IS1108 Digital Ethics and Data Privacy
AY23/24, Y1S2
Notes

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Contents

1 Professional Ethics

1.1 Professional Codes of Ethics

- **SDE (Secure, no malware)**.
- **Data Management**:
  - Use user data only when needed and with consent.
  - Data should be stored securely and used responsibly.
- **AI**:
  - Prevent biased and discriminatory algorithms.
  - Ensure transparency and accountability.
- **ACM Code of Ethics**.
- **Ethical Principles**.

1.2 Ethical Frameworks

- Consequentialist.
- Duty.
- Virtue.

1.3 Importance of Ethics

- Impact on Users.
- Trust and Reputation.
- Legality.
- Innovation and Sustainability.
- Professional Growth.
- Social Responsibility.

1.4 Ethical Dilemma and Principle of Double Effect

- If an action has two possible outcomes, good and bad, it is considered acceptable as long as steps are taken to minimize the bad outcome.
- The bad outcome must not be intended.
- Benefits must outweigh costs.

2 Artificial Intelligence Ethics and Governance

2.1 Types of AI

- Reactive.
- Limited Memory.
- Theory of Mind.
- Self Aware.

2.2 Laws of Robotics

- May not injure a human, or through inaction, allow a human being to come to harm.
- Must obey orders when given by a human unless conflicted with the above.
- Protect its existence unless conflicted with the above.

2.3 Pillars of Trustworthy AI

- Fairness.
- Explainability.
- Robustness.
- Transparency.
- Privacy.

2.4 Principles and Pillars for AI Adoption

- **Principles**:
  - Explainable, transparent, and fair.
  - Human Centric.
- **Pillars**:
  - Internal Governance.
  - Operations Management.
  - Human Centricity.
  - Stakeholder Communications.

2.5 SG National AI Strategy

- Goal is to be a Global Hub for AI Solutions.
- Govern and Manage AI Impact.
- Generate Economic Value and Improve Lives.
- **Sectors**:
  - Transport and Logistics.
  - Smart Cities and Estates.
  - Healthcare.
  - Education.
  - Safety and Security.

3 Automation and Autonomous Systems

3.1 Impact of Automation

- Low Impact, Low Autonomy.
- Low Impact, High Autonomy.
- High Impact, Low Autonomy.
- High Impact, High Autonomy.

3.2 Consideration of Ethical Automation

- Safety.
- Privacy and Data Security.
- Liability.
- Effects to workforce.
- Autonomy and Independence.
- Social Connectedness.
- Objectification.
- Deception.
- Social Justice.

3.3 Ethical Framework for Automation

- Technical.
- Professional.
- Regulation.
- Oversight.
- Acceptance.
- Ethics.

4 Data Protection in ICT

4.1 Personal Data Privacy Act (PDPA)

- Covers data that can identify an individual.
- **Business Contact Info (BCI)** is not protected by PDPA.
- **Data Intermediary**.
- **PDPA Obligations**.
- **DP Practices**.

5 Digital Ethics by Design

5.1 Framework for Adopting Digital Ethics

- Ethical Requirements and Values.
- Ethical Design Principles.
- Ethical Impact Assessment.
- Practice Principles for Digital Ethics.

6 Human-Machine Interaction Design

6.1 Core Concepts

- Goal of HCI.
- HCI and UX Design.
- Autonomy levels of machines.

- Automation levels of autonomous cars.
- HCI Ethical Consideration.

7 Digital Divide, Equity, Accessibility, and Inclusion

7.1 Key Areas

- National Programs for Digital Equity.
- Digital Inclusion.
- Promoting Digital Equity.

8 Computing for Social Good

8.1 Socially Responsible Computing

- Inclusive Design for Accessible Products.
- Corporate Social Responsibility.
- Environmental, Social and Corporate Governance (ESG).
- Balancing Profitability or Sustainability.
- Collaborative and Sharing Economy.
- Circular Economy.
- Holistic Accessibility in Ethical Design.

9 Digital Intellectual Property Rights

9.1 Intellectual Property (IP)

- What is Intellectual Property.
- Subject matters of Intellectual Property.
- Types of IP Rights.

9.2 IP of Software

- IP of software is protected through copyrights and patents.
- Copyright-protectable elements of computer software.

- Copyright in terms of IOT and AI.
- Copyright in terms of big data and DA.
- Patent-Protectable elements of Computer Software.
- Patent in terms of Software.
- Proving Patentability of Invention.
- Filing for patent Application in Singapore.
- Areas for open source/shared domains.

10 Building Ethical Products

10.1 Product Strategy and Analysis

- Value Proposition of a Product.
- Triple Layer Business Model Canvas.
- Ethical Impact Assessment.
- Digital Transformation.
- First Principles Design Thinking.
- **Market Analysis**:
  - Market Opportunity.
  - Target Customers.
  - PEST Analysis.
  - Competitive Analysis.
  - SWOT Analysis.
  - Five Forces Model.
- Key Drivers of Successful Tech Products.

10.2 Product Design and Implementation

- Successful Product Delivery.
- Product Development Process.
- **User Experience Design (UX)**:
  - Moments of Truth.

  - Journey Map.
- **Agile Approach**:
  - Paradigm Shift.
  - SCRUM Framework.
  - Agile Scope Management Process.
  - Iterative and Incremental Delivery.
- User Interface Design.
- **Lean Startup**:
  - Minimum Viable Product (MVP).
- Product Stacks Components.