Assignment 2 – IT Technologies Report (FINAL)

**Natural Language Processing and Chatterbots.**

**What does it do?**

*Natural language Processing*

The term Natural Language Processing or NLP is a broad definition used to describe the translation of languages. In the IT industry, natural language processing refers to a computer science that is used to examine human language and speech that can be converted into computing languages. This converted language can then be used to assist and further develop areas of artificial intelligence (AI), management and distribution of complex data, online monitoring, and filtration systems.

There are five key types of analysis used to handle and process languages:

1. Tokenization analysis
2. Lexical analysis
3. Syntactic analysis
4. Semantic analysis
5. Pragmatic analysis

Tokenization and Lexical analysis are used to collect language and convert them into characters into a sequence of lexical tokens (‘What is Tokenization in NLP – Lexalytics’ 2021), these tokens are used to teach machines about words and provide a foundation to work on (‘What is Tokenization in NLP – Lexalytics’ 2021).

Syntactic analysis operates on understanding the logical composition of a sentence or text (‘Syntactic analysis’ n.d.) whereas semantic analysis uses interpretation to process sentences and pull meaning from sentences and texts (‘Semantic Analysis, Explained’ 2020). Both forms of analysis rely heavily on the use of correct grammar to be effective.

Finally, pragmatic analysis relies on external word knowledge to interpret a sentence’s meaning and reiterate typically in a more complete, condensed form of communication (‘Pragmatic Analysis | Python Natural language Processing’ n.d.).

Each method of analysis can be crucial depending how they are implemented and what type of processing they will be handling. As an example, tokenization and lexical analysis could be used as tools to build a foundation of keywords to target in search engines or translation software whereas syntactic, semantic and pragmatic may be utilized in chat bots that provide assistance and guidance.

*Chatterbots*

Chatbots or chatterbots are software that run in the form of an application used online to service communication and interaction. These applications work by processing, analysing and translating voice or text and generating a response based on the users’ requests. Chatterbots can be thought as an extension of natural language processing, where NLP provides the framework to translate the information, chatterbots are the application used to implement it online.

Currently, chatterbots are used to navigate conversation and handle low complexity tasks. The most common type of chatbots are assistance-based applications, which are typically the first point of contact for users that offer guidance and help with common pain points. The technology now allows chatbots to handle the initial contact as they typically offer up pre-generated conversation that users can interact with. This is where the software relies on the use of keywords in order to continue or navigate the conversation. As the interaction takes on more complexity, for example, where users are now asking questions or responding with sentences, the application is relying on analysing the logic and understanding of text or voice to continue the interaction. Most chatbots now are simply used as a tool to start a conversation, find a user’s paint point and connect them with a person. This is simply because the technology isn’t available for chatterbots to be able to handle the complexity of a conversation, yet. This is still generally reserved for humans who can process this information quicker, more effectivity and most importantly improvised.

AI and NLP will be the biggest contributing factors in seeing how chatterbots will develop. As these types of analysis and database tools continue to improve, chatterbot applications will also be able to improve. Chatterbots have proven to be critical tools used by businesses that focus heavily on customer service and experience, so investment will no doubt be possible in making these tools more effective. In future developments, chatterbots may be able to handle more complex styles of interaction or entire conversations. I can see the development of chatterbots taking a similar pathway to how voice recognition software in smart phone and home devices has. The overall product can handle more complex processes but is still quite clunky compared to the control of a human.

**What is the likely impact?**

Natural language processing and chatterbot applications will only continue to improve as technology continues to advance. One area that I can see drastically changing is the complexity and depth chatterbot communication will be able to provide to consumers. Chatterbots now, can only carry out certain aspects of customer service and interaction. Typically, they will guide a user towards the assistance or action they require before the task is passed on to a human that can handle the more challenging level of interaction. Further development of analysis tools in the future could see a depth of AI processing that let’s chatterbot applications manage an entire complex interaction independently. A chatterbot that could manage all aspects of a conversation, from answering numerous questions, providing product or technical information, and most importantly, handle complaints, could put immense pressure on the role of support staff. The current job has already seen a reduction in roles and responsibilities as chatterbots usually manage the initial interaction. As AI processing continues to develop, chatterbots could provide personal 24/7 assistance, end to end communication, at a fraction of the cost. This will make it increasingly difficult for business trying to compete with AI, having to choose between having a real person behind a computer or minimising costs and maximising profits. AI software won’t require a salary which will lead to a reduction or redundancy of the human support role.

**How will this affect you?**

I imagine this could have a massive impact on the way we communicate and interact in an online space, which will almost certainly expand into other areas like telephone calls, voice to text, and smart home appliances. I believe it would be a positive experience to have better NLP, chatterbot and AI processing systems integrated into high use, everyday items and provide better overall customer service and convenience.

Overall, dealing with businesses in an online space and on a telephone would be vastly different if there were chatterbot or voice recognition software in place that could manage an entire conversation. Personally, when I do have an issue online, I use chatbots for assistance which can be frustrating as they can only narrow down a topic I need to discuss with a real person, or they require my details so that someone can make contact later to discuss the issue. It would be extremely beneficial to be able to resolve an issue when it arises.

Furthermore, I can also see voice to text functions being vastly different as well. The function is a handy tool to have especially for searching long terms on google or replying to messages. However, these functions currently can be quite clunky and often misinterpret words and sentences incorrectly. With advanced software and analysis tools increasing the richness of AI databases, this could mean that human voice is understood much better. This would ultimately reduce how much I would have to check grammatical or interpretation errors and make the software more fluid and seamless.

I can see family and friends sharing a similar positive experience as well. The biggest issue I hear from older members of family is how frustrating it is to not be able to speak to a real person. If chatbots and AI processing can advance to the point where it is able to replicate a conversation with the same personality as real individual, I can see their experiences being enriched as well.

**Reference List**

‘Pragmatic Analysis | Python Natural Language Processing’, viewed 5 January 2023, <https://subscription.packtpub.com/book/big-data-&-business-intelligence/9781787121423/3/ch03lvl1sec27/pragmatic-analysis>.

‘Semantic Analysis, Explained’ 2020, *MonkeyLearn* Blog, viewed 5 January 2023,< <https://monkeylearn.com/blog/semantic-analysis/>>.

‘Syntactic analysis’ *Engati*, viewed 5 January 2023, <https://www.engati.com/glossary/syntactic-analysis>.

‘What is Tokenization in NLP? – Lexalytics’ 2021 viewed 5 January 2023, <https://www.lexalytics.com/blog/tokenization/>/.