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No23451

Reflective statement

E- portfolio components

# Reflective statement

**1. Introduction:**

This module has been a transformative learning experience, offering a rich and varied exploration of core computing concepts alongside essential ethical considerations. It has significantly evolved my understanding and approach to technology. Initially, my knowledge of AI was limited and often shaped by media portrayals.

**Link to E-portfolio:**

https://nima-osman.github.io/masters.github.io/Module\_6.html#stats

Delving into the global impact of generative AI and the complexities of establishing AI governance, as highlighted by Corrêa et al. (2023) and Deckard (2023), I was struck by the absence of a universally accepted definition of AI and the lack of globally agreed-upon laws governing its usage. This lack of consensus creates a challenging environment for both developers and regulators, requiring a nuanced approach to navigate the ethical, legal, and social implications of this rapidly evolving technology.

One particularly striking concept was the idea that autonomous AI could potentially develop its own ethical guidelines, shifting the discussion from AI being a tool used by humans to AI potentially operating on its own terms (Borghino, 2014; Cuthbertson, 2017; Spector, 2006). This raises profound questions about accountability, responsibility, and control, reinforcing the critical need for strong ethical frameworks in AI development. Reflecting on the historical progression of AI, including cycles of progress and setbacks (Spector, 2006), and the recent acceleration driven by Big Data (Duan, Edwards & Dwivedi, 2019), I became more critically aware of how these developments intertwine with societal concerns. The availability of vast datasets has enabled more sophisticated AI models but also raises concerns about privacy, bias, and potential misuse.

Examining the contrasting approaches to AI regulation across the world further deepened my understanding. The EU’s risk-based framework (European Commission, 2019), Asia’s focus on balancing innovation and control, and Africa’s emerging discourse on AI ethics (Kiemdi et al., 2022) illustrated how cultural values, economic priorities, and political systems shape regulation. The global challenge of creating unified ethical standards became evident, highlighting the need for international cooperation and adaptability.

Engaging in collaborative discussions around ethical dilemmas within the tech industry helped translate theory into real-world applications. Scenarios involving workplace harassment revealed how unethical leadership can persist without proper checks, underscoring the need for robust reporting systems and ethical training. We also explored a case where a web hosting company enabled cybercrime for profit, prompting reflection on corporate responsibility and the dangers of prioritising profit over integrity. The deceptive use of dark UX patterns highlighted the ethical role of designers in ensuring transparency and user empowerment. Additionally, a medical startup's data breach emphasised the importance of ongoing security audits to protect sensitive healthcare data. These discussions underscored the relevance of professional codes of ethics like those from the ACM and BCS in navigating complex workplace scenarios.

A major turning point for me was critically reviewing two academic papers on AI and Big Data. The first involved a survey on AI usage in radiology (Allen et al., 2021), where I questioned the application of the MOORA method and the unclear ranking criteria. The second was a study on predicting epileptic seizures using deep learning (Kiral-Kornek et al., 2018). While the methodology was solid, I noted limitations in dataset size and representativeness. These evaluations sharpened my analytical skills and underscored the importance of methodological rigour, clear communication, and the role of peer review in maintaining research quality. They also emphasised the value of representative datasets to ensure accurate, generalizable findings.

Exploring ethical dimensions of data access and privacy further solidified my understanding of responsible data use. A case study involving a researcher requesting property tax records highlighted the tension between advancing scientific research and protecting individual privacy (GDPR, 2018; ICO, 2020). I learned about the importance of informed consent, data minimisation, and building public trust—key principles that should guide all data-related decisions. When researchers contact individuals directly, respecting purpose limitation (ICO, 2020) and consent (GDPR, 2018) becomes even more vital. The broader message was clear: the pursuit of knowledge must not compromise ethical principles like transparency, privacy, and individual rights (BMA, 2021).

The ethical implications of misusing surveys came into sharp focus through the analysis of high-profile cases such as the Cambridge Analytica scandal (Confessore, 2018; Hinds et al., 2020). The scandal illustrated the risks of harvesting data without proper consent and its use in political manipulation, leading to a profound erosion of public trust and stricter data laws. Another case involved the Korean National Health and Nutrition Examination Survey (KNHANES), which was misused due to flawed statistical methods (Kim et al., 2013). This highlighted the responsibility researchers bear to use sound methodology and ensure their findings do not mislead or cause harm.

The module also offered practical, hands-on opportunities to apply statistical methods. Comparing two diets showed that Diet A led to greater and more consistent weight loss (Worksheets 7.1B & 7.2B), while frequency analysis revealed the dominance of the "Other" category in a dataset (Worksheet 7.3D). A t-test comparing two conditions (Worksheet 7.4F) helped build my understanding of hypothesis testing. These exercises improved my ability to interpret descriptive and inferential statistics, recognise patterns, and make evidence-based conclusions.

Using Excel to conduct hypothesis tests further reinforced my statistical skills. I interpreted results from one-tailed and two-tailed paired t-tests, understanding when and why to use each (Exercise 7.1, 7.2, 7.3). These activities helped me understand how to approach data scientifically, applying the right tests to draw accurate conclusions. Analysing datasets and creating visualisations offered additional practice. Revisiting the weight loss dataset, I used descriptive statistics and t-tests to confirm results, presenting them in a bar chart. A Chi-Square Test of Independence in a brand preference analysis indicated no significant association between brand and demographic area, though Brand A was dominant in Area 2. While these exercises enhanced my technical skills, their repetitive nature signalled the value of diversifying tasks to deepen engagement and learning.

The final phase of the module involved presenting a research proposal on systematically comparing Vision Transformers and GANs for breast cancer subtype classification. I focused on addressing gaps in reproducibility and comprehensive evaluation—key issues in machine learning research. This experience refined my ability to evaluate studies critically and construct a well-structured proposal, which is crucial for securing funding and guiding research. Reproducibility, in particular, stood out as a foundational pillar of credible science.

To conclude the module, I developed a Professional Development Plan (PDP), supported by a personal SWOT analysis. It identified strengths such as rapid learning and creative problem-solving, while highlighting areas for improvement like public speaking and self-doubt. This planning process helped me reflect on my progress and chart a clear course for personal and professional growth.

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