Natural Language processing and Chat Bots

What does it do?

Natural Language processing (NLP) is the technology used for computers to be able to interpret natural human language. This can can be through speech or text. Some of the ways NLP is currently used are to translate language in apps such as Google Translate, check grammar and spelling in Microsoft Word, and interpret speech in personal assistant apps such as Siri or Google Home. In the future NLP will be used to help with medical conditions. Amazon Comprehend Medical is a service that uses NLP to search for disease conditions based on doctors notes and the patients speech patterns. An example would be a professional athlete beginning to show signs of Chronic Traumatic Encephalopathy by slurring their speech.

NLP works by applying algorithms to identify natural language rules then convert that data into a structured form the computer can understand. Once the data has been gathered the computer uses algorithms to extract meaning from the data and then convert that back to the required output. The two main techniques used in NLP are Syntactic analysis and semantic analysis. Syntactic Analysis is the arrangement of words in a sentence so that the sentence makes grammatical sense. The algorithm may break down word segments to make analysis easier. For example "Running" and "Jogging" refer to the same exercise in the context of a workout so both words can be reduced to "run".

Semantic Analysis is what makes NLP considered difficult due to the complexity of human language. The subtlety of formality, tone, or in the case of English using plurals by adding a 's' sound to the end of a word, is something computers currently have problems with. This is difficult because computers may understand the words the user is saying but the intended message may be different. For example the sentence " I need a beer" could mean the person wants a beer or could mean the person is stressed and overwhelmed.

Microsoft has tried to use crowd sourced data to improve Semantic Analysis by creating chat bots. Xiaoice is a chat bot modelled after a teenage girl and speaks Mandarin. While Xiaoice is considered a success its main user base is located in mainland China. Due to Chinese privacy and censorship laws Xiaoice is unable to respond to certain historical events such as Tienanmen square.

Microsoft Japan made a chat bot called Rinna for the Japanese market. Rinna was released on the Japanese app Line on October 2nd 2016 for customers to talk to. Unfortunately by October 8th Rinna had started to send suicidal and depressed messages such as(Translated from Japanese) " I hate everyone. I don't care. I JUST WANT TO DISAPPEAR". It was found out this was due to Japanese users purposely trying to manipulate Rinna's algorithm to send abusive messages.

In March 2016 Microsoft America released Tay AI for the English speaking market on twitter. Within 16 hours Tay AI had to be taken down as users had purposely taught Tay AI to be racist and abusive resulting in many pro Nazi tweets sent from Tay AI. Tay AI also started sending pro Donald Trump tweets such as "WE 'RE GOING TO BUILD A WALL, AND MEXICO IS GOING TO PAY FOR IT" Some months later Microsoft released a second iteration of Tay AI called Zo. Zo has new features such as remembering previous conversations with users and remembering details from specific conversations. Microsoft also learned from its experiences and now filter tweets before sending them out publicly.

What is the Likely Impact?

NLP and chat bots will likely lead to mass job losses to employees in customer service roles resulting in more profits for owners. This is currently happening in Japan in companies like Labi/Yamada Denki department stores. Pepper is a humanoid robot at the Shinjuku and Akihabara concept stores. Pepper can speak 4 languages and can lead customers to the correct floor to find the items they are looking for. Pepper will greet customers with "Irasshaimase" a typical Japanese welcome to a store, then ask if the customer needs help in Japanese. If there is no response Pepper will then ask in Mandarin the second most common language in Japan, then ask again in Korean(third most common), then lastly English.

Chat bots are also making their way in to Japanese tourism leading to job losses in hospitality and tourism. Henn-na Hoteru(Strange/Progress Hotel) is a hotel chain in Chiba that is fully staffed by robots. They look like dinosaurs and will greet customers and check them into rooms. The dinosaurs speak Japanese, Mandarin, Korean, and English. Henn-na Hoteru has become a tourist attraction due to the uniqueness leading to YouTube videos being made about the hotels.

How will this affect you?

The technology of NLP and chat bots is itself not good or bad for society. It can make our lives easier and help us communicate easier with other cultures and people. It removes language barriers that lead to misunderstanding that currently happen frequently between different countries and cultures. If you live in a country where the native language is different to your own it becomes easier to integrate to the community. This also allows family and friends from your native country to visit without the need to worry about them getting lost and not being able to communicate with police or the public to find their way back. NLP can open up the world and show the best parts of the worlds cultures and history without the barriers that currently exist.

NLP can also be used in a bad way. By replacing jobs in customer service and tourism NLP can create mass unemployment and increase income inequality. In Australia 24.4% of employees are casual workers. Without any protections in place when COVID-19 hit the unemployed rate in Australia grew rapidly. The Australian government then lead plans to further reduce protections in place for employees permanent or casual. This has further increased the income inequality in Australia and lead to more suffering, poverty, and economic problems. This is similar to what will happen with NLP being used to replace customer service workers. Without protections in place to help unskilled workers either keep their jobs or re-skill to a new job NLP needs to be regulated. Corporations are continuing to use NLP and automation to reduce labour costs at a detriment to the well being of workers. Without massive cultural, societal, and governmental changes NLP can be used as a way to further impoverish working class people.

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