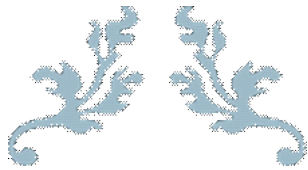


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Assignment 1: Innovation & Research

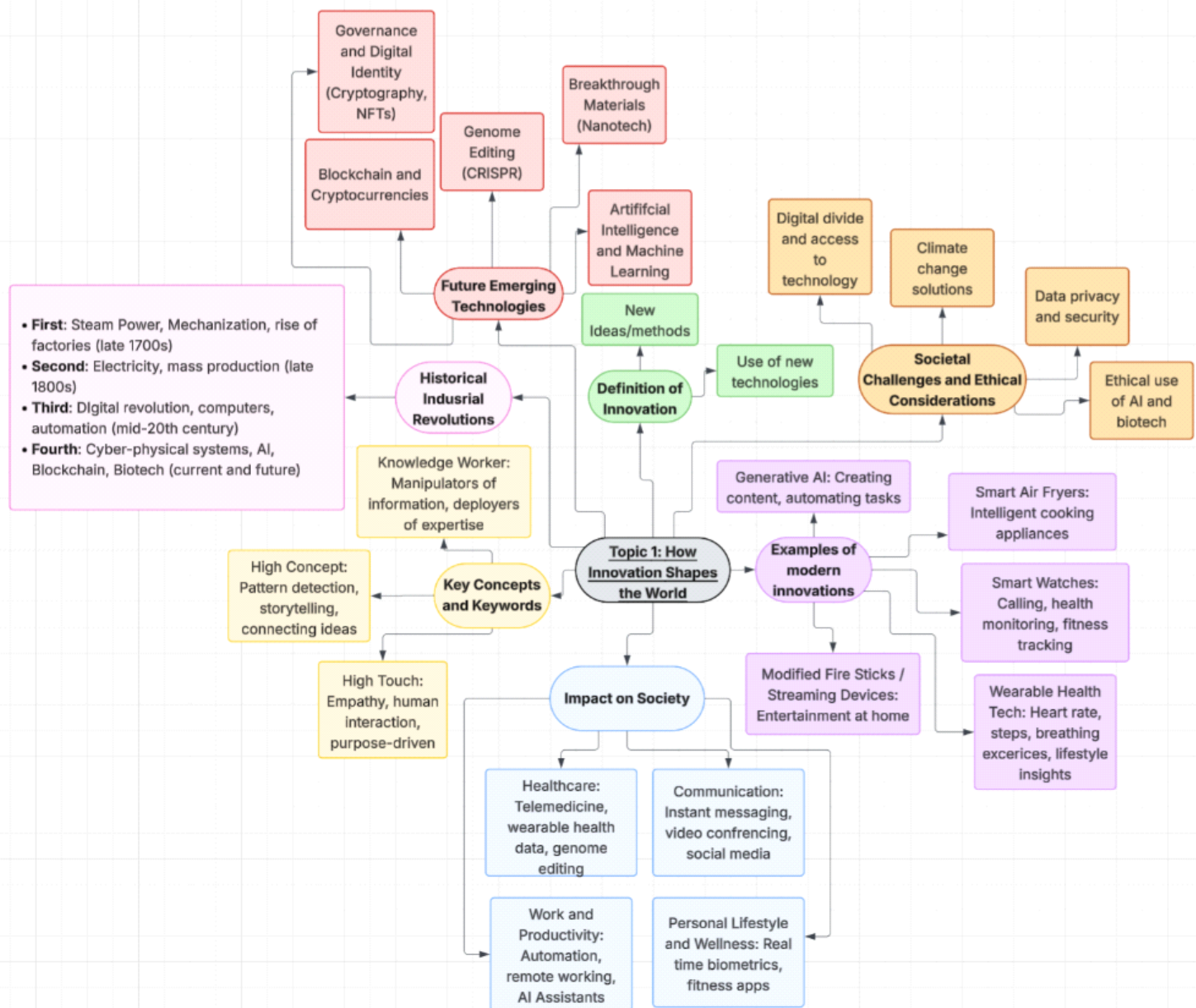
Elisedd Evans – 2204972 - BSC2-PT Computing



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Q1. Create a mind map that includes some of the areas/concepts from Topic 1 of Unit 1 on Moodle and includes some project ideas from areas of personal interest related to your program of study.

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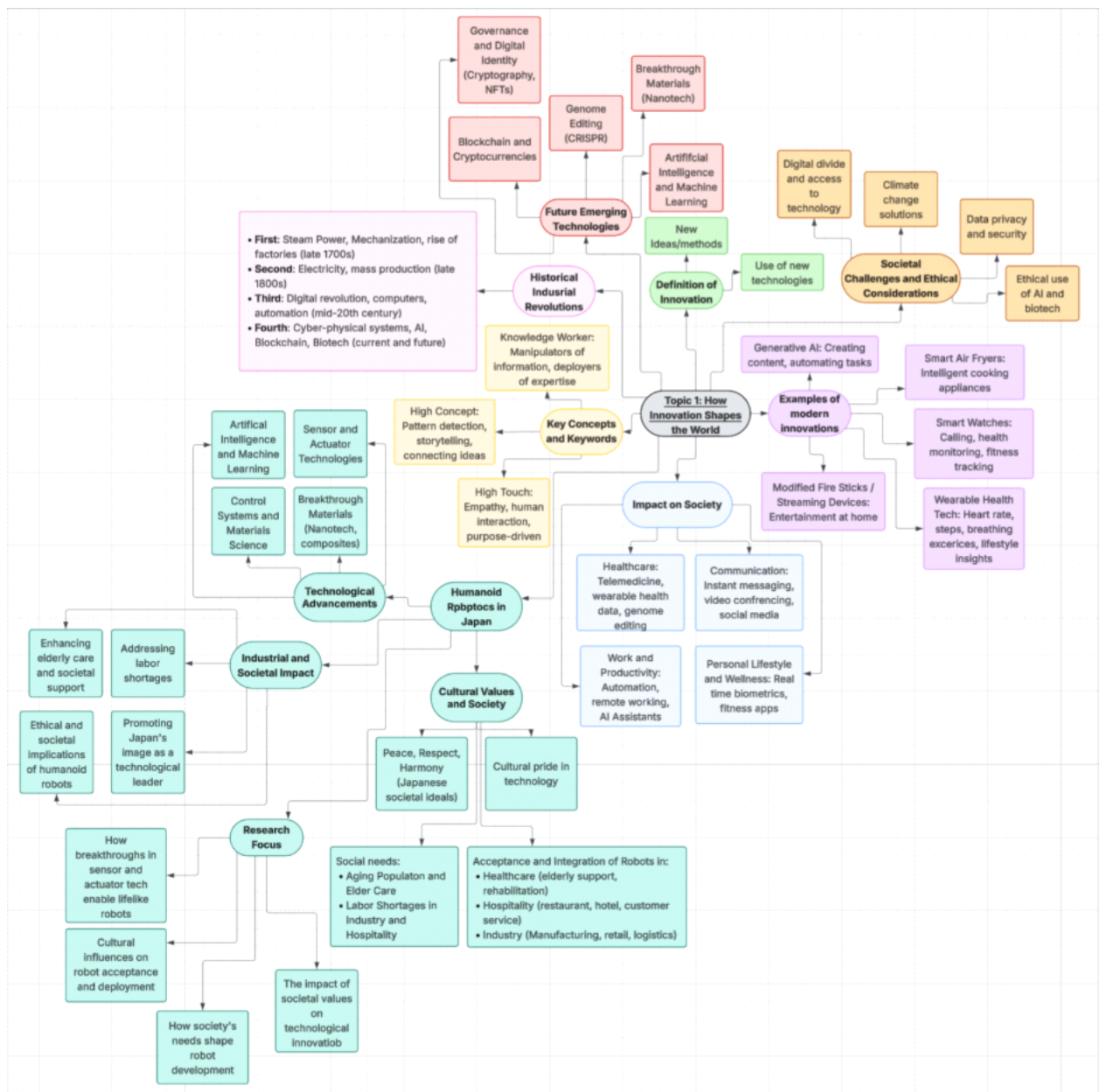


Q2. Select a project idea that you would like to take forward and add this to the map.

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My project concept is to investigate the development of humanoid robotics in Japan, with a focus on how scientific advancements, cultural values, and industrial uses have led to Japan's leadership in this area. I'd like to investigate how breakthroughs in sensor and actuator technologies, artificial intelligence, control systems, and materials science have allowed the creation of advanced humanoid robots. In addition, I want to investigate how social needs, such as Japan's aging population and labor shortages, influence the development and acceptance of these robots in areas such as healthcare, hospitality, and industry (for example restaurants, shopping assistants etc.). In addition, I intend to investigate how Japan's cultural emphasis on peace, respect, and technological pride affects the integration of humanoid robots in diverse industries. These industries include healthcare, where robots support the elderly; hospitality, where robots provide customer service; and industry, where robots help address labor shortages. This project will investigate how Japan's unique societal difficulties and cultural values influence the development and deployment of humanoid robots, as well as their impact on society and industry. I want to look at technological, sociological, and cultural factors to better comprehend Japan's position as a global leader in humanoid robotics.

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Q1. Create and document a single Aim and several Objectives for your project.

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The primary goal of this study is to investigate how cultural values, and societal demands impact the acceptance and development of humanoid robots in Japan. This approach recognizes how Japan's unique cultural environment and demographic concerns have influenced scientific achievements and the public's view of robotics. To accomplish this goal, many specific objectives must be addressed. First, it is important to identify the fundamental technological innovations – such as sensor and actuator tech, artificial intelligence and materials science – that have allowed Japan to lead in humanoid robotics. This will provide a summary of the technological support that supports Japan's robotics industry. Second, researching cultural views about robots and their impact on acceptance will bring light on how social values, media representations, and standard practices shape public perceptions. Third, assessing societal needs particularly Japan's aging population and dropping birthrate – will show how the demographic forces influence on the development and deployment of robots for eldercare, healthcare, and labor support. Fourth, evaluate public perceptions and ethical concerns about humanoid robots, such as privacy, work, and human and robot relationships. Finally, using these insights, the study will develop recommendations for strengthening public acceptance and integration of humanoid robots, making sure they are effective and culturally suitable tools for Japan's future.

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Q2. Identify an appropriate research philosophy for your project.

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Given that the project's goal is to explore perceptions, attitudes, and social implications of AI in healthcare, an interpretivist research philosophy is appropriate. This is in line with the concept discussed in "How do you solve a Problem?", which highlights the need to understand human experiences and societal processes through the eyes of the people concerned. Because social acceptance of AI is highly influenced by personal opinions influenced by cultural values and ethical issues (which is discussed in "How Innovation Shapes the World"), a qualitative approach allows in-depth assessments of these complex context-dependent elements. The theory encourages the use of methods such as interviews and focus groups to explore stakeholders' ideas, concerns, and expectations, which are critical for understanding the "known knowns" and "unknown unknowns" in public attitudes towards AI.

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Q3. Select and document appropriate search tools including specific research databases to identify research related to your project area and use search strategies to identify relevant research related to your project.

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To efficiently learn relevant research, I plan to use a combination of specialized research databases and search engines that allow access to peer reviewed papers, industry reports, and scientific journals. PubMed, which is especially useful for medical and healthcare research, and IEEE Xplore, which provides many resources on technical breakthroughs such as AI and robots, are two examples of important academic databases. Furthermore, ScienceDirect offers access to a diverse range of scientific journals in healthcare, engineering, and computer science, whereas Google Scholar is an advanced search engine for research across disciplines. To refine my searches, I will make strategic use of keywords, Boolean operators, and filters. For example, I could use search terms like “artificial intelligence”, “healthcare”, “diagnosis”, “AI adoption”, “robotics assistance” and “healthcare systems”. Applying these filters and including publication dates, for example the last five years, peer-reviewed status, and document genre, can help narrow down the most relevant and current research. These search tactics will ensure that I get high quality, trustworthy data which will act as a solid foundation for assessing how technological developments affect healthcare practices as well as views.

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Q1. Consider and document strategies to enhance validity, reliability, generalizability and ethical considerations.

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To guarantee the strength of this study effort, numerous measures will be implemented to improve validity, reliability, and ethical standards. Validity will be prioritized by triangulating data sources, such as academic literature, industry reports, and stakeholder interviews, to verify findings and reduce bias – an approach emphasized in the topic “Finding a Needle in a Haystack,” which advocates for thorough and systematic literature review practices. Reliability will be maintained by carefully documenting all research procedures, including search terms, inclusion criteria, and data collection protocols, to ensure consistency and reproducibility, in line with the principles discussed in “It’s All In The Numbers,” which emphasizes the importance of standardized data collection. To maximize generalizability, the sample will be diverse, including healthcare professionals, patients, and policymakers from various demographics, ensuring that findings reflect broader public attitudes and experiences, in line with the emphasis on generalizability in research methodology. Anonymity and confidentiality will be maintained throughout, in line with the ethical guidelines outlined in “Finding a Needle in a Haystack”, which emphasizes responsible research conduct. Furthermore, ethical approval from relevant institutional review boards would be sought to ensure adherence to ethical standards.

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Q2. Select research strategies/data collection methods you would use to collect data for your project. And design a pilot data collection method appropriate for your project and acquire some feedback to improve the focus of your project (including in an appendix section/page and referred to in the main body of the proposal).

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For my project, I plan to create a simple Google Forms survey that I will share with my classmates and peers to gather their general opinions and attitudes about the idea of using humanoid robots in healthcare, labor, and retail environments. Since this is a quick and informal way to get a sense of what people think, I want to make sure that the questions are clear, relevant, and easy to answer. To do this, I will first draft the survey and ask a few friends or classmates to review it and give me feedback on how understandable and focused the questions are. Their suggestions will help me improve my wording and make sure the questions are effective. For example, I might ask, "Would you feel comfortable interacting with humanoid robots in places like surgery, hospitals, restaurants etc." and "What concerns or worries do you have about robots replacing humans in certain jobs?" I might also include some multiple-choice questions regarding how frequently people expect to see robots in their daily lives, as well as open-ended questions about their beliefs. The input from this pilot will help me improve the survey so that I can get honest, simple replies from my peers, giving me a better understanding of the general public's perspective of humanoid robots in these industries. This simple approach will allow me to swiftly gather important insights for my project.

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Q3. Outline some different types of quantitative and qualitative analysis.

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Quantitative and qualitative analysis provides different approaches to data knowledge, and both are important in academic research. Quantitative analysis focuses on numerical data and uses techniques such as statistical analysis, which describe data using metrics such as mean, median, mode, and frequency to show patterns or trends. Another important type is inferential statistics, which involves drawing conclusions from sample data to make conclusions about a larger population; this can include hypothesis testing, analyze correlations (positive, negative, or zero), and find potential casual relationships between variables. These tools allow researchers to accurately assess and predict results. In contrast, qualitative analysis is focused on non-numerical data such as views, feelings, and experiences. This includes techniques such as thematic analysis, which finds common themes in interview or focus group records, and content analysis, which pulls patterns from written or visual sources. Other qualitative methods include discourse analysis, which studies language use and communication, and narrative analysis, which investigates personal stories or experiences. While quantitative methods attempt precision and generality, qualitative analysis offers depth, context, and insight into the meanings behind the data. Combining both approaches in mixed-methods research can lead to a deeper understanding of challenging research problems.

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