RISK OF USING ARTIFICIAL INTELLIGENCE TO INTERPRET EMOTIONS

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Introduction

In modern times, the use of artificial intelligence (AI) techniques has become quite frequent in almost every sector. The departments concerning public dealing like public relations, help desks and customer redressal portals are mostly governed by various tools of AI. Some of the common examples of application of Artificial Intelligence are chatbots which is widely used by several companies to handle their customer, computerized calling systems to smartly catch the emotions of the people, smart CCTV cameras to record the reactions of the customer or any intruder at the place etc. This technology uses the AI robots to talk with the humans and answer to their queries in the most satisfactory manner. Thus, these AI techniques will be able to come up with the best results only when they are able to understand the real humans with their real issues.

It is not easy for a machine with no brain and heart of its own to go deeper into the minds and emotions of the humans and interpret them into original form. Even humans themselves have different perspectives and emotional standards regarding different subject areas. But the modern technology believes that it is safer to use AI to interpret human emotions in order to maximize the efficiency and satisfaction levels of the functioning of these AI based machines. The human beings are a combination of intellect and emotions. If either of them is left behind then it is impossible to understand the human tendency.

Hence, nowadays AI experts are working on development of softwares which could not only take external commands of the humans but can also understand their emotion by sensing their actions, reactions, facial expressions, reflexes, responses etc. This will take the functioning of these AI machines to the next level and will also decrease the risk of bias in interpretation of human emotions. Although, apart from the fact that there are various benefits of interpretation

of human emotions by the AI operated machines, there are certain risks involved in the process of interpretation. The present research paper highlights the same.

The instant research paper has been divided into various chapters. The first chapter talks about the significance of human emotions in general and professional world along with their proportionality to human intelligence. The second chapter develops an understanding about the "Emotional Artificial Intelligence", its need and significance and the methods used by it for the interpretation of human emotions. The last chapter focuses on stating risks involved in the process of interpreting human emotions by the Artificial Intelligence. Thereafter, they are followed by critical analysis, conclusion and suggestions.

CHAPTERIZATION

Chapter-1: Significance of Human Emotions

1.1 Proportionality of Human Emotions to Human Intelligence

In earlier times, the emotions were not given much importance to evaluate the human intelligence. The belief was that the emotions are inessential element of human mind which makes human intelligence and human emotions inversely proportional to each other. But this notion was contradicted by a great researcher named Antonio Damasio, a famous Portuguese-American neuroscientist. He proposed in his book that human rationality is closely related to human emotions. Damasio's study in the subject reveals that the human emotions have a significant part in the "rational thinking mechanism" of a human being.[1]

The idea of not considering the human feelings and emotions can cause a serious ambiguity in evaluation of human intelligence as it will comprise the human rationality. The reason behind the same is that the presence of these emotions only makes human mind distinctively human. It can also be perceived in the real world that the human emotions have a direct impact upon the reasoning of a human mind as both are constituents of a human body, hence, are inseparable.

A human body is a combination of both "human intelligence" and "human emotions", thus, they works together in order to produce a human reaction in certain situation. A human reaction

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[1] ANTONIO DAMASIO, DESCERATES' ERROR: EMOTION, REASON AND THE HUMAN BRAIN 24-25 (Penguine 2005).

cannot be expected to be product of only intellect; rather, it is produced after stimulation of human intelligence by human emotions. Hence, it can be inferred that "human emotions" play a significant role in "decision-making process". Thus, the "human emotions" are directly proportional to the "human intelligence". [2]

1.2 Significance of Emotions in the Professional Era

The real fact is that human emotions are inseparable from human actions. It is better to call them co-existing and co-dependent as the emotions act as a highly influential factor regarding the behaviour of an individual. And this human behaviour ultimately affects the working environment of the place and reflects the professional conduct of both employee and employers. The "emotional intelligence" and "social intelligence" are acquired by the human automatically from their surroundings. And the basic levels of human intelligence and emotional intelligence which are partially present in humans and partially acquired by them, makes them to behave in certain ways.[3]

Although, generally, the Intelligence Quotient (IQ) of a person is considered by deciding the suitability of that person for the particular job, but, the consideration of Emotional Quotient (EQ) also need to be done in order to determine that whether a particular person is capable to fulfil the demands of a certain job both emotionally and mentally.[4] For example, a person applying for the position of an Associate in a legal firm, then EQ of that person will help the employers to evaluate that whether he is emotionally and mentally strong enough to handle the stress and position of the position as the job is usually considered a little more demanding.

Chapter-2: Emotional Artificial Intelligence

The title "Emotional Artificial Intelligence" is not defined literally as if it does not refers to a machine which starts feeling emotional on some sad or happy occasions like humans. In the time of 1990s, it was also referred as "Affective Computing".[5] In general, it can be said that the "Emotional Artificial Intelligence" is a branch of "Artificial Intelligence" only which is

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[2] Juan Martinez-Miranda and Arantza Aldea, *Emotions in Human and Artificial Intelligence,* 21 Computers in Human Behaviour 323, 323-326 (2005).

[3] Olivia Brookehouse, *Can Artificial Intelligence Understand Emotions?,* THINKING BUSINESS (Sept. 26, 2021, 13:31), https://business.blogthinkbig.com/can-artificial-intelligence-understand-emotions/.

[4] DANIEL GOLEMAN, WORKING WITH EMOTIONAL INTELLIGENCE 150 (Bloomsbury Publishing India 2001).

[5] Olivia Brookehouse, *Can Artificial Intelligence Understand Emotions?,* THINKING BUSINESS (Sept. 26, 2021, 13:31), https://business.blogthinkbig.com/can-artificial-intelligence-understand-emotions/.

used to recognize, process, understand and respond to human emotions. Thus, the main motive of introducing this branch is to enhance the natural connection and communication between humans and Artificially Intelligent machines and decrease the gap of confusion among them.

The topic of "Emotional Artificial Intelligence" has come up as a significant subject of research in the hi-tech era of Artificial Intelligence which covers wide domain of life of people in the modern times. Nowadays, every individual wants to become smart by the use of AI operated smart gadgets in the market. The conversion of "Artificial Intelligence" in to "Emotional Artificial Intelligence" will bring a drastic change in the world of technology.

The use of Artificial Intelligence has now become very much frequent in the modern era of technology. It is commonly used in education sector where children are taught by smart robots and makes them to practice their assignments, customer care and help desk department of almost every company which helps the public to resolve their issues and answer their queries regarding the company, decision support processes in which artificial intelligence help the person to go with right path, interactive environment and search and classification also takes help from artificial intelligence etc.[6] Hence, in order to ensure the efficient working of artificial intelligence in all these sectors and many more it is necessary to make it user friendly.

2.1 Need and Significance of Emotional Artificial Intelligence

In the present times, the practice of filtering communication through digital media has become quite common. Everyone prefers to chat via texts or talk via video calls rather that option for in person meetings or conversation. Moreover, earlier people used to like to go for physical shopping but now people usually prefer online shopping. This leads to various issues for which we turn to the chatbots. But many times they are unable to resolve the human problems due to lack of their ability to interpret human emotions which results in frustrated customer.[7]

The merging of "human emotions" with the "artificial intelligence" leads to development of "Emotional Artificial Intelligence". It is one of the most desired future prospects of the Artificial Intelligence. The aim is to develop smart software systems that can conduct various

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[6] Arvind Kumar, et al., *Emotional Intelligence for Artificial Intelligence: A Review,* 7 IJSR 479, 479 (2018).
[7] Kai Bossen, *Emotion AI- The Artificial Emotional Intelligence,* DMEXCO Conference (Sept. 26, 2021, 21:00), https://dmexco.com/stories/emotion-ai-the-artificial-emotional-intelligence/#:~:text=Machines%20with%20this%20kind%20of,both%20verbal%20and%20nonverbal%20signals.

functions by resulting into intelligent responses. And this can only be possible if AI systems are incorporated with programming that can "act and reason" as human beings in a certain domain or engaged in AI vision algorithms that can understand the emotions of the humans, along with making other inferences.

After analysing the above stated realization regarding the importance of human emotions in AI and the established fact that "human emotions plays a very significant role in human rational thinking", the researchers and scientists found that "human emotions" should mandatorily be incorporated while modelling "human reactions" into artificially intelligent software and machines.[8] The Artificial Intelligence should be capable to process the perceived human emotion[9] as it was inferred that "emotion is the predominant operation, mediating between cognition and action".[10]

This makes the AI operated devices more "humanly and safer" in a particular manner. The inducement of emotions in AI will result to make the AI operated robots to be moralistic and ethical in their conduct. This will also built an "emotional connection" between the humans and machines which will have a direct positive impact on the working environment and wherever the AI has been used and operated around humans.[11] The studies reveal that majorly there are three goals for the development of "Artificial Emotions".[12] First, to promote interaction between AI operated robots and humans; second, to provide information about internal state like emotions, aim etc. of the robot to the user; and, third, to perform like a "control mechanism" upon the user by reflecting the impact of user's behaviour on robot and robot's capability of adaption to different situations.

2.2 Mechanism of Interpretation of Human Emotions

The most common methods used by researchers to determine the human emotions by Emotional Artificial Intelligence are by facial expressions, body language, dialogue and physiology of a human. Some special kinds of sensors are fit along with the required

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[8] Juan Martinez-Miranda and Arantza Aldea, *Emotions in Human and Artificial Intelligence,* 21 Computers in Human Behaviour 323, 323 (2005).
[9] D.G. STORK, *Scientist on the Set: An Interview with Marvin Minsky,* HAL'S LEGACY: 2001'S COMPUTER AS DREAM AND REALITY 15-31 (MIT Press 1997).
[10] WILLIAM JAMES, THE PRINCIPLES OF PSYCHOLOGY (Henry Holt and Company 1890).
[11] Kevin LaGrandeur, *Emotion, Artificial Intelligence, and Ethics,* 9 Intelligent Engineering and Informatics 97, 97 (2015).
[12] Terrence Fong, et al., *A Survey of Socially Interactive Robots,* 42 Robotics and Autonomous Systems 143, 151 (2003).

programming inside the Artificially Intelligent devices to perceive signals regarding the above stated methods as an input.

2.2.1 Recognition of Emotion from Facial Expressions

The "automatic recognition of facial expressions" of the humans by the Emotional AI is the mostly researched area in comparison to other methods of recognition of human expressions. Many researchers have researched to find out accurate and suitable method to recognize the facial expressions of the whole face by capturing the "facial action units" like widening of eyes or raising of eyebrows etc.[13] Thus the main focus is capturing all expressions, regarding eyes or mouth, at the same time, hence, a special type of camera i.e. "IBM Blueeyes Camera" is used for the said purpose.

The "Blueeyes Camera" helps to track the facial expressions while an individual is moving his head. The "red-eye effect principle" is used herein as pupils work as good "infrared mirrors", therefore, the pupils get fill up with the light in the image. It can be inferred that this system simplifies the task of capturing facial expressions, hence, acts as "real-time expression recognition system". Generally, the problem in capturing arises during frequent changes in light rapid head movements as it results in bringing errors in capturing and consequently, decreases the accuracy of AI to interpret the human emotions.[14]

2.2.2 Recognition of Emotion from Dialogue

The method of recognition of emotion from dialogue is a very smart way to understand one's mood at a particular point of time. It is believed that the dialogues are able to reveal the emotions of a person in a natural manner and some people are also more comfortable to express themselves through dialogue. The "dialogue systems" have an opportunity to catch those words only which the person selected to speak or write down. Thereafter, it can process about the affects of the dialogue by using either "common sense reasoning" or "classic rule-based reasoning tools" from the Artificial Intelligence.[15]

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[13] Maja Pantic and Leon Rothkrantz, *Toward an Affect-Sensitive Multimodal Human-Computer Interaction,* 91 Proceedings of the IEEE 1370, 1374 (2003).
[14] Ashish Kapoor, et al., *Fully Automatic Upper Facial Action Recgnition,* 2003 IEEE International SOI Conference 195, 198 (2003).
[15] Clark Elliott, *The Affective Reasoner: A Process Model of Emotions in a Multi-Agent System,* DEPAUL UNIVERSITY (Sept. 19, 2021, 21:45), https://condor.depaul.edu/~elliott/ar/papers/dis/elliott-phd.html.

There are also certain occasions when the emotions of a person could not be sensed by the words of the statement or dialogue; rather, they are communicated through the manner in which they are spoken. The tone of the statement shows the intention, enthusiasm, mood and emotions of the person at a particular event. The inflections in voice are important to be noted in order to interpret the human emotions and hidden feelings behind their words. Therefore, the Artificially Intelligent machines have a chance to hear "para-linguistic aspect of speeches" to sense the feelings of a human. Hence, it can be said that "emotion recognition in speech" is a dynamic filed of research.[16]

The dialogue recognition systems for interpretation of human emotions are widely used in call centres and other work places where intelligent management of emotions has significant professional impacts. Basically, they have become an important part of the "customer service interaction" and helps in maintaining balance between fixing problems and managing feelings. Even if the company is unable to resolve the customer's problem, still the idea that the company is able to understand customer's issue and feelings itself makes him satisfied.[17]

2.2.3 Recognition of Emotion from Physiology

Physiology plays an important role in revealing the human emotions. It works on its own without any stress or influence as functioning of a human body is a natural process. Thus, it can be said that recognition of human emotions with the help of physiology is a natural process. The machines containing physiology sensors used to sense different information about humans like body temperature, heart rate, blood pressure, pulse rate, muscle tension, skin conductance etc.

The monitoring of changes in details about all of the above stated parameters can help the Artificially Intelligent machine to sense the human emotions. For example, a higher pulse rate or heart beat shows that a person is stressed or terrified or angry, basically he is emotionally vulnerable at that particular point of time. Thus, the "physiological information" contains details about those parameters of the body which varies with the different emotions.[18] This

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[16] Ellen Douglas Cowie, et al., *Speech and Emotion,* 40 Speech Communication 1, 2 (2003).
[17] Rosalind W. Picard, *Towards Machines with Emotional Intelligence,* MIT MEDIA LABORATORY (Sept. 1, 2021, 22:45)*,* https://affect.media.mit.edu/pdfs/07.picard-EI-chapter.pdf.
[18] Paul Ekman, et al., *Autonomic Nervous System Activity Distinguishes Among Emotions,* 221 Science 1208, 1209 (1983).

information helps to maintain the record of the emotions of a particular person by structuring classifiers for a person's affective state.

Chapter-3 Risk of Using Artificial Intelligence to Interpret Emotions

It has been crystal clear from the above stated discussion that "Emotional Artificial Intelligence" is an "emergent phenomenon" which is being used in almost every area of life via different smart devices. The "Emotional Artificial Intelligence" has built an entirely new thread of connection between technology and humans. But, apart from various advantages of this dynamic relationship, there are various risks involved in the process of interpreting human emotions by Artificial Intelligence.

It has been well said by Kate Crawford that *"There is no good evidence that facial expressions reveal a person's feelings. But big technology companies want you to believe otherwise"*. This phrase clearly shows that there is a risk of misreading emotions by the Emotional Artificially Intelligent system by using the facial expressions. The real fact is that there is 100% surety that the human emotions recognized from a human face are revealing his true inner emotions.[19] There are various occasions when people fake their own emotions. Hence, using facial expressions alone as a mode of interpreting emotions by Emotional AI can lead to ambiguous or false results.

The fact that AI operated devices can recognize emotions only when both the devices and humans react and respond with a "similar sets of answers". The use of AI for interpreting human emotions seems like "quantification of human emotions and subjecting them to economic value". This is exposing the humans to the risk of being treated as "objects" as not as "subjects". They are seen as "emotional animals" which are need to be "biologically manipulated and mapped". Thus, in certain cases this process turns in to blatant violation of human dignity. The AI systems must take care that they should not harm the mental health of the users.[20]

Apart from all other risks, the major risk involved in the process is the violation of "Right of Privacy". The humans are subjected to unwanted and non-consented attention to their body and

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[19] Kate Crawford, *Artificial Intelligence is Misreading Human Emotion,* THE ATLANTIC (Sept. 26, 2021, 13:15), https://www.theatlantic.com/technology/archive/2021/04/artificial-intelligence-misreading-human-emotion/618696/.
[20] Arvind Kumar, et al., *Emotional Intelligence for Artificial Intelligence: A Review,* 7 IJSR 479, 483 (2018).

behaviour which leads to non-consented collection of data about them. This may amount to abuse of personal control of an individual over his own emotions and body. Moreover, the storage of personal information about humans regarding their emotions, physiology, behaviour, facial expressions, body language etc. goes into the memories of the Artificially Intelligent devices, hence, results in "artificially created memories" of the subjects. Then it is quite obvious that this may give rise to abuse of these memories of personal data[21] of an individual in one or other manner.

The "recognition of human emotions" also poses risk to "social relations" of human beings. A human being is an emotional animal; therefore, he likes to be understood emotionally by someone. Humans usually got emotionally attached to the people who understand their feelings and support them is their emotional crisis. This helps them to build and maintain their social relations. Hence, if this job will also be overtaken by technology and machines then it will bridge a gap between society and individuals. The emotional dependency leads to attachment, so if machines start replacing the humans as an emotional support system of each other, then it will lead to "adverse social consequences"[22] in the real world.

3.1 Regulation of Artificial Intelligence

The scientific concern is growing day by day regarding the "use and misuse" of the Artificially Intelligent technologies. Thus, it is realized that there is dire need to introduce certain regulations to control the functioning and application of the tools that make claims about our minds in order to bring some protection. For several years, the researchers have used federal bodies for the regulation of robotics and facial recognition. Now, this need extends to the robotic emotional interpretation also.[23] The need of the hour calls for formulation of "national regulatory agencies" to regulate against the Emotional Artificial Intelligence technology targeting the human emotions as its input stock.

The results of clinical trials reveal the need of regulation of Artificial Intelligence. The world can no longer afford the un-regulated use of this technology. The time has come to introduce

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[21] Kevin LaGrandeur, *Emotion, Artificial Intelligence, and Ethics,* 9 Intelligent Engineering and Informatics 97, 107 (2015).
[22] Andrew McStay, *The Right to Privacy in the Age of Emotional AI,* OHCHR (Sept. 20, 2021, 11:43), https://www.ohchr.org/Documents/Issues/DigitalAge/ReportPrivacyinDigitalAge/AndrewMcStayProfessor%20 of%20Digital%20Life,%20BangorUniversityWalesUK.pdf.
[23] Kate Crawford, *Time to Regulate AI that interprets Human Emotions,* Nature (Sept. 27, 2021, 12:38), https://www.nature.com/articles/d41586-021-00868-5.

"legislative regulatory tools" to bring legal protection in the system in order to avoid any kind of unproven risks involved in the application of Emotional Artificial Intelligence in all sectors like education, employment, health care, legal department, corporate sector etc. These safeguards will recenter rigorous science.

Chapter-4: Risk of Bias in Emotional Artificial Intelligence

It is said that due to the distinctive character of emotions, the emotional artificial intelligence is specifically subjected to prejudice or bias. Evaluating the repercussions in the place of work, in which a procedure continuously determining a particular as displaying contradictory or dissenting emotions may impact the individual progression of his/her career. The artificial intelligence might not be that much cultivated and refined to interpret the cultural differentiations in articulating and understanding emotions, thereby making very much difficulty in developing correct outcomes and predictions. Take an example, the meaning of smile in Japan may be interpreted in one meaning while its understanding can be contrasting in Germany. An ambiguity in the interpretation of such word might resulted in making improper decisions in the businesses. Thus, in short, it can be said that if the issues pertaining to the emotional artificial intelligence remain unaddressed, the apprehensive and non-apprehensive AI based on emotions can establish notions and speculations in an abnormal or extraordinary manner.[24]

4.1 Preventing Bias in Emotional Artificial Intelligence

As increasing organizations combining emotional artificial intelligence in their business endeavors, it will be very much vital that such companies are conscious enough for the presence of subjective bias and thus, must be effectively working to curb the same. It is evident that detection of emotions, be the nature and the prevailing inconsistencies, is a cumbersome process. There is availability of several technologies which are good then that of the other in terms of tracking of several emotions, therefore, amalgamating these technologies could facilitate in curbing biasness. Further, in a study conducted by the Nielsen which tested the authenticity of the technologies based on neuroscience namely "facial coding", "biometrics" and "electroencephalography (EEG)". It was concluded that these technologies used individually, the level of authenticity were calculated at 9%, 27% and 62% consequently.

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[24] Mark Purdy, et al., *The Risks of Using AI to Interpret Human Emotions,* Harvard Business Review (Sept. 20, 2021, 01:49), https://hbr.org/2019/11/the-risks-of-using-ai-to-interpret-human-emotions.

However, when all such technologies amalgamated and joined together, the level of authenticity roses to about 77% and moreover, when these results were tested on the basis of survey, the level of accuracy raised to 84%. Although, such incorporations act a tool of accuracy, however, it is still far from the realized level of accuracy that the mechanism should be looking for in order to achieve authenticity.[25]

It is also very much important that there should be creation and availability of diversified teams developing algorithms based on emotional artificial intelligence as it will helps in curbing biasness and obtaining entire intricacies of the emotions. This will include not only diversity rest upon gender and ethnicity but also the status and opinions based on socioeconomic arena. If the information and data gathered is more diverse in its nature, then automatically the artificial intelligence developed would be more just, reasonable and non-prejudiced. There is a sense of responsibility on the part of corporations to be more concerned and cautious by not propagating historical biasness at the time of the training and development of the emotional artificial intelligence. The historical inputs can be utilized for training artificial intelligence on certain other level of emotions, but the main requirement for the present time is the availability of real time and live inputs.

Critical Analysis

There are various other issues also involved in the interpretation of human emotions by Artificial Intelligence. The possibility of bias and error must be ruled out from the AI system.[26] There are still certain anomalies regarding usage of AI technology to in understanding emotions. Hence, it reflects there is need of more intensive research in this area. There is no sufficient research on modes of interpretation of human emotions. No particular set of models are present to guide the users to incorporate voice or expression detecting sensors in the AI devices. Moreover, there is no certainty of the accuracy of these devices.

Conclusion

From the above stated discussion about the topic, it can be concluded that human emotions plays a very significant role in influencing the behaviour of humans. Therefore, in order to

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[25] Robin Murdoch, et al., *Getting Emotional: How Platforms, Technology, and Communications Companies can Build a Responsible Future for Emotional AI* (Sept. 20, 2021, 5: 15), https://www.accenture.com/_acnmedia/PDF-116/Accenture-Responsible-Use-Of-Emotional-AI-Final-v2.pdf.
[26] MARK PURDY, supra note 24.

bridge up the gap between Artificially Intelligent devices and humans, it necessary to incorporate emotion-recognition programs in them. This will make them more user-friendly and will increase their utilization and efficiency both. But, the fact that there are various risks regarding violation of human dignity and privacy are involved in the process of sensing human emotions by Artificial Intelligence.

Suggestions

There are certain suggestions which can be implied in order to avoid the risks involved in interpretation of human emotions by "Emotional Artificial Intelligence". The technology of "Emotional artificial Intelligence" must be used in a limited manner with all due precautions for the purpose of commodification of emotions. Although, no complete ban is recommended on the same but it must be applied critically and carefully. The elements of "transparency and accountability" must be incorporated in the process. The inclusion of transparency will help in ensuring reinforcement of "digital ethics". On the other hand, the inclusion of element of accountability in the process will lead to the enforcement of "digital responsibility". This idea will help the companies to build trust among their customers or employees with the Artificially Intelligent machines. Hence, the introduction of "transparency and accountability" in the process of interpreting emotions by the Emotional Artificial Intelligent will make it more trustworthy and non-ambiguous.

Further, the emotion capturing technologies should be applied in an appropriate manner in order to maintain dignity of human life and the right to privacy of an individual which is "fundamental right" as well as a "human right" of every human being. A balance must be strike down between the idea of maximizing the efficiency of the Emotional Artificial Intelligence in sensing human emotions and non-exploitation of humans. Moreover, the "data protection authorities" and "self-regulating agencies" should work actively to avoid the misuse of personal data of people.