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ASSIGNMENT COVER PAGE

Validated by: UNIVERSITY OF LINCOLN UNITED KINGDOM

Programme	**Course Code and Title**
Bachelor of Computer Science (Hons) Bachelor of Information Systems (Hons)	CES3013/N: Social and Current Issues in Computing
Student's name / student's id	**Lecturer's name**
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Date issued	**Submission Deadline**	**Indicative Weighting**
Week 2 - 10/02/2023	Week 6 - 10/03/2023 - Report	30%
Assignment [1] title	**Assignment 1**: Report writing (Individual work)	

This assessment assesses the following course learning outcomes

# as in Course Guide	**UOWM KDU Penang University College Learning Outcome**
CLO3	Evaluate the implications of social and ethical issues in the development of information systems.

# as in Course Guide	**University of Lincoln Learning Outcome**
CLO2	Demonstrate awareness of the nature of professionalism in context.

Student's declaration

I certify that the work submitted for this assignment is my own and research sources are fully acknowledged.

Student's signature: *Zhe Yuan*

Submission Date: **10/3/2023**

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Table of Contents

Main Report **1**
Introduction 1
Driving Factors for AI Development 1
AI Social / Ethical Issues 2
Conclusions 3
Recommendations 4
References **5**
Marking Rubric **7**

Main Report

1. Introduction

AI (Artificial Intelligence) has become prevalent in modern societies as a core technology that powers modern applications and solutions in recent years. With the contribution of the Covid-19 pandemic to the increasing demand for autonomous systems, communities have begun to realize the importance and reliability of such systems in time of need. According to statistics obtained by Thormundsson (2022), AI is heavily used for service operations and development related functions up to 45% of organizations worldwide, especially in the high tech and telecom industry. Dependence on AI for risk and service operation functions in the financial service industry is also gradually gaining. In another research conducted by Thormundsson (2022), AI startup acquisitions have grown almost fourfold between 2015 and 2018 since 2010, and global funding for AI startups increased from over a billion dollars in 2013 to 8.5 billion dollars in the first quarter of 2020 alone. It was predicted that the AI market will grow over half a trillion dollars by 2024 and over 1.5 trillion dollars by 2030.

This shows that AI is slowly becoming an integral component of business operations due to its ability to simplify and fulfill complex tasks. However, regardless of how large the positive impact AI will bring to the common populace in the near future, it has raised several questions and concerns regarding to the sustainability of the current society following the major applications of AI. It is so crucial to evaluate the overall integration of AI into our current society that a specialized field, AI ethics, has been made to conduct studies of ethical and societal issues of AI facing developers, producers, consumers, citizens, policy makers, and civil society organizations (Wynsberghe, 2021). This was done so that the reliance of AI will not endanger the values and state of the current society and economy for generations to come.

2. Driving Factors for AI Development

The question remains on why people demand the need for AI and its development, even more so considering the fact that AI did escape from the public's knowledge during a period of time which was dubbed the "AI Winter" during the 1980's (Rangaiah, 2021). There are many justifications that can be made for this particular topic, but the following section lists some of the more commonly known and relatable factors that lead to the rise of AI development.

One of the supporting factors that drove the emergence of AI is that AI simply makes manual and routine processes easier and quicker to complete using automation. According to Waldow (2022), an average office worker spends more than 3 hours a day on mundane and repetitive tasks that can be easily automated if the technology is in possession. By using AI to handle tasks that fit the above description, employees are freed up and are allowed to focus on more important goals. It also allows organizations to cut costs for hiring employees and instead depend on automation when performing such tasks, increasing productivity, and effectively eliminating human errors from these routine workloads as well (Waldow, 2022). According to Sakpal's (2020) Gartner study, it was predicted that 69% of routine work currently done by managers will be fully automated by 2024, further proving the idea of using AI to manage routine activities.

Another factor for the rise of AI development would be the availability of enormous amounts of data in various industries. In a Forbes article, Janakiram (2018) once mentioned that storing and accessing data was a costly process for businesses before the cloud became

mainstream. Therefore, the existence of the cloud has enabled businesses, academia, and governments to unlock data that were once confined to tape cartridges and magnetic disks (Janakiram, 2018). Data is important for these entities because it provides them the current state and statistics of interest, allowing them to make informed decisions, identify problems that they are making, and also build a strategic approach to act on the obtained data (Bhavsar, 2020). By having a constant stream of data, researchers will have more opportunities to train and update AI models using latest, real-time data (Analytics Insight, 2020), which improves AI products and moving them closer to the ideal state.

The maturity of hardware and modern computer architecture also influenced the rise of AI development. In Routley's (2017) words, computing performance has seen a whopping trillion-fold increase in computing performance since 1956. It kickstarted AI research as traditional microprocessors and CPUs back then were not designed to deal with the heavy workloads that come with training an AI model. Now, GPUs that come with thousands of cores provide the capability to speed up ML training processes without hassling about insufficient processing power (Janakiram, 2018). In other words, the availability of modern computer hardware increased the performance of the cloud and further reinforced its status as a reliable computing source, creating more demand for machines that serve the cloud. According to Vailshery (2022) for instance, the global annual capital expenditure for edge computing devices and infrastructure equipment is forecasted to reach around 146 billion dollars by 2028.

Based on the above justifications, it shows that there is no clear reason to stop researching and developing AI applications as the circumstances for AI development were too beneficial for humankind in general to ignore. In fact, the knowledge of AI bred rivalry among business enterprises and create a competition of efficiency and productivity that were provided by AI technologies to gain the upper advantage in their markets (Analytics Insight, 2020). To put simply, many have high hopes for AI to transform their environments to a more leisure lifestyle.

3. AI Social / Ethical Issues

While there are good things to say about the constant evolution of AI, there are implications and issues that were brought out by the public about its unrestricted usage. Namely, the sustainability of the current society, economy and environment was reportedly challenged with the use of AI in a paper by Wynsberghe (2021). A very true and resounding quote from Wynsberghe (2021) states that "the entire issue of sustainable development (of AI) centres around inter- and intragenerational equity anchored essentially on three-dimensional distinct but interconnected pillars, namely the environment, economy, and society". Therefore, it was brought into attention that the usage of AI has indeed caused many injustices that the AI development community may have overlooked.

For starters, the rise of AI was said to have disrupted the established position and value of human employees. While business owners acknowledge that AI will give them a well-needed efficiency boost, many individual workers will lose their jobs as a result of replacing routine jobs and maintenances using automation. To maintain their usefulness, employees are forced to strengthen their working skills and capabilities. However, this is not always the case for every employee as it depends on one's adaptability, flexibility, and willingness to learn other specialties which slowly dulls over age. According to Rege and Yarmoluk (2020), various reports have also suggested that current educational systems prepare students for jobs of today's generation instead of the future, causing students to be underskilled when they follow industrial practices.

This creates further panic and uncertainty due to the inability to predict and control one's destiny to obtain a stable career that is not dictated by AI.

Returning to Wynsberghe's (2021) paper, it was also revealed that the development of AI have threatened the welfare of the environment. The paper's research shows that the process of training a single deep learning, natural language processing (NLP) model with GPU can lead to approximately 600 thousand pounds of carbon dioxide emissions. Google's AlphaGo Zero also Google's AlphaGo Zero generated 96 tons of carbon dioxide over 40 days of research training which amounts to 1000 hours of air travel or a carbon footprint of 23 American homes. Researchers have re-considered using carbon-free energy for model training, but in their words, energy is still not currently derived from carbon–neutral sources in many locations, and when renewable energy is available, it is still limited to the equipment they have to produce and store it, and energy spent training a neural network might better be allocated to heating a family's home (Wynsberghe, 2021, p215).

Serious political issues may also accompany AI development. It is not surprising that AI would be used for malicious activities as well due to its powerful nature. According to an anonymous Pestle Analysis contributor (2020), AI can be a threat to democratic institutions, ranging from unlawful acts such as data surveillance, privacy breaches, and election hacking. It allows attackers to undermine the authority and fairness of the acting legal constitution all the while remaining anonymous. For instance, it has been reported that the widespread of fake news and accounts using machine learning tactics in Facebook since the 2016 has brought about the downfall of former Phllippines president, President Rodrigo Duterte (Pestle Analysis, 2020). This shows that when used in the wrong hands, the effects of AI will be devastating to a nation's societal status and living conditions.

A more recent issue regarding AI development is that intellectual properties are being plagiarized and stolen. A prime example that testifies to that fact is the ongoing hype of AI art. Art produced by AI programs may appropriate another artist's art style or ideas without giving any credit, violating the copyright laws and financial compensation of their work. According to Popli (2022), a book author successfully monetized an AI-generated book using ChatGPT and profited from selling it, which received criticisms from artists towards his authoring process. It was revealed that AI has been typically trained off existing artwork, troubling and frustrating creators as they feel the need to be asked for consent before their work's distinct art style is being used for other purposes. It is even argued that digital art in general would lose its originality and attractiveness using AI generation. The question of authorship and ownership of AI generated art is also being debated among peers in the creative field (Olla, 2022). Therefore, it can be seen that all these overwhelming issues originated from the intrusiveness of AI and its inability to recognize unethical conducts.

4. Conclusions

In essence, the majority of the public did not realize the implications of AI to the current status quo as the technology is still in its infancy. It is imperative to discover a method of utilizing AI without affecting or endangering societal and environmental wellness. On that note, the notion of "Sustainable AI" was proposed by Wynsberghe (2021) as "a movement to foster change in AI product lifecycles towards greater ecological integrity and social justice". They urged that the methods of developing AI should be compatible with sustaining environmental resources in consideration for incoming generations, economic models for societies, and societal values that

are fundamental to a given society. This change can create awareness to the society about the disastrous effects of using AI carelessly and convince people to take a more sophisticated approach when dealing with AI products.

To summarize, current societies need to become aware of the negative implications that AI can bring to the society and environment. Sufficient effort should be put into researching AI control methods so that AI developers will be able to have a guideline on handling AI products without affecting innocent bystanders. In fact, youths who are digital natives of the current era should be informed of these issues as well to reinforce their perspectives on AI at an early age. It helps in their critical thinking and may indirectly influence them to discover a solution for ethical issue that were caused by AI.

5. Recommendations

As justification for the possible implementation of “Sustainable AI”, it was recommended that AI must be conceptualized as a social experiment conducted on society (Wynsberghe, 2021). Wynsberghe (2021) dubs AI as having an experimental nature and intends to expose it explicitly to the public. With that knowledge in mind, people would be forced to start taking precautions against possible consequences of using AI for fear of their sudden introduction into the society. It would also spawn and give purpose to organizations that are dedicated in preventing these incidents from happening.

On the topic of sustainable AI management organizations, it was also recommended that sustainable AI taskforces should also be acquired and recognized by the government and provide them the necessary resources to actively engage in expert discussions on negative AI impacts. Policy makers should be given more leeway to govern AI at a more detailed level and suggest that certain methods should not be permitted for ethically charged tasks (Wynsberghe, 2021). While hired organizations for sustainable AI work on creating dependable rules of thumb for AI applications, society would also be able to feel relieved as there is a government official to rely on and know that efforts for creating sustainable AI is, in fact, underway.

One recommendation also states that a proportionality framework for assessing the model training-carbon footprint ratio should be created to determine the appropriateness of a model training or tuning. According to Wynsberghe (2021), developers have proposed “carbontrackers", a tool for tracking and predicting the energy consumption and carbon emissions of training deep learning models. The idea is to generate and analyse carbon impact statements of these trainings and allow model trainings to be stopped at the user’s discretion if the predicted environmental cost is exceeded. This enables AI developers to have more control over their products and enable them to apprehend environmental issues before their occurrence at a moment’s notice. It also provides statistics on carbon emissions and allow researchers to work on a better fix in current AI products to move the statistics towards a better, optimal value.

Last but not least, business organizations are especially recommended to take the helm in maintaining sustainable AI in various industries. Company ethicists should be hired to ensure sustainable AI development is taken seriously and prevent companies from overstepping ethical boundaries when using AI. Business should set up internal AI review boards to consult stakeholders of AI-related decision making. Companies should be responsible in undergoing these trials because employees want companies to protect them from unfairness, bias, poor accountability, inadequate privacy protection, and lack of transparency (West, 2018).

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[CES3013/N: Social and Current Issues in Computing]

MARKING RUBRIC
ASSIGNMENT [1]
(30%)

REPORT COMPONENT (100%)

LEARNING OUTCOMES	MARKING CRITERIA	SCALE					YOUR MARKS/COMMENTS	
		Fail (0-49)	3rd Class (50-59)	2nd Lower Class (60-69)	2nd Upper Class (70-79)	1st Class (80-100)		
CLO3: Evaluate the implications of social and ethical issues in the development of information systems.	1. Introduction and background to issue or subject of discussion (10%)	Weak or no introduction and background of the topic.	Basic introduction that states the background to issue but lacks interest.	Adequate introduction and states the background to issue.	Proficient introduction that is interesting and states background to issue.	Exceptional introduction that grabs interest of reader and states background to issue. All issues are critically addressed.	Weightage 10%	Actual Mark
	2. Discussion regarding AI development, potential implications of AI and ethical problems for the living society (40%)	The discussion is not related the AI development, potential implications of AI and ethical problems for the living society.	Many ideas require clarification about the AI development, potential implications of AI and ethical problems for the living society.	Ideas are stated fairly clear and are related to the AI development, potential implications of AI and ethical problems for the living society.	Most ideas are stated clearly at good level and are related to AI development, potential implications of AI and ethical problems for the living society.	Wonderful ideas and the write-up about AI development, potential implications of AI and ethical problems for the living society is insightful.	Weightage 40%	Actual Mark
	3. Appropriate content flow about AI development, potential implications of AI and ethical problems for the living society. (10%)	The discussion is too short or incomplete, too long, and/or completely not related to AI development, potential implications of AI and ethical problems for the living society.	The discussion is merely average performance in writing about AI development, potential implications of AI and ethical problems for the living society.	The discussion is slightly above average performance with AI development, potential implications of AI and ethical problems for the living society.	The discussion is good in writing about AI development, potential implications of AI and ethical problems for the living society.	The discussion is excellent in writing about AI development, potential implications of AI and ethical problems for the living society.	Weightage 10%	Actual Mark
	4. Differing perspectives on AI development, potential implications of AI and ethical problems for the living society (20%)	The discussion does not meet the criteria to explain the differing perspectives pertaining to AI development, potential implications of AI and ethical problems for the living society.	Many ideas require clarification in the explanation of the differing perspectives about AI development, potential implications of AI and ethical problems for the living society.	Appropriate ideas in the differing perspectives about AI development, potential implications of AI and ethical problems for the living society.	Good ideas in the differing perspectives about AI development, potential implications of AI and ethical problems for the living society.	Outstanding ideas with sharp discussion in the differing perspectives about AI development, potential implications of AI and ethical problems for the living society.	Weightage 20%	Actual Mark
	5. Citation and referencing (10%)	Missing or no citation and Reference.	Minimal amount of citation and references.	Adequate amount of citation and references. Some inconsistencies evident.	Good amount of citation and references without inconsistencies evident.	Excellent effort in citations and references with no errors. Both text and visual are rigorously adhered to the Harvard style.	Weightage 10%	Actual Mark
	6. Conclusion and Recommendation (10%)	Conclusions and recommendations are missing or inadequate.	Some attempt at a conclusion and recommendation for further work.	The conclusions and recommendations are on balance acceptable. The work are limited and do not show the necessary broader perspective.	A sound conclusion and recommendation that covers a good range of issues. On balance, the work is good but not excellent.	An outstanding conclusion and recommendation of the work undertaken, incisive, self-critical, evidence-based and complete in all respects.	Weightage 10%	Actual Mark
						Overall score (100%)		