CS #1: Facial Recognition (Discussion Preparation)

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Question 1 – What factors are most important in your evaluation of the current status and implementation of facial recognition software?

Answer 1 – As a student who is studying engineering, I think the most important factor is certainly the technical accuracy and reliability of the software. In addition, when we talk about facial recognition accuracy, I believe we should take diversity into consideration, which means the accuracy and reliability should be evaluated based on both male and female faces, as well as both lighter skin and darker skin tones.

Question 1 (a) – Is the technical accuracy and reliability of the software important?

Answer 1 (a) – Yes, the software accuracy and reliability are very important. Firstly, if the facial recognition software has very low accuracy or very bad reliability, then no one will purchase this software, and the compony Fluvian will lose a lot of money or investment because of such software failure. Secondly, as I mentioned in Question 1, the accuracy and reliability should be evaluated taking diversity into consideration, so that we can efficiently monitor, detect and improve this software to reduce or remove gender and racial bias.

Question 1 (b) – Do the motivations of the company's leadership matter?

Answer 1 (b) – Yes, the motivations of the company's leadership are very important because it is leaders who make the final decisions. Leaders decide how much budget to develop a software and decide what datasets to be used in model training. If the company's leadership does not care about diversity, then it is very likely that the company's product will embed gender and racial bias.

Question 1 (c) – Do openness and algorithmic transparency matter?

Answer 1 (c) – Yes, the openness and algorithmic transparency are very important because these could help the public to better monitor and regulate the company's behavior. If there are some problems with the algorithm, then it is much easier for the public to figure out the source of such problems.

Question 2 – Do you agree with any of the critics? If you agree with any of the critics, which ones do you agree with and why? If you do not agree with any of the critics, why not?

Answer 2 – In the penultimate paragraph, I agree with the critics' argument about changing the question from "Who committed this crime?" to "Did this individual commit this crime?" and this is because the second question is clearly prone to indicating gender and racial bias. We all know that sometimes machine learning algorithms perform poorly, if we have to list the top five matches, even having very low matching percentage, then such bias could be further aggravated. In the last paragraph, however, I do not agree with researchers about having national regulations to forbid nationwide use of facial recognition. Other companies with sufficient budget may choose to purchase diverse datasets for training and therefore bias reducing or removing could indeed be expected.

Question 3 – What is the good produced by current implementations of facial recognition software? What is the potential good from future implementations of this type of software?

Answer 3 – Currently, I think facial recognition can help police officers identify and apprehend suspected criminals simply by comparing a photo or a sketch, which efficiently saves a lot of time and resources to solve a case. In the future implementations, I think facial recognition can be used for ticket checking, attendance checking, and shopping payment. All these applications could significantly improve daily convenience of the public.

Question 4 – What harms are produced by current implementations of facial recognition software? What are other potential harms from future implementations of this type of software?

Answer 4 – Currently, I think gender and racial bias are harmful, and this is due to the inexpensive, non-diverse training databases. In the future implementations, if facial recognition is bonded with our daily life, such as credit evaluation, work performance evaluation, and crime evaluation, then I am very concerned that the life quality of female and darker skin tones will be heavily harmed/jeopardized due to such bias embedded in algorithms. The safety and stability of our society could also be degraded.

Question 4 (a) – What steps could be taken to mitigate existing harms and prevent future harms? How would you decide which steps, if any, to take?

Answer 4 (a) – I think 3 steps could be taken. Step 1, the public should monitor and criticize the gender and racial bias in the facial recognition software to help people become aware of currently existing harms. Step 2, laws should be built not to forbid facial recognition, but to regulate the behavior of companies, such as asking them to use diverse datasets and to keep their algorithms open and transparent. Step 3, with the above two steps, software companies should constrain themselves and devote to reducing and removing gender and racial bias when developing facial recognition software, by planning budget in a more appropriate way.

Question 5 – What are the intended and unintended consequences of current implementations of facial recognition software?

Answer 5 – I think the intended consequences are to save budget and efforts while still providing explainable solutions (top five suspect matches) to police officers. I think the unintended consequences are concerns that women and people of color are prone to being misidentified and arrested simply because their faces ranked the top five even with very low match-confidence percentage, which clearly shows the gender and racial bias.

Question 5 (a) – Do current implementations contribute to a common good, or do they disproportionately distribute benefits to some and burdens to others?

Answer 5 (a) – I think current implementations disproportionately distribute benefits to men and lighter skin tones, while distribute burdens to women and darker skin tones. This is because the inexpensive and non-diverse datasets are used for facial recognition training, and therefore such gender and racial bias will be revealed once the software goes to implementations.

Question 6 – To what parties did the developers at Fluvian have obligations when they designed the facial recognition software and made decisions about the training database?

Answer 6 – Firstly, I think developers have obligations to the Fluvian company and the company's leadership. This is because they are hired by the company and their bosses, and it is reasonable for developers to save money for the company while still completing the facial recognition software project. Secondly, however, I think developers at Fluvian also have obligations to the public people, because their software will be released to public for commercial purposes, and everyone could be influenced by the implementation of such software.

Question 7 – To what parties did the police department programmer have obligations when they designed the internal user interface and made decisions about how to display the matches to the photos in the database?

Answer 7 – Firstly, I think the programmer has obligations to the police department because it is the programmer's job to design an internal user interface to help police officers efficiently identify and arrest suspects. Secondly, maybe the programmer decided not to include the match-confidence percentage simply because they did not want the interface to be visually complicated, then the programmer should also obligations to the public, women and people of darker skin in particular, because they might be disproportionately misidentified by this software.

Question 8 – What do you think about the character of the different persons in the case (including software developers, data scientists, engineers, and the police department programmer)?

Answer 8 – Firstly, I think the software developers are irresponsible and they lied to the entire team. They promised to improve the software after the first iteration, but the software has always been criticized for gender and racial bias since its public release, and we could not see any update or improvement at all. Secondly, I think the data scientists take their responsibilities and did a good job, because they initially claimed the lack of diversity in the training database. Thirdly, I think the machine learning engineers also take their responsibilities and did a good job because they also express their concern about such bias, though constrained by limited time and budget. Fourthly, I think the police department programmer is irresponsible and did a bad job, because they did not care about the potential misidentification due to the gender and racial bias embedded in the software and decided to exclude the match-confidence percentage while always displaying the top five matches in the internal interface. I think this behavior is very bad, maybe the programmer simply does not realize this, or maybe the programmer also has some gender and racial bias. Both possibilities reveal the programmer's irresponsibility.

Question 8 (a) – Do you think anyone acted honorably? With concern for others? Out of selfish motives?

Answer 8 (a) – I think the data scientists and the machine learning engineers acted honorably. Data scientists firstly noticed the lack of diversity in the database and notified the machine learning engineers. Then the machine learning engineers expressed their concerns about gender and racial bias in the software to the entire team. I think the behaviors of both data scientists and machine learning engineers show their concern for others, and such concern is indeed out of selfish motives, but for the team, for the company, and for people in public.