

**Critical Inquiry Topics
Semester 2 AY2022/2023**

Project ID	Project Title	Supervisor
AC-01	Analysis of communities	Alton Chua
AC-02	Analysis of user-generated content	Alton Chua
AC-03	Deception on social media	Alton Chua
AC-04	Rumors and rumor denials	Alton Chua
AC-05	Reduction of Confirmation Bias	Alton Chua
AH-01	Issues/Topics in Singapore	Adrian Heok
AH-02	Issues/topics in organisation management	Adrian Heok
AH-03	Design Thinking/UX	Adrian Heok
AH-04	Anarchism as organisation theory	Adrian Heok
AH-05	Leveraging the metaverse	Adrian Heok
AH-06	Ethics in Information Studies	Adrian Heok
BK-01	Leading through stories	Brenda Lee
BK-02	Leadership through storytelling	Brenda Lee
BK-03	Storytelling in speechmaking for an occasion	Brenda Lee
BK-04	Storytelling in speechmaking during a crisis	Brenda Lee
BK-05	Leading in a crisis through stories (COVID-19)	Brenda Lee
BK-06	Leading in a crisis through stories (Climate Change)	Brenda Lee
BK-07	Storytelling on Video	Brenda Lee
BK-08	Leadership in Literature	Brenda Lee
BL-01	The Social Context of Libraries and Librarians	Brendan Luyt
BL-02	Understanding Wikipedia as a social technology	Brendan Luyt
BL-03	Domain analysis of academic disciplines or sub-disciplines	Brendan Luyt

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CK-01	Enhancing the Zubir Said Knowledge Graph Interface with Digital Music Technologies	Chris Khoo
CK-02	User Interaction and User Learning on Knowledge Graph Interfaces	Chris Khoo
CK-03	Develop a Web API and Web Application for lexicon-based sentiment analysis	Chris Khoo
CK-04	A Knowledge Graph Application	Chris Khoo
CK-05	Analytics of Crime and Sentencing Information: Development of a Google Cloud-based system to perform data analysis, predictive modeling and visualization of a subset of Singapore State Court's judgments -- to predict likely sentences (penalties) based on key features of offences (crimes)	Chris Khoo
DG-01	Understanding perceptions of deepfakes	Dion Goh
DG-02	Safety in the metaverse	Dion Goh
DG-03	Gamification of crowdsourcing tasks	Dion Goh
FT-01	The Value and Impact on a Business' revenues through the use of Digital Proximity Solutions	Francis Tay
FT-02	Customer Intelligence collection methods and analysis	Francis Tay
FT-03	Digital Transformation	Francis Tay
FT-04	Data Analysis in the Workplace	Francis Tay
FT-05	Data Analytic Tools	Francis Tay
FT-06	Intelligent Automation Solutions and Tools	Francis Tay
JP-01	Evaluating deepfake detection algorithms	Jonathan Pan
JP-02	Security Visualisation Project	Jonathan Pan

Project ID	Project Title	Supervisor
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JS-02	Everyday life information behaviour	Joanna Sin
JS-03	Information inequality: Status, effects, and remedies	Joanna Sin
JS-04	Trending topics in Library and Information Science	Joanna Sin
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LCK-02	Porting the movies dataset into Neo4j	Lee Chu Keong
LCK-03	Vertical farming: A bibliometric analysis	Lee Chu Keong
LCK-04	Metaverse: A bibliometric analysis	Lee Chu Keong
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LCS-05	Investigating Digital Nudging Applications	Lee Chei Sian
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NJC-01	Sentiment Analysis of Social Media Content	Na Jin Cheon
NJC-02	Analysis of Online Discussions about Emerging Subjects in Singapore	Na Jin Cheon
NPS-01	Understanding the library trends in post-pandemic period	Nirmal Prabu S/O Sangar

Project ID	Project Title	Supervisor
RSD-01	Managing Knowledge in a post covid era	Rajesh Singh Dhillon
RSD-02	Mobile Based learning	Rajesh Singh Dhillon
RSD-03	Knowledge Management as a tool of Productivity	Rajesh Singh Dhillon
RSD-04	Impact of Hybrid working to organisational Knowledge Management	Rajesh Singh Dhillon
RSD-05	Information/Knowledge Management systems	Rajesh Singh Dhillon
RSD-06	Sustainable Knowledge Management	Rajesh Singh Dhillon
TYL-01	Trend Analysis of Metaverse Technology by Altmetrics and Bibliometrics	Theng Yin Leng
TYL-02	Emerging Jobs and Skills Prediction & Visualisation	Theng Yin Leng
TYL-03	Associations between Environmental Characteristics and Cognitive Functioning	Theng Yin Leng
TYL-04	Improving Intergenerational Communication and Bonding through Applying Video-mediated Communication and Simultaneous Gameplay	Theng Yin Leng
TYL-05	Conceptualisation of Self-administered Multidimensional Frailty Screening Tools	Theng Yin Leng
TYL-06	Use of Gamification to Promote Medication Adherence through Patient Education	Theng Yin Leng
TYL-07	Design, Development and Evaluation of ZurichMOVE Tablet Evaluation App	Theng Yin Leng
TYL-08	The effects of gamified interventions on physical and cognitive frailty in community-dwelling older adults: A systematic review and meta-analysis	Theng Yin Leng

AC-01: Analysis of communities

This project requires students to analyze the relationship patterns among members of an online community. Members therein may transcend geographical and cultural boundaries but are bound together to pursue mutual goals or interests. The goal of this project is to study how members are brought together, and how they co-create content for the community. Students undertaking this project need to be conversant with the use of a web crawler.

AC-02: Analysis of user-generated content

The advent of Web 2.0 has promoted active user participation. Users can now easily contribute their own content, as well as comment on others'. This project requires students to collect and analyze user-generated content. The goal is to identify themes in the content and examine the interaction patterns among users. Students undertaking this project need to be familiar with web crawling and content analysis.

AC-03: Deception on social media

Deceptions on social media have become increasingly prevalent. This project seeks to better understand the ways in which deceptions present themselves, and how users can fall prey into these deceptions. Students undertaking this project need to be familiar with basic statistical techniques.

AC-04: Rumors and rumor denials

With the rise of the Internet, false rumors are ubiquitous. As a way to combat falsehood, some users and organizations develop rumor denial messages. For rumor denials to be effective, they must be shared. This project studies the factors which affect the virality of rumor denials. Students undertaking this project need to be familiar with basic statistical techniques.

AH-01: Issues/Topics in Singapore

AH-02: Issues/topics in organisation management

AH-03: Design Thinking/UX

AH-04: Anarchism as organisation theory

AH-05: Leveraging the metaverse

AH-06: Ethics in Information Studies

Please email the lecturer at adrian.heok@ntu.edu.sg to enquire if interested.

Lecturer and students will develop the topic together.

BK-01: Leading through stories

Howard Gardner says that every great leader is a great storyteller. Much of this great storytelling skill is evident in the speeches of the great leader. In this project, students will select a notable woman leader in business or in politics, and study her speeches over the course of her leadership. The goal of the study is to determine the extent of the leader's story use, uncover the types of story that the leader tells, and if possible, examine the effects of story choice on leadership.

BK-02: Leadership through storytelling

Howard Gardner says that every great leader is a great storyteller. Much of this great storytelling skill is evident in the way the great leader communicates, whether orally or in writing or in some other form. In this project, students will select a notable leader from the east, whether in business or in politics, and study his various modes of communication in the context of his leadership. The goal of the study is to determine the extent of the leader's story use, uncover the types of story that the leader tells, and if possible, examine the effects of story choice on leadership.

BK-03: Storytelling in speechmaking for an occasion

This project will analyse the use of storytelling in speechmaking for one type of occasion. Students keen on this project will focus on a select group of leaders who are well-known for their speeches. The goal of the project is to uncover story types and storytelling strategies used by great speakers for that occasion of choice.

BK-04: Storytelling in speechmaking during a crisis

This project will analyse the use of storytelling in speechmaking during a crisis, whether personal or organisational. Students keen on this project will focus on a number of leaders in business and/or in politics, and study the stories they tell in their speeches to frame/reframe the crisis. The goal of the project is to uncover story types and storytelling strategies used by leaders during times of crisis.

BK-05: Leading in a crisis through stories (COVID-19)

Howard Gardner says that every great leader is a great storyteller. Much of this great storytelling skill is evident in the way the great leader communicates, whether orally or in writing or in some other form. In times of crisis, the leader's skill in using storytelling as a communication tool becomes all the more critical.

In this project, students will take the COVID-19 pandemic as a crisis under study, select the political leaders in a country from the west or the east, and study the stories they

tell in various modes of communication in the context of their leadership. The goal of the study is to uncover the types of story that the leaders tell and the reasons for telling them at different stages of the crisis.

BK-06: Leading in a crisis through stories (Climate Change)

Howard Gardner says that every great leader is a great storyteller. Much of this great storytelling skill is evident in the way the great leader communicates, whether orally or in writing or in some other form. In times of crisis, the leader's skill in using storytelling as a communication tool becomes all the more critical.

In this project, students will take the climate change as a crisis under study, select key leaders from various spheres of influence, and study the stories they tell in various modes of communication for climate change. The goal of the study is to survey the development of the climate change story as it emerges and evolves to its current status.

BK-07: Storytelling on Video

Students keen on this project will take a story filmed on video that has attracted a significant amount of traffic, and analyse the attitudinal response of viewers to the story from the comments posted on major social media platforms. The goal of the project is to determine story impact and uncover storytelling strategies used in the video that have contributed to its virality, and if possible, measure the subjective effect of the emotional value of the story on the viewers in objective terms.

Students can also select more than one video on a particular topic.

BK-08: Leadership in Literature

According to Shoup and Hinrichs (2020), great literature can serve as tutors and mentors in the ways of leadership, equipping leaders and managers with the knowledge and skills to navigate the drama of leadership and engage in meaningful sensemaking to help organizations thrive. The plot and characterizations in novels, novellas, and short stories can act as simulations of real-world situations, fostering empathic growth and prosocial behavior in real-world interactions, equipping readers to properly and adequately handle the often-tangled knot of real-life problems and personalities and improve their social-inference skills.

Students keen on this project will read fiction drawn from the canon of great literature, and elicit key insights useful for effective, empathetic, and ethical leadership.

BL-01: The Social Context of Libraries and Librarians

Libraries and librarians are integral parts of a wider social landscape which shapes and filters their image, policies and general discourse. This project would see students examine some aspect of the relationship with libraries, past or present, and this wider environment

BL-02: Understanding Wikipedia as a social technology

Wikipedia is much maligned in information studies circles as an inaccurate and even dangerous source of information. However, those studies which have been done suggest that its accuracy is comparable to more traditional encyclopedias. What is perhaps of more interest is the social dynamics of the organization as it represents a novel and collective approach to the dissemination of knowledge. Students undertaking projects in this area would examine, with the aid of the instructor, various aspects of these dynamics.

BL-03: Domain analysis of academic disciplines or sub-disciplines

Knowledge is generated by people working within various disciplinary traditions. The study of these traditions is important in order to develop a deeper theoretical and practical understanding of how people look for and use information. The domain analytic approach is one way to study the knowledge traditions of a discipline. In this project students would apply this approach to particular academic disciplines or sub-disciplines.

CK-01: Enhancing the Zubir Said Knowledge Graph Interface with Digital Music Technologies

Zubir Said is a pioneer musician and songwriter in postwar Singapore, who composed the Singapore National Anthem. A knowledge graph and visualization interface have been developed to support exploration of and research on resources in his personal archive, including music manuscripts of his compositions: <https://ZubirSaid.sg>

This project seeks to incorporate digital music technologies to this interface:

- Convert some music manuscripts into digital notation using MuseScore software
- Export digital notation to: MusicXML and MEI formats
- Use VexFlow to display the music notation on screen
- Play the music using a Web Audio API to synthesize the sound (e.g., Verivio for MEI file).

Build user functions based on the above technologies.

Requirements: 1 team member must have some IT background, and 1 team member must be familiar with Western music notation (e.g., play the piano).

CK-02: User Interaction and User Learning on Knowledge Graph Interfaces

This is a user study of user interaction with knowledge graph interfaces (<https://zubirsaid.sg> and <https://singpioneers.sg>), including information searching to answer questions, as well as learning from a knowledge graph to write a story/narrative.

CK03: Develop a Web API and Web Application for lexicon-based sentiment analysis

Develop a publicly-accessible Web API and Web application to carry out lexicon-based sentiment analysis using the WKWSCI Sentiment Lexicon. This will be implemented on a Node.JS and Python server on Google Cloud. The application will tag words in a text with sentiment scores from the sentiment lexicon, and also calculate sentiment scores for sentences and documents.

Requirement: MSc Info Systems students or IT background

CK-04: A Knowledge Graph Application

Student to propose a knowledge graph application

Requirement: K6307 Organisation of Knowledge course

CK-06: Analytics of Crime and Sentencing Information: Development of a Google Cloud-based system to perform data analysis, predictive modeling and visualization of a subset of Singapore State Court's judgments -- to predict likely sentences (penalties) based on key features of offences (crimes)

Requirements: the team members must have IT background

Main features of the project:

- To develop a prototype database of court cases, offences and sentencing information on Google Cloud (probably using Big Query Table)
- To develop a Web API (using Python+Flask on a Google App Engine) to perform data analysis/mining and predictive modeling (using analytic services available on Google Cloud)
- To develop a simple Web interface to accept user input (on type of offence and key features), and to present and visualize the analysis results.

Background: The Singapore Ministry of Law has set up a Sentencing Advisory Panel "to formulate and publish guidelines on matters relating to sentencing, to promote greater consistency, transparency and public awareness. ... Such guidelines could, for example, propose sentencing approaches for particular offences, including sentencing bands based on harm and culpability, as well as aggravating and mitigating factors."

(<https://www.mlaw.gov.sg/news/press-releases/2022-06-02-establishment-of-sentencing-advisory-panel>, and <https://www.sentencingpanel.gov.sg>).

At the same time, the Singapore Academy of Law (<https://www.sal.org.sg/Resources-Tools/LawNet>) maintains a Sentencing Information & Research Repository (SIR) of State Court judgements, including key information of the offences and the sentences passed. This sentencing database is used by judges as a guide in sentencing decisions, and by lawyers to advice clients on likely sentences.

The purpose of this project is to explore and prototype a cloud-based system for analyzing a subset of information from the SIR database for a small number of crimes.

DG-01: Understanding perceptions of deepfakes

This project investigates deepfakes, videos that replace a person's face with another. Studying deepfakes is important as people become more dependent on various online information services and could fall prey to misinformation. This project will study how people perceive and respond to deepfakes. Topics include the extent to which deepfakes are believable, why people fall prey to them, and how they verify the authenticity of videos.

DG-02: Safety in the metaverse

The metaverse refers to virtual/online spaces where people can create and explore with other people. Although the technology is emerging and potentially useful, concerns about safety and wellbeing are already raised by researchers, end-users and policymakers. The goal of this project is to investigate perceptions of safety about potential metaverse users and how to keep them safe from such concerns. Possible topics include identify possible harms in relation to personal safety among different groups (e.g. children or females), how to encourage safety and wellbeing, and proposing types of measures that could be taken. Research methods may include interviews, surveys and systematic literature reviews.

DG-03: Gamification of crowdsourcing tasks

One of the challenges of crowdsourcing is to collect sufficient, good quality contributions. Various approaches have been used to motivate participation including appealing to a sense of altruism, and monetary incentives. This project investigates whether gamification can motivate participation. The project team will conduct an experiment that compares a gamified crowdsourcing application against a non-gamified one to evaluate user experience and perceptions of effectiveness. Results will have important implications on the design of crowdsourcing applications.

FT-01: The Value and Impact on a Business' revenues through the use of Digital Proximity Solutions

Students will explore the various ways that businesses can use digital proximity solutions for marketing, customer service, etc. The students will compare how businesses in different markets approach the use of such technologies to have a positive impact on their business.

FT-02: Customer Intelligence collection methods and analysis

Students will look at the array of ways to gather customer intelligence across the various customer touch points. The focus can be on B-to-B or B-to-C business models. Students would develop a framework on what would be a good way to collect customer intelligence for different types of business models.

FT-03: Digital Transformation

Students will research how companies are transforming themselves, if at all. The focus will be on what companies' perception of digital transformation is, what it entails, and are already implementing. Students will write-up case examples as part of their final report.

FT-04: Data Analysis in the Workplace

Students will research what type and level of data analysis is being done, the expectation by companies, and the tools or software used, by employees in companies. The objective is to better understand the job skills expected of employees today and in the future. Students, through interview and surveys, come up with a list of must have skills that employees should have in the future.

FT-05: Data Analytic Tools

Students will do a comprehensive research on the tools available in the market that can be used to conduct basic and advanced data analysis. The objective is to come up with an unbiased toolkit list that can be used by companies for the varying analysis across the value-chain. The final report will be primarily based on secondary research but supplemented with user and/or customer survey.

FT-06: Intelligent Automation Solutions and Tools

Students will research the extent of interest and use of Intelligent Automation solutions in business operations. The focus will be on the awareness, interest and use of solutions and tools like Robotics Process Automation (RPA), Keyboard Automation, WebApps,

Virtual Reality (VR) and Augmented Reality (AR). Students will write-up case examples as part of their final report.

JP-01: Evaluating deepfake detection algorithms

This project studies and evaluates deepfake detection algorithms. The ability to detect deepfakes is increasingly important as people increase their consumption of online materials. Deepfakes on online platforms could mislead people with negative consequence. To deal with such misinformation, many researchers have developed deepfake detection algorithms. This project involves the gathering of openly published source codes of such algorithms, the analysis and evaluation of these algorithms. Programming and knowledge of artificial intelligence algorithms will be the prerequisites.

JP-02: Security Visualisation Project

This project involves the development of a security visualisation application that turns raw cyber security data into visual representations. Such representations seek to enhance the cyber security analysts' ability to detect anomalies or cyber intrusions. A working prototype and academic report are the expected deliverables for this project. Programming and knowledge of cyber security domains will be the prerequisites.

JS-01: Perception and use of libraries

Nowadays, individuals often turn to sources beyond libraries for their information needs. This project aims to study the perception and use of libraries by a specific group (e.g., adolescents, parents, etc.). Researchers may also focus on a particular type of library (e.g., public, school, or academic libraries). The goal is to identify how libraries can improve and promote their services. The study may examine: How do individuals perceive and use libraries and other sources such as social media platforms? What library services are most valuable to the user group? What services do users want the library to provide or enhance? What are the demographic, cognitive, affective and contextual factors that contribute to use or non-use?

JS-02: Everyday life information behaviour

The advent of social media and mobile communication has led to an explosion of information being disseminated through many channels. How do individuals stay informed about daily happenings and topics of interest to them? Researchers may focus on a specific demographic group and investigate some of the following areas: Everyday information needs and information barriers; information behaviour on social media; information overload; credibility assessment; or factors affecting users' everyday life information behaviour.

JS-03: Information inequality: Status, effects, and remedies

Recent technological development has not mitigated the unequal access and use of information resources among different user groups. It may even have exacerbated the digital and information divide. In this project, researchers may study specific demographic groups, types and channels of information (e.g., health information, printed materials, the Internet), and geographic scopes. The study may focus on: mapping and charting the status and changes in information inequality; identifying the factors that contribute to unequal access and usage; examining the effects of information inequality on different groups; or exploring practices and policies that address information gaps.

JS-04: Trending topics in Library and Information Science

Research in Library and Information Science (LIS) plays an important role in informing the effective provision of up-to-date library and information services. This topic explores the subjects and issues central to LIS and its subfields. The research may focus on: longitudinal changes in topics discussed in Singapore and worldwide; changing usage of theories and methods in LIS research; and differences in topics covered by scholarly publications and informal channels such as social media.

LCK-01: Porting the arXif dataset into Neo4j

(<https://www.kaggle.com/datasets/Cornell-University/arxiv>)

For this project, students will be working in Python, Neo4j and Django.

LCK-02: Porting the movies dataset into Neo4j

(<https://www.kaggle.com/datasets/rounakbanik/the-movies-dataset>)

For this project, students will be working in Python, Neo4j and Django.

LCK-03: Vertical farming: A bibliometric analysis

LCK-04: Metaverse: A bibliometric analysis

Please email the lecturer at ascklee@ntu.edu.sg to enquire if interested.

Lecturer and students will develop the topic together.

LCS-01: Social Media for Teaching and Learning

This project examines the use of social and mobile communication media for teaching and learning. Educators are increasingly interested in the social tools available to facilitate engagement and encourage learning. What trends are emerging for teaching and learning? What are the motivations driving educators and students to use some tools? What concerns might be keeping educators and students from using them? How should learning be conducted in the new “normal”?

LCS-02: Investigating Crowdsourcing

Crowdsourcing is the practice of engaging a 'crowd' or a group for a common goal. Put differently, crowdsourcing relies on the power of the crowd and has the ability to draw from the collective memory, expertise and experience of other people. The project will investigate different crowdsourcing approaches/techniques for play and work.

Examples of projects include: (1) Motivations for participating on a crowdsourcing platform. (2) Incentives and mechanisms (including gaming techniques) to motivate participation on a crowdsourcing platform. (3) Exploring the feasibility of crowdsourcing at work. (4) Developing mobile crowdsourcing applications for different contexts of use. (5) Investigating factors influencing quality of participation on a crowdsourcing platform. Students who are interested to explore crowdsourcing can also propose related projects.

LCS-03: Making sense of social media data

This is an interdisciplinary research project that explores the use of computation techniques and analytics to provide insights from social media data.

LCS-04: Effects of Cute Aesthetics Interface Design

This project aims to explore the cognitive and affective effects of cute aesthetics design (mobile and web-based application) on online user behaviors. Specifically, the project will examine how cute aesthetics interface design effects user experiences and usage intention across different demographic profiles and different types of online applications (mobile and web).

LCS-05: Investigating Digital Nudging Applications

This project investigates the notion of digital nudging and explores its effectiveness in changing online and offline behaviors across various contexts.

LGP-01: Case study of sustainability informatics in organizations

LGP-02: Perceptions and expectations of climate change: A survey

LGP-03: Critical success factors of sustainability information management in organizations

Please email the faculty at peelg@ntu.edu.sg to enquire if interested.

NJC-01: Sentiment Analysis of Social Media Content

Sentiment analysis is a type of subjectivity analysis which analyses sentiment in each textual unit with the objective of understanding the sentiment polarities (i.e., positive, negative, or neutral) of the opinions toward various aspects of a subject. The CI group will investigate sentiment analysis of user generated content using machine learning algorithms. Especially, the CI group will explore aspect-based sentiment analysis of social media content using a deep learning approach. Text/Data mining and computer programming skills are required for the project.

NJC-02: Analysis of Online Discussions about Emerging Subjects in Singapore

NPS-01: Understanding the library trends in post-pandemic period

Information about the CI project: The impact of the COVID-19 pandemic on library services has been significant, and these changes are still ongoing. Libraries face a fundamental shift that will extend far into the future and beyond the pandemic. This project requires students to analyse the current technological trends and how it can be mapped to the different libraries, including public and academic libraries. The goal of this project is for students to survey and understand what technological trends are important to patrons and librarians. The results will need to be analysed and assessed on how it can be fed into the Library Management System.

RSD-01: Managing Knowledge in a post covid era

Knowledge management has regained its stand as an essential part of business success and has become even more essential with the COVID-19 pandemic's scattering of staff among homes and work [sites.in](#) this project, students will select an industry (other than healthcare) and explore the options and strategies that business have and should embark on managing their knowledge.

RSD-02: Mobile Based learning

Organizations have embarked on mobile based learning as a learning tool especially during the covid pandemic, in this project students will select a learning platform and study the benefits or disadvantages this brings to the future of work. lecture and students will explore and develop the topic together.

RSD-03: Knowledge Management as a tool of Productivity

KM has regained its stand as an essential part of business efficiency and has become even more essential with the COVID-19 pandemic's hybrid work structure. In this project students will look at the efforts to ensure effective and efficient use of its diverse resources and information in their quest to achieve competitiveness as well as to increase productivity that must be managed.

RSD-04: Impact of Hybrid working to organisational Knowledge Management

The future of work has seen a global take-up, with staff working remotely from anywhere in the world and yet contributing to their work organisations, in this study the students will study the impact of a hybrid work environment to how organisations manage knowledge and the pros and cons.

RSD-05: Information/Knowledge Management systems

Innovation and collaboration are key in managing information and knowledge, today more so Tech-enabled tools, allow organisations to leverage cloud technology to facilitate sharing and collaboration in an innovative ecosystem. in this study the students will select a platform of their choice and study the benefits it brings to organisational management of critical knowledge and information.

RSD-06: Sustainable Knowledge Management

This topic is open and students who are keen will develop the topic with the lecturer.

TYL-01: Trend Analysis of Metaverse Technology by Altmetrics and Bibliometrics

The metaverse is a fast-growing trend with a considerate penetration rate of users for various applications such as gaming, content creation, social interaction, learning and training, online shopping and healthcare. This study aims to gain insights into the overall application of metaverse technology in the study of healthcare areas with the following two steps:

1) analyse research papers for metaverse in healthcare research using Altmetrics and Bibliometrics methods. Altmetrics can be described as new or alternative metrics based on activities on social media for measuring scholarly impact. Different altmetrics systems exist that offer dashboards and tools for viewing bibliometrics and altmetrics.

- Perform trend analysis of data (already) collected over the last 3 - 4 months;
- Visualize the data.

2) establish a visual and unbiased approach to exploring hotspot knowledge frontiers in the metaverse research area. The distribution and research influence of countries, regions, institutions, and journals will be analysed.

- Determine whether the usage of altmetrics would better quantify research impact compared to using bibliometric measurements;
- Build some machine learning models to predict bibliometrics based on altmetrics.

TYL-02: Emerging Jobs and Skills Prediction & Visualisation

Faced with rapid changes brought by the ageing population and COVID-19, it is urgent to re-locate and re-map employees, especially the ageing workforce in their career paths. New emerging skills will also enlarge the existing skills gaps between the new requirements of this sector and individuals. This study aims to investigate the million historical job postings, reflecting the skills employers demand in Singapore.

- Perform trend analysis of job roles from job postings (existing available);
- Perform trend analysis of skills in demand;
- Perform clustering analysis by job role and skills;
- Visualize Job Postings and Skills.

TYL-03: Associations between Environmental Characteristics and Cognitive Functioning

GPS technology has the potential to examine the highly detailed geographic and temporal scope of mobility in older adults, thus providing a “holistic view” of mobility in real-time and enabling prompt interventions to prevent adverse health events resulting from mobility limitations. This study aims to identify meaningful GPS-derived mobility patterns and develop standardized guidelines for GPS use and data analytics (e.g., distance, recording period, and speed).

- Perform points clustering analysis of GPS data (existing available);
- Perform correlation analysis between environmental parameters and mobility variables (speed and distance);
- Perform correlation analysis between mobility variables and socio-demography;
- Visualize / Animate raw GPS data.

TYL-04: Improving Intergenerational Communication and Bonding through Applying Video-mediated Communication and Simultaneous Gameplay

Risks of COVID-19 have aggravated social exclusion of older persons through measures to restrict movement and contact such as stay-at-home restrictions and lockdowns. While such measures are crucial for ensuring the safety of all, they have increased the elderly's social isolation, disrupt their connectivity with others, and worsen their health outcomes. Moreover, United nations has recently reported an increase in ageism and discrimination

towards older people during this pandemic crisis. Communication across generations needs to be strengthened to foster intergenerational solidarity. Since the Covid-19, video-mediated communication technology has been massively adopted across the globe. It provides a vital infrastructure for (re-)connecting elderly so to mitigate social isolation risk while remaining at safe physical distance from others.

Using motion-based sensors, our team has developed Virtual Exercise Therapist System (VETS) which allows single-player offline exergames (video games for the purposes of exercising) to promote physical and intergenerational activity between elderly and youths. In this proposal, leveraging on existing teleconferencing platform (e.g., Zoom), we will first incorporate Video Communication Components to VETS (VETS-VCC). It will allow exergame-play between 2 (or more) players simultaneously within the video call. To evaluate the benefits of the VETS-VCC, 60 elderly-youth pairs will be recruited. They will be communicated over 8 weeks through VETS-VCC or video call only (without exergame). Impact on changes in well-being, exercise motivation, and intergenerational perceptions will be compared. Conversational analysis will also be conducted based on the audio and video streams of the video call to understand the development and dynamics of the intergenerational bonding.

We aim to introduce an inexpensive, accessible, potentially scalable technology solution to improve the connectivity of elderly through exergaming within video-mediated communication platform so to mitigate the negative effect of the social distancing. The intergenerational bonding fostered during the exergaming can also improve the mental well-being of the elderly.

TYL-05: Conceptualisation of Self-administered Multidimensional Frailty Screening Tools

Using Singapore as a case example, this project aims to develop a Mobile-based Frailty Screening Tool to help detect frailty early so that it can further reduce the existing healthcare burden. The concept and procedure of self-screening for frailty conditions is still developing on the global stage. The detection for frailty is usually done in primary care setting (e.g., hospitals, clinics) through trained medical personnel and focuses mainly on physical frailty.

The current project proposes to develop a multidimensional frailty (physical, cognitive, and social) screening tool that can be self-administered through a smartphone or web-browser (i.e., mobile-based) that is suitable for large-scale screening for the local Singaporean multilingual population. Specifically, we aim to (i) systematically review of the existing physical, cognitive, and social frailty indicators and diagnostics tools to identify the potential to be implemented as a self-screening tool for the senior citizens (50 years or above) and (ii) conceptualise an assistive mobile-based (smartphone or web-based) tools to be used for self-screening of frailty among older adults in the community with different modality such as computerised task or voice-bot to accommodate various literacy and language proficiency levels.

The proposed self-screening frailty tool will radically improve the process of identifying frailty in the community. It will supplementing the existing frailty assessment that often requires trained personnel/clinician to perform. It can also help to early detect and alerts of pre-frail

older adults in the community so that it allows follow up for early frailty intervention to reverse or delay the progression to frailty.

TYL-06: Use of Gamification to Promote Medication Adherence through Patient Education

In this project, we aim to explore the use of technology and gamification to educate and improve patients' understanding of their medical conditions and medications. Through greater understanding of their medical conditions and medications, we hypothesise that patients will be more adherent to their prescribed medications. Based on previous works in Patient-ACE Frameworks and Tamamon game, we propose to design, develop and evaluate a mobile game module to the PACE prototype for patients to use during their in-patient stay at the Integrated Care Hub (ICH) Trial Ward, as well as on-discharge and post-discharge. PACE mobile game module will equip and educate patients with knowledge to better understanding their medical conditions and medications. There are two phases: Phase 1 - Assessment and Conceptualisation: (i) To assess patients' level of understanding of their health conditions and prescribed medications; and (ii) To conceptualise the PACE mobile game module with purpose to prepare, guide and assist patients during their in-patient stay at ICH, on-discharge and 1 month post-discharge. Phase 2 – Development and Evaluation: (i) To develop the PACE mobile game prototype; and (ii) To evaluate PACE mobile game module usability with patients at ICH Trial Ward.

In this project, the Beliefs about Medication Questionnaire (BMQ) will be administered to patients who consent to participate in the project. This will form the baseline measure of the patient's beliefs about medications. Patients will then be introduced to the PACE mobile game module during their stay at the hospital. The PACE game will have content that can be customised to their healthcare needs such as management of hypertension, diabetes, pain, bowel movement, etc.

TYL-07: Design, Development and Evaluation of ZurichMOVE Tablet Evaluation App

Most injurious falls occur during walking, not surprising as it is the most common activity of daily living. In order to walk effectively, we need intricate coordination of our limbs both spatially and temporally, for maintaining balance in a continuous manner. Age-related decline poses challenges in being able to walk and this burden is further intensified by the individual's susceptibility to injurious falling. By synergising novel wearable technology ZurichMOVE with the state-of-art machine/deep learning/statistical modelling approaches we will provide personalized assessment of fall risk in an ecologically valid manner.

In this project, walk data are collected by data collectors/field researchers using wearable devices (e.g., the ZurichMove sensors). An app was developed based on earlier requirement gathering from stakeholders to integrate the wearable data and streamline the process of data collection.

The aim is to enhance the user Interface (UI) and user experience (UX) of the ZurichMove tablet app prototype, with the possibility of conducting a User Acceptance Test (UAT) and Pilot Test with data collectors and elderly adults through the development process.

TYL-08: The effects of gamified interventions on physical and cognitive frailty in community-dwelling older adults: A systematic review and meta-analysis

Frailty is a public health priority, since it is highly prevalent, negatively affects the quality of life of older adults and their families and generates significant social and economic costs. Numerous interventions and programmes to promote healthy behaviours and lifestyle, have been introduced to address frailty prevention and delay.

Game-based interventions (GBIs) have been used to promote health-related outcomes, including physical and cognitive functions. However, criteria for selecting game-elements (GE) have not been adequately described in terms of their ability to address older adult's conditions or targeted health outcomes. This present review aims to identify the GE applied in GBI and their effectiveness for physical and cognitive frailty.

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