Standards, Ethics and Impacts Outline

Capstone Project Report Outline

Standards

Engineering Ethics

Impacts and Constraints

Presentation Slide

Outline of the Capstone Project Report

Declaration
Approval
Ackownledgement
Abstract
List of Abbreviations
List of Tables
List of Figures

Chapter 1 Introduction	Chapter 2 Background	Chapter 3 Proposed Model	Chapter 4 Implementation, Testing, and Result Analysis	Chapter 5 Standards, Constraints and Milestones	Chapter 6 Conclusion
1. Inroduction 2. Problem Statement 3. Problem Background 4. Research Objectives 5. Motivations 6. Flow of the Research 7. Significance of the Research 8. Research Objectives 9. Thesis Organization 10. Summary	1. Introduction 2. Literature Review 3. Problem Analysis 4. Summary	1. Introduction 2. Feasibility Analysis 3. Requirement Analysis 4. Research Methodology 5. Design, Implementation, and Simulation 6. Summary	1. Introduction 2. System Setup 3. Evaluation 4. Results and Discussion 5. Summary	1. Introduction 2. Sustainability 3. Impacts on Society 4. Ethics 5. Challenges 6. Constraints 7. Timeline 8. Gantt Chart 9. Summary	1. Introduction 2. Future Works and Limitations

References

Standards

- Standards are essential in creating and maintaining an open and competitive market for equipment manufacturers and in guaranteeing national and international interoperability of data and telecommunications technology and processes.

- Standards provide guidelines to manufacturers, vendors, government agencies, and other service providers to ensure the kind of interconnectivity necessary in today's marketplace and in international communications.

Standards (Cont'd)

- The intent is that equipment manufacturers and users comply with these standards.

- Standards guarantee that despite the fast development in the communications industry, any software and hardware manufactured by different companies can share information.

Standards Organizations

- An association of organizations, governments, manufacturers and users form the standards organizations for developing, coordinating and maintaining the standards.

  1. International Standard Organization (ISO)
  2. International Telecommunications Union-Telecommunication Sector (ITU-T)
  3. Institute of Electrical and Electronics Engineers (IEEE)
     - Autonomous Robotics (AuR)
     - Age Appropriate Digital Services Framework-Based on the 5Rights Principles for Children
     - Classification of Adaptive Instructional Systems
     - General Requirements of Online Detection Based on Machine Vision in Intelligent Manufacturing
     - General Requirements of Mass Customization
  4. American National Standards Institute (ANSI)
  5. Electronics Industry Association (EIA)
  6. Telecommunications Industry Association (TIA)
  7. Internet Architecture Board (IAB)
  8. Internet Engineering Task Force (IETF)
  9. Internet Research Task Force (IRTF)
  10. International Electrotechnical Commission (IEC)
  11. Joint Technical Committee (JTC)
  12. United States: The NIST Roadmap ⎤
  13. Germany: BMWi/DIN/DKE initiative ⎦ National standards-based Approaches

Standards (Cont'd)

ISO/IEC JTC 1/SC 42 Standards Under Development

Project	Focus area
ISO/IEC TR 20547-2:2018	Information technology — Big data reference architecture — Part 2: Use cases and derived requirements
ISO/IEC TR 20547-5:2018	Information technology — Big data reference architecture — Part 5: Standards roadmap
ISO/IEC AWI 38507	Information technology — Governance of IT — Governance implications of the use of AI by organizations
ISO/IEC CD 22989	Artificial intelligence — Concepts and terminology
ISO/IEC CD 23053	Framework for Artificial Intelligence (AI) Systems Using Machine Learning (ML)
ISO/IEC CD TR 20547-1	Information technology — Big data reference architecture — Part 1: Framework and application process
ISO/IEC AWI 24668	Information technology — Artificial intelligence —Process management framework for Big data analytics
ISO/IEC FDIS 20547-3	Information technology — Big data reference architecture — Part 3: Reference architecture
ISO/IEC 20546:2019	Information technology — Big data — Overview and vocabulary
ISO/IEC NP 24029-2	Artificial Intelligence (AI) — Assessment of the robustness of neural networks — Part 2: Formal methods methodology
ISO/IEC AWI TR 24368	Information technology — Artificial intelligence — Overview of ethical and societal concerns
ISO/IEC CD TR 24029-1	Artificial Intelligence (AI) — Assessment of the robustness of neural networks — Part 1: Overview
ISO/IEC PDTR 24028	Information technology — Artificial Intelligence (AI — Overview of trustworthiness in Artificial Intelligence
ISO/IEC NP TR 24027	Information technology — Artificial Intelligence (AI) — Bias in AI systems and AI aided decision making
ISO/IEC AWI 23894	Information Technology — Artificial Intelligence — Risk Management
ISO/IEC CD TR 24030	Information technology — Artificial Intelligence (AI) — Use cases
ISO/IEC NP TS 4213	Information technology — Artificial Intelligence — Assessment of classification performance for machine learning models
ISO/IEC AWI TR 24372	Information technology — Artificial intelligence (AI) — Overview of computational approaches for AI systems

Standards (Cont'd)

- **Standards from countries / regions**

  - US ASCII (American Standard Code for Information Interchange)

  - EU GDPR (General Data Protection Regulation)

- **Bangladeshi Standards**

  - Currently not very strong in the field of CSE

- **Different types of standards**

  - Safety (Example: Code safety)

  - Ethics (Example: IEEE/ACM code of ethics)

  - Technological (IEEE 802.11b/g)

Compliance with Standards

- A chapter of the interim report Mention the standards that you are following Standards from international bodies

    - ISO → The **International Organization for Standardization** (**ISO)** is an international standard-setting body composed of representatives from various national standards organizations.

    - IEEE → **Institute of Electrical and Electronics Engineers** (**IEEE**) is the world's largest technical professional organization dedicated to advancing technology for the benefit of humanity.

    - USB Consortium → **Universal Serial Bus** (**USB**) is an industry standard that establishes specifications for cables and connectors and protocols for connection, communication and power supply (interfacing) between computers, peripherals and other computers.

    - www consortium (W3C) → The **World Wide Web Consortium (W3C)** is an international community where Member organizations, a full-time staff, and the public work together to develop Web standards.

    - Joint Pictures Expert Group (JPEG) → The **Joint Photographic Experts Group**, also known by the acronym **JPEG**, is a technical committee which develops image standards. JPEG is also the name of the group's primary standard for **image compression**- **JPEG** compression is widely used for images on websites and is supported by most editors, browsers and image viewers. This standard is also used to compress and store images created by most scanners and digital cameras.

Standards (Cont'd)

Applicable Standards
- **Communications**
  - USB v2.0 (universal serial bus)
  - Wireless-802.11b
  - Audio signal
  - Bluetooth
- **Data Formats**
  - Bitmap (image)
  - JPEG Compression (image)
  - PCM Waveform (Audio)
- **Programming Languages**
  - C/C++ (OOP)
  - Assembly
  - JAVA
  - Matlab
- **Connectors**
  - USB
  - RCA
  - Mini-jacks
  - Ribbon/Pin
- Frameworks:
  - Tensorflow
  - Keras
  - Pytorch
  - Scikit learn

Do NOT needlessly inflate the number of standards that you are following

Mention only the ESSENTIAL ones

Engineering Ethics

- Engineering is the process of developing an efficient mechanism which quickens and eases the work using limited resources, with the help of Technology.

- Ethics are the principals (or Set of Rules) accepted by the society, which also equate to the moral standards of human beings.

  - An engineer with ethics, can help the society in a better way.

  - Moral e.g. Being Good to everyone, Speaking only the truth, Avoid Cheating, etc.

Impacts and Constraints

- A chapter of the interim report

    - Mention various types of impacts of your FYDP, and also the constraints you work under

Impacts and Constraints (Cont'd)

- **Economic impact**
  - What is the return on investment? Is it economically viable?
  - Does your project make something cheaper? Or easier to achieve?
  - How does it affect jobs? Does it create or replace jobs?
  - Is there any long term impact?

Impacts and Constraints (Cont'd)

- **Environmental impact**
  - How much energy does it consume?
  - Does it affect our ecosystem?
  - Is there any threat or benefit to the environment?
  - Is there any waste? How do you manage it?
  - How does the change in your users behavior affect the environment? (for example more cars would lead to more air pollution)

Impacts and Constraints (Cont'd)

- **Ethical impact**
  - Are there any ethically questionable decisions?
  - Does it help the disadvantaged people?
  - Can the project be used to serve morally questionable objectives? (ex: using AI for military drones)
  - Can it be used for unfair means? (ex: software for cheating in benchmarks)
  - Are the users / workers treated fairly and informed of their rights? (ex: facebook data breach)

Impacts and Constraints (Cont'd)

- **Health and Safety impact**
  - What kind of safety measures are you following?
  - Is the coding safe, and free from well known exploits?
  - Do your product impact the health of its user?
  - Does it correlate with any specific health threats? (ex: radiation and cancer)
  - Does it have any measures to prevent long term health problems? (ex: night mode display)

Impacts and Constraints (Cont'd)

- **Social**
  - What is the impact on society? (Ex: Smartphones, Internet)
  - Long Term and Short Term.
  - What are the social norms regarding this? Is the product socially acceptable? (Dating apps are popular in some societies, taboo in others)

Impacts and Constraints (Cont'd)

- **Political**
  - Is there any laws preventing this? (Ex: Flying drones in BD without permission)
  - Does it depend on government action? (Ex: metro rail management system)
  - Does it depend on government approval/decision? (GSM vs CDMA)

Impacts and Constraints (Cont'd)

- **Manufacturability**
  - Can you build it?
  - Can you build it in large numbers? (very easy for software)
  - Does it depend on upcoming technological advances? (example: self driving and miniature LiDAR)
  - Is it profitable to manufacture?

Impacts and Constraints (Cont'd)

- **Sustainability**
  - Is it sustainable?
  - Is the product durable?
  - Does the design take into account accidental inputs?
  - What is the expected age?
  - What is the expected frequency of update / servicing ?

Presentation Slide

- No. of Slides : 30.

  – Cover Page and Table of Contents (2)

  – Introduction (3)

    • Background/Problem Statement/ Objective/Motivation/Research Framework

  – Literature Review (4)

  – Methodology (3)

  – Expected Outcome (2)

  – Standards, Ethics, Impacts and Constraints (1)

  – Gantt Chart, Conclusion and References (3)

- Oral Presentation Duration : 15 min (Group Presentation).
- Divide the time equally among each member of your group.

Thank You