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Пінчук С. С., здобувач вищої освіти 2 курсу, група ПІ-191

Науковий керівник – **Кормільщина С. Ю.**, викладач

Національний університет «Чернігівська політехніка» (м. Чернігів, Україна)

GRAMMARLY: AN ONLINE-SERVICE OR A FUTURE MIND-TOOL TEACHER

Grammarly is a worldwide class IT-company with more than 30 million daily active users[1]. The startup with roots from Ukraine gained 200 million dollars of investments, and newly its capital was evaluated at 1 billion dollars. This fact made the company the first Ukrainian “unicorn”.

Grammarly is an intelligent online-service for checking English grammar based on Machine Learning technology. Max Lytvyn, Alex Shevchenko, and Dmytro Lider founded Grammarly in 2009, intending to help people communicate more effectively.[1] It became public in 2010 as a web-based editor. During 11 years of growth, they developed various browser extensions, desktop, mobile apps, keyboards for smartphones, and many other products to reach their goal. Grammarly has reached 20 million daily active users in 2019.

It has a basic plan with simple writing suggestions and a premium one with style, tone, and clarity improvements for writing with a 29.95\$ price for monthly, 19.98\$ per month for quarterly, or 11.66\$ per month an annual subscription[2].

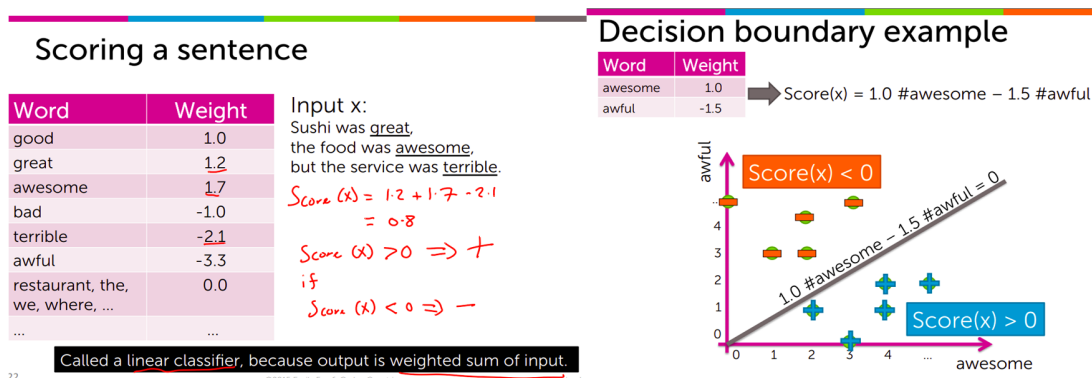
Although Grammarly is interesting for its linguistic opportunities, it's also attractive from the side of technology. The developers declare using such technologies as Data Science, Machine Learning, Natural Language Processing. In addition to this, they're using cloud technologies to not overload users' devices. It's a highly complex solution. It's not getting easier to understand the fact that there are no open-sourced parts of this system. You know, it's developed by a lot of different teams, starting with computational linguists and continuing deep learning engineers. In any case, It's not a big deal for us to find out how it works under the hood.

There are pretty long discussions about how Grammarly actually works on different forums. What is essential for us is that Grammarly, like any other kind of software, follows some specific concrete algorithm, in other words, pattern.

For example, we can give you a general idea of its tone detector. Imagine that we have a list of positive and negative words, and we have to make a classifier to define the tone of some message. To achieve that, we could simply calculate the sum of all the words we met in every list and just make a subtraction to judge from which list were more words. Due to its simplicity, it has some problems. The most obvious is the complexity of words.

We can also introduce a linear classifier in which every word corresponds to some numeric value, positive or negative. In other ways, we can suppose that we have only two words. We can

split the coordinate plane under some angle according to the word's weight. After that, we can claim that, for example, above the line is a negative tone, under the line is positive. We can leave a point somewhere and, according to its placing - under or above the line - conclude its tone. Those were all the examples from the Machine Learning basics course that we have passed during the summer [3].



Picture 1 – A visual example of the most simple classifying models (was taken from the course materials [3])

Besides, Grammarly might use different rules to check your text depending on the website you are typing on. For example, it can be stricter when you are using it on LinkedIn and, therefore, need to be more formal, sound more professional. On the other hand, when you're posting something on Facebook or Twitter and want to write less formally, using the passive voice and some slang, Grammarly will turn off alerts that could be useful for LinkedIn [4]. We should also don't forget that this software is becoming more intelligent with every interaction with the user. For example, when you see the wrong suggestion, you can click on the button "ignore" thereby informing the scientific team that this suggestion wasn't helpful. If they get similar signals from many users, they have to react to it.

We are convinced, Grammarly is not only about grammar checking. It is a great choice to improve communication quality in the modern world and help people do it more effectively. And in the future, perhaps, machines will use the service too.

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