



Answer all the 5 questions. Numbers to the right of the questions denote their marks.

1. Mr. Ross Geller is a Final year Undergraduate student doing his thesis in the domain of Natural Language Processing and Social Media Analytics. His topic is "Identify Cyberbullying and Offensive posts from Social Networking Sites (SNS)". He wants to collect Social Media data of 10,000 Facebook users and utilise it to train the model. He gathered the data by scraping the site which means he didn't used any consent forms. He later posted the data set in forum to discuss with like minded people. Later his work was picked up a news site which wrote a article on it which was inaccurate. Mr Geller tried to clarify the situation.

List the violated IEEE codes of ethics and what can be done minimize the violations.

[5]

2. In 2014, Facebook conducted a study in which it manipulated the news feeds of over 600,000 users to see if it could affect their emotions. The study, titled "Experimental evidence of massive-scale emotional contagion through social networks," was conducted by researchers from Facebook, Cornell University, and the University of California, San Francisco.

The study involved randomly selecting Facebook users and manipulating the emotional content of their news feeds for one week in January 2012. Some users were shown more positive content, while others were shown more negative content. The researchers then monitored the users' own posts to see if they exhibited emotional contagion meaning if their moods would be affected by the emotional content they were exposed to on their news feeds.

The study found that users who were exposed to more positive content were more likely to post positive updates themselves, while users who were exposed to more negative content were more likely to post negative updates themselves. The study caused controversy when it was revealed that Facebook had manipulated users' emotions without their consent.

Now, explain how Facebook exploits the vulnerable populations in their research. Which ethical concerns do arise in Facebook's research?

[5]

3. The Chernobyl disaster was a nuclear accident that occurred on 26 April 1986 at the No. 4 reactor in the Chernobyl Nuclear Power Plant, near the city of Prip'yat in the north of the Ukrainian SSR in the Soviet Union. Called the world's worst-ever civil nuclear incident.

The accident destroyed the Chernobyl 4 reactor, killing 30 operators and firemen within three months and several further deaths later. The accident occurred during a safety test meant to measure the ability of the steam turbine to power the emergency feedwater pumps of an RBMK-type nuclear reactor in the event of a simultaneous loss of external power and major coolant leak. During a planned decrease of reactor power in preparation for the test, the operators accidentally dropped power output to near-zero, due partially to xenon poisoning. While recovering from the power drop and stabilizing the reactor, the operators removed a number of control rods which exceeded limits set by the operating procedures. Upon test completion, the operators triggered a reactor shutdown. Due to a design flaw, this action resulted in localized increases in reactivity within the reactor. That brought about the rupture of fuel channels and a rapid drop in pressure, thereby prompting the coolant to flash to steam. This caused the reactor 4 to go critical.

The Chernobyl accident was the result of a flawed reactor design that was operated with inadequately trained personnel.

Write case-study on the above scenario considering IEEE code of ethics.

[5]

4. Assume you work for a large tech company that specializes in manufacturing and selling computers and other electronic devices. As part of a new initiative, the company is seeking to reduce its environmental impact and improve its sustainability practices while also minimizing production costs. As a member of the team responsible for developing this initiative, you are tasked with identifying the potential environmental impacts of computer technology and devising strategies to mitigate them. In particular, you are asked to consider the impact of the entire life cycle of the company's products, from manufacturing to disposal, with a focus on reducing e-waste. Using your knowledge of computer technology, environmental science, and cost optimization, outline some of the potential environmental impacts of computer technology, propose some strategies that your company could implement to minimize those impacts, and also suggest some cost-effective ways to reduce e-waste.

[5]

5. Andrea Pirlo a machine learning expert works for a sports data analytics company that has developed an AI-powered model to predict the winner of the FIFA World Cup. However, it has recently come to light that the model has a bias due to the data used to train the model it had results from previous FIFA World Cups from 1934 to 2018. The data used to train the model has been found to be biased towards certain countries, leading to incorrect predictions and unfair advantages for certain teams. As a member of the team responsible for developing and maintaining the AI model, Pirlo is tasked with finding a solution to remove the bias and ensure that the model provides accurate and fair predictions for all teams participating in the World Cup. What kind of bias is introduced here? Explain your answer with solution.

[5]



We, the members of the IEEE, in recognition of the importance of our technologies in affecting the quality of life throughout the world, and in accepting a personal obligation to our profession, its members and the communities we serve, do hereby commit ourselves to the highest ethical and professional conduct and agree:

I. To uphold the highest standards of integrity, responsible behavior, and ethical conduct in professional activities.

1. to hold paramount the safety, health, and welfare of the public, to strive to comply with ethical design and sustainable development practices, to protect the privacy of others, and to disclose promptly factors that might endanger the public or the environment;
2. to improve the understanding by individuals and society of the capabilities and societal implications of conventional and emerging technologies, including intelligent systems;
3. to avoid real or perceived conflicts of interest whenever possible, and to disclose them to affected parties when they do exist;
4. to avoid unlawful conduct in professional activities, and to reject bribery in all its forms;
5. to seek, accept, and offer honest criticism of technical work, to acknowledge and correct errors, to be honest and realistic in stating claims or estimates based on available data, and to credit properly the contributions of others; ~~not~~
6. to maintain and improve our technical competence and to undertake technological tasks for others only if qualified by training or experience, or after full disclosure of pertinent limitations;

II. To treat all persons fairly and with respect, to not engage in harassment or discrimination, and to avoid injuring others.

- ~~7.~~ to treat all persons fairly and with respect, and to not engage in discrimination based on characteristics such as race, religion, gender, disability, age, national origin, sexual orientation, gender identity, or gender expression;
- ~~8.~~ to not engage in harassment of any kind, including sexual harassment or bullying behavior;
9. to avoid injuring others, their property, reputation, or employment by false or malicious actions, rumors or any other verbal or physical abuses;

III. To strive to ensure this code is upheld by colleagues and co-workers.

10. to support colleagues and co-workers in following this code of ethics, to strive to ensure the code is upheld, and to not retaliate against individuals reporting a violation.

Adopted by the IEEE Board of Directors and incorporating revisions through June 2020.

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- Proposed changes shall have been published in THE INSTITUTE at least three (3) months in advance of final consideration by the Board of Directors, with a request for comment, and
- All IEEE Major Boards shall have the opportunity to discuss proposed changes prior to final action by the Board of Directors, and
- An affirmative vote of two-thirds of the votes of the members of the Board of Directors present at the time of the vote, provided a quorum is present, shall be required for changes to be made.