data analytics model - Incorporate usability, scalability, and AI-driven insights
Test: Gathering Feedback and Iterating	Test prototypes with real users to validate their effectiveness.	- Collect feedback on usability, relevance, and improvement areas - Iterate solutions based on testing insights

3.0 Detailed Description

3.1 Problems

Big Data and Artificial Intelligence (AI) are transforming industries by offering powerful tools to analyse, predict, and automate processes. However, several challenges limit their full potential:

- **Complexity**: Many AI and Big Data solutions are overly technical, making them difficult for non-experts to understand and use effectively.
- **Accessibility**: Small businesses and individuals often lack the resources to implement these technologies.
- **Usability**: Poorly designed interfaces and systems lead to a frustrating user experience.
- **Ethical Concerns**: Issues like data privacy, algorithmic bias, and transparency create trust barriers.
- **Integration**: Organizations struggle to integrate AI and Big Data into existing workflows due to a lack of tailored solutions.

3.2 Solutions

To address these issues, a **Design Thinking approach** was applied to develop innovative and user-focused solutions for Big Data and AI. The key steps include:

- **Empathy**: Conduct user research to understand the needs, challenges, and expectations of diverse stakeholders.
- **Problem Definition**: Identify specific pain points, such as difficulty in interpreting AI insights or a lack of user-friendly tools for managing large datasets.
- **Ideation**: Brainstorm solutions like AI-driven dashboards, predictive analytics tools, or natural language interfaces to simplify interaction with data.
- **Prototyping**: Create simple, functional prototypes of these solutions, focusing on user experience, accessibility, and practicality.
- **Testing and Iteration**: Gather feedback from users, refine the designs, and repeat the process to ensure the solutions align with user needs.

For example:

- A predictive analytics platform tailored for small businesses could provide actionable insights in plain language.
- A privacy-first AI system could ensure secure data handling, addressing ethical concerns.
- Visual analytics tools with intuitive dashboards could make complex data more comprehensible for all users.

3.3 Team Working

The success of this project relied on effective teamwork, combining diverse skills and perspectives to ensure comprehensive solutions. Key aspects include:

- **Collaboration**: A multidisciplinary team comprising data scientists, AI engineers, UX designers, and industry experts worked together to integrate technical innovation with user needs.
- **Communication**: Open communication channels and regular brainstorming sessions ensured alignment on goals and fostered creativity.
- **Role Distribution**:
  - **Data Scientists** focused on analyzing user data and creating algorithms. o **UX Designers** ensured the solutions were intuitive and user-friendly.
  - **Project Managers** coordinated efforts, maintained timelines, and tracked progress.
- **Feedback Loops**: The team continuously gathered user feedback and refined prototypes, ensuring solutions remained aligned with user expectations.
- **Tools and Platforms**: Collaborative platforms like Trello, Slack, and Figma were used to manage tasks, facilitate communication, and visualize designs.

4.0 Design Thinking Evidence

4.1 Empathy
Possible Questions and Answers for the User:

- **Q:** What challenges do you face daily in using Big Data and AI tools? **A:** I often feel overwhelmed by the sheer volume of data and find it difficult to extract useful insights quickly.
- **Q:** How do you feel about the current Big Data and AI tools you're using? **A:** The tools feel too complex and not intuitive enough for someone without deep technical expertise.
- **Q:** What would an ideal solution look like to you? **A:** It should be easy to use, with clear, actionable insights, and provide personalized recommendations based on the data.
- **Q:** What emotions do you experience when working with existing AI and Big Data systems?

  A: I feel frustrated and sometimes helpless, as the tools don't seem to align with my needs and I often don't know where to start.

Composite Character (User Persona):

Name: Muhammad Usman

Age: 25

Background: Usman is a mid-level professional in a fast-paced tech company, juggling work deadlines and personal development. They are tech-savvy but prefer tools that are intuitive and easy to use. Usman values solutions that reduce stress and enhance productivity without adding complexity.

4.2 Define
Defined Problem:

Usman needs an AI-powered tool that simplifies her interaction with Big Data, offering intuitive interfaces and actionable insights while reducing the overwhelming complexity of data analysis. Current tools don't address her emotional need for simplicity and efficiency.

Example Problem Statement:

"How might we design an AI and Big Data tool that simplifies data analysis, provides clear insights, and is easy to use for professionals like Usman who need to make quick decisions based on data?"

Unfulfilled Needs Example:

Usman needs a system that not only simplifies data visualization but also adapts to her work style, delivering personalized recommendations and insights based on her current tasks and challenges.

4.3 Ideate
Brainstorming Process:
Methods Used:
- **Mind Mapping:** Explore the frustrations Usman faces, such as confusion with complex dashboards, slow data processing, and overwhelming information. Then, brainstorm ways to simplify these issues.
- **SCAMPER Method:** Substitute difficult-to-understand data visualizations with simpler, interactive displays, combine AI with personalized insights to make data more actionable, and adapt the interface to Usman's working style by offering easy customization options.
- **Brainstorming with Stakeholders:** Conduct sessions with Usman and other similar users to understand the challenges they face with existing Big Data and AI systems.

Example Ideas:
- **Customizable AI Dashboard:** Develop an intuitive, user-friendly dashboard that prioritizes data and provides AI-driven suggestions based on user preferences and tasks.
- **Mood-Driven Task Management:** Integrate a feature where users input their mood or stress level, and the AI adjusts the data insights and tasks accordingly. For example, suggesting lighter data tasks when the user feels overwhelmed.
- **Mindfulness Integration:** Incorporate periodic reminders for mindfulness breaks or gamify data-related tasks to encourage mental wellness and productivity during heavy analysis sessions.

4.4 Prototype
Prototype Development:

- **Customizable Dashboard**: A prototype of the AI-powered dashboard was created, featuring a clean, easy-to-navigate interface with prioritization features based on user preferences. It included real-time analytics and basic AI-driven recommendations.
- **Mood-Driven Feature**: A feature was developed where users could input their mood, which would trigger tailored suggestions, such as simpler data tasks or offering mental wellness tips.
- **Mindfulness Integration**: A basic prototype included reminder notifications for breaks and a progress tracker to gamify task completion.

4.5 Test
Testing Process:

- **User Testing:** Usman and other users tested the prototypes in real-world scenarios, such as analysing datasets or making data-driven decisions. They provided feedback on the ease of use, features, and the effectiveness of the AI-driven insights.
- **Feedback Collection:** Users provided input on what worked well (e.g., intuitive interface, personalized task suggestions) and areas for improvement (e.g., mood input could be more detailed, AI recommendations could be more specific).
- **Iterations:** Based on the feedback, the dashboard's AI algorithm was refined to provide more tailored insights. The mood feature was expanded to allow for multiple emotion inputs, which better influenced the suggestions given. The mindfulness integration was tested by offering reminders after analysing data for long periods.

Reflection (Tahiya Nuzhath Khan)

The Design Thinking of BIG DATA AND ARTIFICIAL INTELLIGENT NEW INNOVATION has taught me the importance of empathy and user-centered approaches in creating solutions for Big Data and Artificial Intelligence. I learned how the stages such as Empathy, Define, Ideate, Prototype, and Test can guide the development of intuitive and impactful technologies. As a software engineering student, this knowledge will help me design solutions that are not only technically sound but also user-friendly and ethical. In the future, I aim to apply these principles to create meaningful technologies that address real-world challenges effectively.