**Assignment 1**

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**Introduction**

A multi-national company has a proposal about designing a new system, which can collect the facial and body’s feature information through some common photographic equipment, and all the data of the facial or body information will be given to an algorithm for deeper analysis to give healthy and mental advice to the employees.

However, there are some potential problems with the proposed project that could raise ethical and social concerns, which are the privacy protection problem, bias in face recognition, and the last is the risk of misrecognition in this application. To prove how the social and ethical issues are at stake, I will first explain the meaning or definition of these social and ethical issues, then I will explain the source of the problem, at last, I will explain the possible harm caused by the ethical issues, and I will give some examples of this ethical issues.

**First ethical issues**

In this proposal, Contoso wants to use the EMI to capture images and videos of the employees through the existing infrastructure, and store the data into the human resource management systems. The problem could become very serious if the images or videos of the employees are leaked as the biological characteristic [1] is unique for everyone, and the personal identity information, life trajectory, personal hobbies, and preference will be dug out by using the biological characteristic [1]. Therefore, the usage of facial image capture will cause the concern for personal privacy protection, and abuse or monopolization of data by individual organizations. All of this will bring new challenges to ethics.

The source of the problem is that people’s facial information is valuable and profitable which tempting some Internal staffs to intentionally or unintentionally leak the data to other organizations or the internet. On the other hand, the database is easily invaded by the hacker if the software or hardware security is not deployed well such as bad access control. I will explain how the social and ethical issues are at stake by using some different cases of data leakage.

If the facial data is leaked intentionally by the staff, and the data holder may not notice that, then the facial data even the weekly analytics email content might be resold to other organizations such as some fraud rings. This kind of organization can analyze the email and learn your personal information, Financial situation by using the facial image or what is your preference or recent health status by reading the email. The fraud rings may defraud the data holder by selling some fake medical product or service which cause huge damage to the data holder's property and even is life-threatening. Another case is that the data is leaked unintentionally, which means they do not leak privacy with a specific purpose, for example, the human resource management systems administrative staff may leak the data when they discuss the facial information with others or they may be store all the facial data and analysis result on the cloud or public computer that can be easily captured by third parties and cause privacy concern.

the private facial information and the analysis result can also be leaked by the hacker, which means the hacker using some system vulnerabilities to invade the database to stole the facial image and video or manipulate the data. The leakage of private facial images could bring serious harm to the main body and family such as property damage, or it could cause discrimination and stigmatization to the data holder because of data’s manipulation.

**Second ethical issues**

The second potential ethical issue is the bias in the facial recognition’s algorithm. As the Contoso is a large and multi-national company so it must have lots of staffs of different races or from different countries, all of these are important features when training the AI algorithm. For the building process of the EMI, it must use plenty of real-life data to train the deep neural network, and it is a Multistage process, which will learn and encode the certain characteristics of different races and different regional people. Consequently, the model will be used to predict the staff health status and make suggestions.

The source of the problem is that some specific characteristic of machine learning causes the issue. One specific characteristic is that machine learning follows a very rigorous process to learn and the way it makes the decision is hidden and implicit, not like our humans, when we act as a classifier or recognizer, we make the decision based on the sense and sensibility, and we subjectively want to make a fair decision, and we may intentionally or unintentionally ignore some human characteristics such as gender or race. Another characteristic is that machine learning is extremely dependent on the training data, different training data might output a different prediction with the same input. All of these characteristics might let the model trained by the ML process produce some incomprehensible, unimaginable prediction.

The bias in the AI algorithm could lead to a serious ethical problem because it may Increase workload for a specific race’s people or it could give some wrong ergonomic suggestions for female or male or it could always think that some staffs who come from the same country are unwell. In the first case, if the EMI’s algorithm has prejudice on a specific race, for example, it always recognizes and decides that an X color skin people are not tired even they are actually very tired, therefore, X color skin staff never receive a rest recommendation and in the most extreme case, the X color skin staff falls ill. Basically, the bias in the AI algorithm could threaten people’s life. EMI not just record people’s facial image but also record the whole-body structure which claims that it can make ergonomic suggestions however, the training data of people who come from a specific region and have a specific custom used in the AI algorithm may be different from the staff in this company. Like Contoso staff may have a different custom but the algorithm often gives some ergonomic suggestions that may not let the staff feels comfortable. The EMI also detect staff’s health status but what if the AI algorithm always think that some kind of people are unwell but actually they feel good (race, region, gender), this will cause that kind of staff to always receive a suggestion to see a doctor and eventually it will waste their time and money to go to the hospital. On the other hand, the EMI is embedded in the human resource management systems, so if the HR manager observes that the staff being targeted always feels unwell, the HR manager may want to dismiss him or her because of the analysis result.

**Third ethical issues**

The third ethical issue is the risk of misrecognition and division of responsibility problems. There is no AI algorithm that can 100% recognize any person correctly, it has the possibility to make a mistake, so we should consider the case that the mistakes that the EMI made may harm the staff or leads to property loss. And we should consider who should be responsible for the mistakes.

The source of the problem is that the limitations of the algorithm itself. Facial recognition is a complex process, there are some limitations in the process of face capture, analysis and recognition, which are inevitable. So even the possibility of the AI algorithm will make a mistake such as mis-match is very low, it still has some vulnerabilities to break the system. For example, if the staff wear a mask or sunglass or hat, the False recognition rate may be very high, besides, what if staff has some make- ups or face-liftings, the EMI might be failed to find the match in the database, another situation is that what happens if some people have some similar human characteristics, such as twins, brothers and sisters [2].

This kind of social and ethical issues are at stake when the AI algorithm makes a wrong prediction of a staff status, which includes the health status, the weekly analytics email may say this staff seems like having a specific disease but actually it identifies wrong symptoms, therefore the staff may go to the Pharmacy and have some wrong medicines which could be physical harm to him or her. On the other hand, if the AI algorithm wrongly math two people or confuses one staff with another staff, then it could cause stigmatization to one of the staff, e.g. staff A do badly or has a negative attitude in a meeting and the facial analysis and skeletal tracking detect it but the system wrongly matches this behavior to another staff B, so staff B may suffer this grievance and stigma, it could cause psychological damage to staff B.

**Conclusion**

In this paper, I review three potential problems with the proposed application that could raise ethical and social concerns, which are the privacy leakage concern, bias in the AI algorithm and the risk of misrecognition problem. Although EMI is a promising business opportunity and can improve employee working efficiency, it may have some negative effects, such as property loss or Health damage or psychic trauma. Therefore, we need to formally and rigorously regulate this application and ensure the algorithm’s fairness and finalize the division of responsibility.

**Reference**

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[2] Liu Ying (School of Information, Renmin University of China, Beijing 100872, China). A brief discussion on the ethical issues of face recognition, 2017.