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The instability of meaning: what challenges does multilingual NLP face in 2021?

From chatbots to digital assistants, in 2021 multilingual NLP is already an established part of the fabric of our lives. But, despite their ubiquity, NLP-powered solutions are far from infallible.

In the 1974 film *The Conversation*, Gene Hackman plays a surveillance expert hired by his client to covertly listen in to a couple as they stroll through Union Square in San Francisco.

After diligently cleaning away the background noise, he can hear the woman tell her partner: "They'd *kill* us if they got the chance". Fearing their safety, he decides not to share the transcript with his client. It is only at the film's denouement, however, that a grizzly misunderstanding becomes apparent.

After he finds out his client has died in a mysterious accident, he revisits the recording to notice a subtle yet crucially different stress in the sentence. "They'd kill *us* if they got the chance" is how he hears the sentence this time around. The words remain the same, but the shift in emphasis reveals a transformation in the couple's role from potential victims to murder suspects.

The power of context, intent and emphasis

Directed by Francis Ford Coppola, *The Conversation* reminds us that language is a hugely malleable entity in which meaning shifts depending on a huge range of variables outside the words themselves. This includes, of course, their context, the intent of those using it, and even the emphasis on different linguistic elements.

While the film is nearly 50 years old, it has a timeless lesson to learn as we discuss advances in multilingual NLP and the applications that use it.

The technology is, of course, hugely impressive. More importantly, it is adding significant value to the products and services provided by brands to large global audiences by engaging with them in their local languages on a larger scale than ever before.

Google, among other industry leaders, is becoming ever more sophisticated in understanding user intent across a huge range of languages.

But it is also certain that Alexa would not have noticed the telling difference between the fearful "They'd *kill* us if they got the chance" and the more sinister implications of "They'd kill *us* if they got the chance".

(To be fair to Alexa, Gene Hackman's seasoned surveillance professional wouldn't have noticed either until it was too late to be of use.)

Ambiguity is everywhere

Apart from understanding emphasis (and murderous intent), what other challenges do our multilingual AI-powered chatbots and digital assistants currently face?

One obvious answer is that ambiguity is everywhere in language. Through our evolution, as humans we rely our intellects, our emotions and our experience of the wider world of physical and historical associations to make sense of it.

Take, for example, the sentence: *I helped the man with my money*. Depending on whether the phrase "with my money" modifies the verb ("I helped") or the object ("the boy"), the meaning changes from "I helped the boy by giving him some of my money" to "I helped the boy, who happens to have my money".

These kinds of semantic and syntactic ambiguities are a part of our everyday experience of language, and unravelling them can sometimes be tricky for humans, let alone chatbots.

The slang factor

Because it exists outside of the conventions of standard vocabulary, grammatical rules and formal structures, slang can be extremely difficult to process even for the most advanced NLP-powered machine translation engines.

To choose a simple example, derived from American English slang, in certain contexts the word "bad" is used to confer praise: "that movie was *bad*", for

example, can actually express admiration. (In French, the word "terrible" also has equally polar positive and negative connotations).

But how can an NLP-powered engine understand this without human context? The meaning depends on who is speaking and the social context of the conversation. Slang is, by its very nature, often difficult to comprehend from the context of established language norms.

As any parent struggling to understand their teenager knows, slang is often used as way to build identity precisely by making it difficult for outsiders to make sense of it. For this reason, it is one of the most dynamic areas of language, changing year by year, from region to region, and from peer group to peer group.

And, much like the abovementioned parent, NLP engines are always in danger of understanding a set of meanings just as they are abandoned by those who invented it.

But, if they are always two steps behind, at least they are in good company.

(So-called) errors

We've all experienced the frustration of the dictatorial autocorrect application which won't let us write the words we actually want to use. Sometimes it feels like a short-sighted grammar tutor has decided to co-author our SMSs without asking permission.

Occasionally, for example, we deliberately misspell or mispronounce words – and of course it's hard for a machine to understand and navigate this reasoning.

Likewise, of course, we constantly make deviations from perceived norms in the way we write, pronounce and structure language. Sometimes these could be defined as "errors"; perhaps more generously we can categorize them as part and parcel of the flow of everyday language.

Non-standard words, incomplete phrases, non sequiturs, confusing word order and unconventional grammar structures, particularly in the spoken word, are how we experience language all the time. From this perspective, they can hardly be regarded as "mistakes".

Nevertheless, they do present great challenges for NLP-powered technologies. It should be said that, because it works with such large datasets, NLP is increasingly likely to spot and understand common errors and to learn from them.

But errors, by their nature, are still unpredictable. And while NLP engines are exponentially better at dealing with them than traditional rule-based

translation approaches, it's still an area of inherent weakness that can be improved rather than solved.

In conclusion

At this GlobalSaké event it is, of course, always fascinating to hear about new advances in multilingual NLP and how it is shifting the way we can interact with audiences in ever more languages. It's a hugely important tool in making brands more inclusive and relevant to customers around the world.

However, it's crucial also to remember that there are limitations to the technology. Some of these will improve over time, as NLP engines continue to develop at pace. However, we must also accept that, because language is both continuously evolving and inherently ambiguous, no solution will ever be able to map its full complexity.

After all, as *The Conversation* shows us, the exact same words can have very serious implications depending on how we contextualize them.

To learn more, please contact Alpha CRC: globalservices@alphacrc.com