Affective Computing
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Week - 12
Lecture - 39
Finale

Hi friends.

So, it is fascinating to see the this wonderful journey that we have taken together is now coming to end goal. And it was wonderful learning experience for both of us. And I believe for you as well to go through these emotionally intelligent machines and the understanding of the emotions. So, in short, we tried to cover just the tip of the iceberg. And some of the topics that we tried to cover were including the foundations of the emotions.

So, first we tried to understand how emotions can be expressed, can be modelled, how they are expressed in the in humans and trying to build on the understanding of their expressions in humans. We tried to understand how machines can further express it, can recognize it and can also make use of it to make the interactions more empathetic through different modalities.

So, once we understood how these emotions can be represented from machine perspective, started looking at the different modalities, the different sensors which can be used to understand the user's effect. So, first we started with the camera. So, looking at the facial expressions, the hand gestures, the body movement.

And we realized that the camera based data can give us very powerful cues to understand the emotional state of the user. From the camera we moved on to the microphone. So, we discussed about how speech based signals can be used to map the user emotion onto the computer understanding. And then also how machine a computer can react back and have the

emotion based variation in the speech typically from the perspective of text to speech systems.

And then friends we also discussed about the natural language processing, text based emotion analysis. So, typically we see these E-mails and these conversations, chatting, social blogs and so forth. So, how we can understand the affective state and particularly the perceived affective state of the user based on these text analysis?

So, further we try to understand that these are not the only modalities through which emotions are expressed by humans. And hence machines can not only use these modalities, but they can also take a step further and try to look into the physiological signals.

Hm.

And the way humans use physiological signals to express these emotions. We looked at a range of physiological signals including galvanic skin response, heart rate, brain signals so on so forth. And then we tried to see how all together these modalities can come together and complement each other through the help of multimodal understanding of the emotions and also the expression of these multimodal emotions. So, that was how we tried to understand how can we recognize the emotions.

Next, we tried to understand how machines can also express emotions. So, for example, we tried to understand how can there be a more empathetic interaction with the humans building upon the basis of these emotions that we have. And then we tried to look into a very naive case study where we tried to see how we can make use of a virtual agent.

Hm.

Which can be emotionally intelligent so, we tried to convert Siri, Alexa like virtual agents into an emotionally intelligent virtual agents and we looked at some of the naive codes and

code bases as well. And then further we tried to see what could be some of the ethical issues around it.

So, typically when we are designing any AI enabled system and you know the context of this course, we are looking at emotionally aware AI enabled system, right. So, the ethics is an extremely important topic. So, friends we discussed about how the privacy of the user can be taken into consideration, how different sensors if not carefully used can lead to invasiveness in privacy.

Hm hm.

And then also looking at the concepts of you know lacks and gaps currently in the community. For example, there is currently a policy vacuum, right. So, affective computing is a very new area. So, certainly there is a need for a policy to come in to decide what can.

Hm hm.

Emotion enabled systems do. Where emotions should be measured, for whom emotion enabled systems should be you know given access to. And once emotion has been detected, has been predicted by a machine, what all should the system be allowed to do with it.

For example, the meta analysis, where it is stored, to whom the machine will give access to the emotion. So, all of these are like very burning important questions, which need to be taken into consideration before we design an emotionally aware machine such that the user interest is a primal and it is always taken care of.

Yeah, and I guess of you know it is worth addressing and commenting that during the offering of this course only we have seen the phenomenal rise in the advancements of the large language models.

Yes.

Such as the ChatGPT and all that and users may be aware the learners may be aware about the lots of issues that are arising with the advancements of these technologies. And there is a lot of talk among the researchers, among the policymakers about how can such a technology be regulated.

And I would say you know while we are nowhere nearby on the understanding of the regulations around these large language models, but once it comes to an stage imagine that there is a large language model which is also emotionally intelligent. So, what about the regulations around that kind of technology?

So, where we are definitely not still there yet, but of course, building on what we have to know about regulations with respect to the existing technologies, with respect to the AI technologies, with respect to the LLMs maybe we can definitely look a forward to create regulations and.

Yes.

And policies around how an ethical usage of emotionally intelligent machines can be done.

Yes, and also friends we have seen a very healthy participation from you on the blogs, on the forums. We would really like for you to continue that, you know go move forward, write blogs, try to integrate emotion aware technology where it is ethically you know allowed within your AI based systems.

Hm hm.

And keep in touch. So, certainly we would love to see these new knowledge where you have added not only the emotion sensing, the affect sensing, but also the emotional response into your next AI enabled projects.

Yeah, and certainly I would like to reiterate what you know just said. You know so, this is certainly the end of the course, but this is certainly not the end of the learning for you and neither for us. So, definitely we would like and hope to see you will create this, you will do keep this lifelong learning around the affecting computing.

And definitely we would love to see even here back from you about some of the projects that you are doing and that you are interested in doing some of the ideas that you have around the usage of affecting computing.

Let it be, you know, you could be a researcher, you could be a student, you could be a practitioner in a technology in your particular business. So, we would love to see the ideas that how are you trying to make use of this technologies or the learning that you have acquired in this course, in making better products, in making better interactions and making the entire experience for your users more empathetic.

And then, certainly along with the learning, I think this has been a wonderful collaboration. And I am really hopeful that this resource which we have created together would be useful in the longer term. And I will also like to take this opportunity to thank the team at triple IIT Delhi, Ravi, Anoop and Aman and of course, also the brilliant TA Gulshan Sharma.

Yeah, I completely agree, you know I think this entire beautiful effort and the collaboration would not have been possible without the support that we got from triple IITD. And also, you know, wonderful TA's and students who those who have assisted us during the offering of the course itself.

I think a very warm thanks to all of them. And it was really wonderful to have you here. And you know, to be able to collaborate with you on this in this last few months to create this beautiful resource. And we hope that this kind of collaboration continues beyond this course as well. So, with that learners, we would like to wish you all a.

Happy learning.