Project and Professionalism
(6CS020)

A1: Professionalism Assessment

Attendance System using Face Recognition and Detection

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1. Introduction to project and professionalism aspects:

The attendance system is an automatic based system that will be implemented and used by the college environment for the wellbeing of students and teachers. This system will help the teachers to track the attendance of students using their facial data and recognizing them in class. The system will use a face detection and recognition system to take attendance of students. As the name of this system, it does not only take attendance there is more different functionality available in this system such as generate attendance report of a whole class, provide feedback to students, apply for leave, etc. It is a huge system.

The main concern this project is being carried out and this system is being developed are because of the methods, which teachers still use to take attendance during their classes. We face a lot of trouble with the traditional student attendance marking technique. The way manually writing down in sheets or marking attendance manually in excel takes a lot of time. So, with the use of this system, it will take less time to take attendance. The attendance system will be able to recognize the faces of the students in the classroom with an accuracy of 85%. The system design will be user friendly with a simple user interface that will serve as access to the functionalities of the system.

As this system is a web-based application, it also consists of professionalism aspects. Professionalism aspects are the most important topic to be discussed. The social impact, ethical issues, legal implications, and security aspects are the term of the professional aspects. Every project consists of these four aspects because it covers all positive impacts, negative impacts, laws, issues, etc. that the project might face in the future. So, in the topics below, we will be discussing all these four aspects related to the Attendance system.

2. Social Impacts:

Social impacts are based on the benefit which society or user gets by using the system. The social impacts are divided into two impacts, positive and negative. Every application has its different social impacts. The system or application is developed for real-world problem solving but some applications turn out to be harmful to society. Sometimes the data and information of users in the application can be used against them which is a negative impact on society.

The social impact of the attendance system discussed in the below topics:

2.1 Positive Impacts:

- **Easy attendance:** The main aim of the system is to automatically take attendance by recognizing student's faces and matching them with the previously stored facial record for the student in the database. So, this is a positive impact on society. The system is user-friendly where the teacher must start the system, and the system will take attendance manually by detecting the student's faces. The student simply must be near the camera so that the system can recognize them. Therefore, it is easy and simple to use the system.

- **Effortless and Time-saving:** The current situation where attendance is taken manually by calling the name of one student at a time and writing it down in an excel sheet takes a lot of time. The attendance system will automatically recognize the students and make them present in the excel sheet and if any listed student of the class is not detected then the system will automatically mark them absent. So, it is an effortless and time-saving process.

- **Superior college management:** The attendance system is a huge system that has multiple functionalities that are implemented to help and improve the college management system. The four actors in the system are admin, teacher, student, and student service staff. All actors have their different functionalities. Some functions such as an admin can manage all users, teachers can take attendance and provide feedback to students, students can view their attendance report and feedback provided by the teacher, student services staff can print the feedback of each student, etc. Therefore, along with the attendance functionality, this system can also be called a college management system.

2.2 Negative Impacts:

- **Fake attendance:** Sometimes when the teacher is not present during the time when attendance is being taken, at that moment if any other student shows the picture of the absent one the system can make them present. This can be a huge negative impact if the system is weak. So, to skip this impact, the teacher always must be present during the time of attendance.

- **Misuse of data or information:** The system contains numerous data of multiple users such as facial data of students, personal information of teachers and staff, national or international id card of staff, address, phone numbers, etc. which, can be very harmful to the users if used against them. Data privacy makes a huge impact during the development of any software or application and is also one of the important factors. An attendance system is a software that is to be used inside the college premises but, if the college distributes those data to any other organization to earn profit then there will be no privacy and the application will make a huge negative impact on society.

3. Ethical Issues:

Ethical issues are the factors that reflect the harmful possibilities the project can implies also it is the term that identifies whether something is appropriate to accomplish or not. Once the software is developed there are some major important things to consider on. The ethical issues describe the ethics and types of circumstances that can take place with misuse of the data and information inside the system.

Some of the aspects of the ethical issues are as listed below:

- **Personal Privacy:** Personal privacy relates to the privacy of the users in the system. The application might require access to the network by which the data inside the system can be easily transmitted over the network. So, to maintain good security and to avoid this problem the network layers should be formidable. The system contains numerous information about the users such as student, teacher, and staff registered to the system so, their data and information are secured by letting them access only to their profile and information not to the others. Login check middleware is added in other to control the access. (Sharma, 2020)

- **Identity theft:** Identity theft happens when someone else uses the data or information of another person and use it as their own by fooling the system. As earlier discussed, identity theft can take place in this system with high chances because it uses facial recognition technology. Image recognition is highly recommended but, in some cases, it can be misapplied heavily.

- **Data damage:** The data loss is not so expected to occur because these days because backups are done on daily basis. The data backups are done with the help of the cloud, but it is stored in the piece of hardware. The damage can be done when any natural disaster or fire occurs which can destroy the server easily so, it is always necessary that the data should be stored on different resources. (Guru99, 2021)

- **Equality Act:** The equality act refers to the discrimination of humans based on age disability, gender reassignment, marriage, and civil partnership, pregnancy and maternity, race, religion or belief, sex, and sexual orientation. The equality act also implies harassment and victimization. The equality act lies in the ethical issues because if the information of the users is used against them then it is the case of harassment and victimization. Attendance system also contains certain amount of information about users such as their sex, religion, and races. These kinds of information are sensitive so maintained securely and only admin has right to view this information to maintain equality and avoid negative factors such as discrimination and all. (Equality and Human Rights Commission, 2010)

- **Copyright Issues:** This issue occurs when the system uses any content or source of any other provider and claim as their own. The main content of the attendance system is user image or facial data which is only stored in the database once the user provides the permission. However, the system will be used in the college surrounding and the website will be restricted to non-users. Only the admin can register users to this website so, there will not any copyright issues. (National Information Assurance Training and Education Center, 2019)

- **Users permission for personal data:** The attendance system will only have the users who are part of college and the website will be limited to only the college users such as teachers, students, and student services staff. When the users are already part of the college then it is not necessary to gather the permissions from users to store their information in the system. However, the data and information will be limited to the user and the admin.

- **User's right to delete:** The users will have the right to delete their data totally from the database but once they are out of college or they are no more part of college they can delete their data. The admin will be responsible for such conditions because the user management system will be handled by the admin and once the user is out of college the admin will remove them from the system.

4. legal Implications:

The legal implications are the rules and regulations that are to be implemented in the country against cybercrimes. The Internet was first introduced during a venture in 1993 in Nepal by the Royal Nepal Academy of Science and Technology (RONAST) and Mercantile Office System (MOS). Cybercrimes are the crime that is performed with misuse of the data and information on the internet. There are different laws and judications that are made to control those measures. In the context of Nepal in 2006, the cyber law was published by Electronics Transaction Act (ETA) after the increasing number of crimes. Some legal implications and crimes that can take place with respect to the Attendance System are,

- Disseminated Denial of Service attack will make a huge loss to the system because when the flood of internet traffic will hit the attendance system website vast number of users inside the college or universities will be using it.

- Spear phishing can occur because it is web-based application and once it is live over the internet random adds can pop up to the system after the increase of traffic.

- Privacy leaks is the major implication to maintain a healthy relationship between the system and the users. The privacy is one of the most major factors inside any system because number of crimes can take place when the privacy of any users is revealed.

- Data Breaching will disclose the sensitive information about the users such as their contact number, address, email address, etc. which can be used against them.

- The data of user can also disclose their social media account and social media crime is of the major issues nowadays. (Pulami, 2020)

Therefore, there are number of crimes and implication the system can face. During 2019, a total of 180 cases related to cybercrimes were registered in Nepal. According to the law published by the ETA under Section 45, the punishment for the person who misuses the data provided on the internet or tries to access an unknown system for an illegal purpose is a maximum of 3 years imprisonment or a maximum of 2,00,000 rupees fine. Also, according to section 48, the person who tries to destroy or hack the system the punishment for them is 3 years of conviction or a maximum penalty of Rs 2,00,000 or both. (Koirala, 2019)

5. Security Aspects:

The security aspects state how the data and information are preserved in the system to maintain better privacy and policies of the users. The main content inside the attendance system is the data and information of the user. Such as user login credentials, password, facial data, and images, etc. these which are to be protected to avoid the circumstances the user might face in the future. The password is stored in encrypted form in the database. The database is like a security vault of the system. The access to the database and the major function of the system is only given to the admin. During the login period, the password is invisible for the security purpose of the user. The security can be divided into four different types of layers which are the Physical layer, Network, Borders, and Presentation layer. Some of the technical vulnerability such as,

- Authentication
- Access control
- Confidentiality/privacy
- Encryption
- Segregation of data and privileges
- Error handling and
- Testing for security

The layers are used to control different factors inside an application such as, physical access to the system, communication with the network, APIs, libraries, the edge of the application, the user interface of the system, the memory of the application, consumption of data inside the application, etc. (Cook, 2006) The admin is an essential actor of the system which can create, delete, update, and read the data of every user in the system. If the system goes live in the future a trustworthy or Head of Department (HOD) should be chosen for the system because the system fully depends on the admin.

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