2nd ed. Sebastopol: O'Reilly Media, Inc., 2017. P. 115-136. **29**. Scott M. WordSmith Tools Manual [Online]. Available: https://lexically.net/downloads/version7/HTML/index.html. **30**. Standard American English or the Brown Corpus [Online]. Available: http://clu.uni.no/icame/manuals/BROWN/INDEX.HTM#t1. **31**. Susan T. Dumais. Latent Semantic Analysis. *Annual Review of Information Science and Technology*. 38: 2005. P. 188-230. doi:10.1002/aris.1440380105. **32**. The UCREL semantic analysis system https://www.researchgate.net/publication/228881331_The_UCREL_semantic_analysis_system. **33**. Rajaraman A, Leskovec J., Ullman J.D. Mining of Massive Datasets. [Online]. Available: http://infolab.stanford.edu/~ullman/mmds/book.pdf. **34**. Weisser M. Manual for the Dialogue Annotation & Research Tool (DART), Version 3.0 [Online]. Available: http://martinweisser.org/publications/DART_manual_v3.0.pdf. **35**. Weisser M. Corpus-based Linguistics – Introduction, 2016; last edited: Wed Apr 03 14:08:29 2019, [Online]. Available: http://martinweisser.org/corpora_site/CBLLinks.html.

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The Effects of Defects

Mechanical translators are in the 21st century an inherent part of translatology. From using the old-school camera and paper cards the technology has shifted to the use of the neural networks, which means the need of technology to use statistical machine translation or neural networks to deep learning. The main translators which started using neural networks are Google Translator, Bing Microsoft Translator and Facebook´s automatic translation service [1].The technology is using its own brain to learn similarity between languages and evaluate the probability of translations. In contrary, the neural machine translation is not perfect. The proof are funny pictures on the Internet, but not every mistake translators made is that banal.

Keywords: translation, translate, translator, issues, defects, neural networks, mechanical translation

History of translators
<u>The beginning</u>

The history began in 1933. At the time the Soviet scientist Peter Troyanskii created the machine for the selection and printing of words when translating from one language to another. He only used cards in four different languages, a typewriter and an old-school film camera [2]. He selected a word and printed it when he was translating from one language to another one [3]. The person who was using it typed a word, took a photo and wrote some information about the word. The film made frames with

words and their characteristics [3]. The USSR found the machine useless, but he worked on it until his death. The machine started being well-known in 1956, when his patents were found [2].

The next big step in the history of translation was made by Warren Weaver. He worked with four problems. The first was how much context had to be required. The next problem was about logical elements in language. The third was about applicability of cryptographic methods. And the last one about logical features, which are common to all languages – he thought they could be linguistic universals [4, p. 5-6].

In 1954 the Georgetown-IBM experiment took place. It was headed by Cuthbert Hurd from IBM and León Dostert, who established the Institute of Languages and Linguistics at the University's School of Foreign. They co-worked with Thomas J. Watson, who was the founder of IBM, Paul L. Garvin, an associate professor, and Peter Sheridan, who did the computer programming. They decided to make the experiment small with a vocabulary of about 250 lexical items from organic chemistry topic and a limited set of six rules. The bilingual machine, as it was called by the press, translated the Russian language into English [5, p. 2]. At the end they were able to translate more than 60 sentences like: "*They prepare TNT, They produce alcohol out of potatoes, The quality of coal is determined by calory content*" [5, p. 5-6].

The rest of the 50-ies and whole 60-ies were both years of optimism and scepticism for the translation field. At the time scientists pointed out problems of the mechanical translation. For example,Yehoshua Bar-Hillel, who was travelling across the world to see and get to know mechanical translators, said that "*the task of instructing a machine how to translate from one language it does not and will not understand into another language it does not and will not understand presents a real challenge for structural linguists* […] ". [6, p. 1] He described four main problems:
  • operational syntax
  • intertranslatability of Natural Languages
  • idioms
  • universal syntactic categories [6, p. 1]

In November 1966 Automatic Language Processing Advisory Committee (ALPAC) published a report which meant the end of the funding of Mechanical translation for twenty years. In report they said Mechanical translation is slower, more expensive than human translation and there is no prospect of mechanical translation [7, p. 2]. For years the interest in mechanical translation was something to keep quiet about [8, p. 1].

However, in the US and the USSR they worked on Russian-English and English-Russian translation. It was used for scientific and technical

documents for a small number of people who accepted the unrevised output, because this was the fastest way to get access to information. For mechanical translation it meant increased demand with different sources, needs and languages. Mechanical translation became a benefit for international commerce [7, p. 3].

In 1968 SYSTRAN was created by Peter Toma. Now, the translation models were produced by trainers of SYSTRAN Marketplace using SYSTRAN Model Studio (uses the computing power of PGUs for models) and algorithm based on OpenNMT [9].

The next step was made by Makao Nagoto, who proposed example-based machine translation. He submitted the idea of subsentential units and how to learn them by examples [10].

The age of neural networks
Google Translator

In 2006 Google Translator was created – at the time of competition with Babel Fish etc. [11].The translator was centred about *statistical machine translation.* It means it worked by translating the text into English and then into the target language with cross-referring the text with millions of others documents like acts, technical norms and other official documents taken from United Nations, European Parliament or Bible [11]. Prerequisite was that those documents are translated the most accurately. But the issue of statistical machine translation was the need of having word pairs in every language for every situation. Those documents cannot reach the level of language richness. Moreover, words in these documents were formal and native speakers hardly ever use them in everyday communication [12]. In 2016 Google announced a new translation system based on neural mechanic translation called Google Neural Machine Translation and started translating whole sentences by deep learning from a big range of sources [11]. Google uses Long short-term memory – a special type of recurrent neural network. Recurrent neural networks are feedback networks. The signal spreads to the output and then back to network input [13]. The translator does not learn languages but learns how to translate text to correspond to the texts [12]. For example the first language pairs were English-Japanese, Japanese-English, Korean-English, English-Korean. Later, the translator was able to translate from Japanese to Korean and from Korean to Japanese [11].

Bing Microsoft Translator

Was created at the beginning of the century as a reaction to Google Translate [14] and for spelling correction in Microsoft word based on Microsoft Knowledge Base. For public it was introduced in 2007. Bing

Microsoft Translator does not use exactly programmed translation rules, but an algorithm to understand and interpret a parallel text. This helps it to learn automatically how to translate from new languages [15]. In 2018 the translator started using neural networks for greater progress in learning new vocabulary and grammar [14].

Facebook

In 2011 Facebook started using on its site an option *to translate*. Facebook cooperated with Bing Microsoft Translator and used it to translate the statuses [16]. In 2017 Facebook announced that it moved to neural machine translation. Now it is using convolutional neural networks and recurrent neural networks to translate automatically. Convolutional neural networks are a type of feedforwards networks, where output of one layer is connected to input of another layer. The signal spreads from input to output [13]. Convolutional neural networks contain convolutional layers, which consist of various filters. Facebook had to fight with problems with informal language, slang acronyms and the style of language. [1]

The issues of translator

Now, I would like to introduce some examples of translating errors. These examples caused upheaval in society and their consequences were fatal.

¿Puedo buscar el auto?

The best worst example of google translating could be the case which happened in the United States of America in 2018.

In Kansas one officer named Ryan Wolting, member of Kansas Highway Patrol, arrested a man named Omaz Cruz-Zamora. First, it looked like a "normal" control because of a suspended registration. The officer quickly noticed that Cruz-Zamora could not speak very much English to prove his legal status. On the other hand, Wolting could not speak very much Spanish either. The officer found out that he was carrying a big amount of cash, but he could not ask for permission to search his car. Wolting got an idea – what about using Google Translate to obtain permission to search the car? [17] So, he typed "Can I search the car?" and it was translated to: "¿Puedo buscar el auto?" The officer found in Cruz-Zamora´s car 14 pounds of cocaine and methamphetamines. Omaz Cruz-Zamora immediately got arrested. On 4th of June 2018 the court was held. The judge Carlos Murguia called two professional interpreters – Johana Garcia and Sara Gardner. And here the whole problem started. Garcia said Google Translate is good for literal translation not for translating a full conversation. Gardner found out Google Translate is not a reliable translation service, it could only make a literal translation without the

necessary context. Gardnet also said that the sentence "¿Puedo buscar el auto?" is translated into English as "Can I find the car?" [18] On the audio and video from the car stop it seemed that Cruz-Zamora incorrectly understood the translated questions. And because anyone who agrees to a warrantless search must provide their consent knowingly, freely, and voluntarily, according to the Fourth Amendment of the US Constitution, he could not give the right permission, because he did not understand what was requested of him. The court had to dismiss prosecution´s arguments [17]. The judge wrote: "So, while it might be reasonable for an officer to use Google Translate to gather basic information such as the defendant's name or where the defendant was traveling, the court does not believe it is reasonable to rely on the service to obtain consent to an otherwise illegal search"[18]. At the end defendant´s Motion to Suppress was granted by application of the exclusionary rule [18].

Good morning

This is one example of wrong Facebook's automatic translation, which happened in 2017.

It was a sunny day. One Palestinian man, who worked as a construction worker at a construction site in the West Bank settlement of Beitar Illit near Jerusalem decided to take a picture of himself and posted it on Facebook. He gave it an Arabic caption يصبحهم, which means *good morning* [19]. After that Israel police officers, who did not speak Arabic, were notified of the post and relied on the Facebook's automatic translation service, which wrongly translated the title as *attack them* in Hebrew and *hurt them* in English. What is more, in the posted photo, he was standing alongside the bulldozer, which was used in hit-and-run terrorist attacks. Unluckily, the photo just made it worse for the poor guy. The police of the Judea and Samaria District suspected he wanted to attack and decided to arrest him. After a few hours of interrogation, the police realized the translation mistake and released him [20]. The case ended by apologies of Necip Fazil Ayan, an engineering manager in Facebook´s language technologies group: "Unfortunately, our translation systems made an error last week that misinterpreted what this individual posted. Even though our translations are getting better each day, mistakes like these might happen from time to time and we've taken steps to address this particular issue. We apologize to him and his family for the mistake and the disruption this caused"[21]. The whole problem was that English transliteration, which was used by Facebook, looked like the verb *hurt to*. The Palestinian man also removed the post from Facebook [20].

Kapara or Kapara?

Another example was created by Bing Microsoft Translator, which is used on Twitter.

In 2018 Netta Barzilai from Israel won Eurovision. It was a moment of national pride. But everything was ruined by Israeli slang expression *kapara*. And this is a story how BingMicrosoft (automatic) Translator was responsible for almost international trouble. Prime Minister Benjamin Netanyahu praised Netta in his twitter account. He used the word *kapara*, which morphed into slang and means affection or blessing. After he posted the congratulation, many people were in shock. The translator made a mistake and translated it into something vulgar. The text sounded as "Neta, you're a real cow. You have brought much respect for the state of Israel! Next year in Jerusalem!" People immediately made a screenshot to comment on his post and tried to alert him about the mistake. In comments there appeared hateful answers to Netta too. Few hours later, Bing Microsoft Translator repaired its mistake and offered an accurate translation [22].

The conclusion

History of translators is very rich and full of breakthroughs. Translators are a unique invention, smart and useful. Revolution based on using neural networks could make everyday life easier. They are also the greatest way for interdisciplinary connection of languages and technology and thanks to it they made a tool which helps to study languages, study foreign language texts or learn new things. On the other hand, these advantages could be a stumbling-block. Despite all the efforts, translations using neural networks still make mistakes, which cause uncomfortable situations or international faux pas. The examples I used could make you laugh but if you look at them from a different perspective, you will see the fatal consequences they made. The result of the first example was illegality of the officer's action and thwarted trial. The Facebook's mistake supported hostility between Israel and Palestine because of fear of terrorist attacks. The last one indirectly ridiculed the Israel winner of Eurovision and made international fuss.

Translators make mistakes every day. Some of them are caused by using slang words, context or not responding to language development. Generally, we could say, mistakes are mainly made during the whole sentence translation because of the lack of context. However, their qualities transcend the shortcomings.

In the end, I would like to advise you to check translations and not naively believe in the first thing machine translators offer you.

References

1. Mannes J. Facebook finishes its move to neural machine translation. [online]. Verizon media,2017 [cit. 2020-02-10]. Available from: https://techcrunch.com/2017/08/03/facebook-finishes-its-move-to-neural-machine-translation/. **2**. Pestov I. A history of machine translation from the Cold War to deep learning [online]. freeCodeCamp, 2019 [cit. 2020-02-10]. Available from: https://www.freecodecamp.org/news/a-history-of-machine-translation-from-the-cold-war-to-deep-learning-f1d335ce8b5/. **3**. Understanding the Background of Machine Translation [online]. Seattle, Dynamic Language. [cit. 2020-02-10]. Available from: https://www.dynamiclanguage.com/understanding- the-background-of-machine-translation/#. **4**. Hutchins J. Warren Weaver Memorandum: 50th Anniversary of Machine Translation. *MT News International* [online]. Issue No. 22 (vol.8, no.1). P. 5-6. IAMT, 1999 [cit. 2020-02-10]. ISSN 0965-5476. Available from: http://mt-archive.info/MTNI-22.pdf. **5**. Hutchins J. The Georgetown-IBM experiment demonstrated in Janury 1954 [online]. P. 2-6. Hutchinsweb, 2004 [cit. 2020-02-10]. Available from: http://www.hutchinsweb.me.uk/AMTA-2004.pdf. **6**. Bar-Hillel, Y. Some linguistic problems connected with machine translation. *Philosophy of Science* [online]. Vol. 20. P.1. 1953 [cit. 2020-02-10]. Available from: http://www.mt-archive.info/Bar-Hillel-1953.pdf. **7**. Hutchins J. The history od machine translation in a nutshell [online]. P. 2-3. Hutchinsweb, 2005 [cit. 2020-02-10]. Available from: http://www.hutchinsweb.me.uk/Nutshell-2005.pdf. **8**. Hutchins J. ALPAC: the (in)famous report [online]. P. 1. Hutschinsweb, 1996 [cit. 2020-02-10]. Available from: http://www.hutchinsweb.me.uk/ALPAC-1996.pdf. **9**. One more Online Translator? Definitely not! [online]. [cit. 2020-02-10]. Available from: https://translate.systran.net/information/view. **10**. Nagao M. A Framework of a Mechanical Translation between Japanese and English by Analogy Principle [online]. P. 3-4. IAMT, 1984 [cit. 2020-02-10]. Available from: http://www.mt-archive.info/Nagao-1984.pdf. **11**. Sommerlad J. Google Translate: how does the search giant's multilingual interpreter actually work? [online]. London: Independent Digital News, 2018 [cit. 2020-02-10]. Available from: https://www.independent.co.uk/life-style/gadgets-and-tech/news/google-translate-how-work-foreign-languages-interpreter-app-search-engine-a8406131.html. **12**. Čížek J. Český Google Překladač začal používat umělou inteligenci. Konce „drahoušků zákazníků" [online]. Czech News Center, a. s., 2017 [cit. 2020-02-10]. Available from: https://www.zive.cz/clanky/cesky-google-prekladac-zacal-pouzivat-umelou-inteligenci-konec-drahousku-zakazniku/sc-3-a-187234/default.aspx. **13**. Radová V. Neuronové sítě [online]. P. 20. Plzeň: Západočeská univerzita v Plzi, katedra kybernetiky [cit. 2020-02-10]. Available from: http://www.kky.zcu.cz/uploads/courses/nses/2_Typy_umelych_neuronovych_siti_a_faze_jejich_cinnosti.pdf. **14**. 20 nejlepších online překladačů v roce 2019 [online]. Praha: Langeo, s. r. o. [cit. 2020-02-10]. Available from: https://is.gd/sjCWKC. **15**. 2 TOP překladače v roce 2018. Jak fungují? [online]. Praha: Langeo, s. r. o. [cit. 2020-02-10]. Available from: https://is.gd/3aqLJT. **16**. Dočekal D. Facebook doplnil možnost strojového překladu příspěvků [online]. Pooh.cz,

2011 [cit. 2020-02-10]. Available from: https://pooh.cz/2011/10/09/facebook-doplnil-moznost-strojoveho-prekladu-prispevku/. **17**. Livni E. A US court rejected Google Translate as a means of providing consent to a cop [online]. QUARTZ, 2018 [cit. 2020-02-10]. Available from: https://is.gd/hdoHol. **18**. Case No. 17-40100-CM. In the United States District Court fot the District of Kansas [online]. 4th June 2018. [cit. 2020-02-10]. Available from: https://ecf.ksd.uscourts.gov/cgi-bin/show_public_doc?2017cr40100-24. **19**. Hern A. Facebook translates 'good morning' into 'attack them', leading to arrest [online]. Guardian News & Media Limited, 2017 [cit. 2020-02-10]. Available from: https://www.theguardian.com/technology/2017/oct/24/facebook-palestine-israel-translates-good-morning-attack-them-arrest. **20**.Berger Y. Israel Arrests Palestinian Because Facebook Translated 'Good Morning' to 'Attack Them' [online]. Haaretz Daily Newspaper Ltd. 2017 [cit. 2020-02-10]. Available from: https://is.gd/s9Ad6G. **21**. Fussell S. Palestinian Man Arrested After Facebook Auto-Translates 'Good Morning' as 'Attack Them' [online]. G/O Media Inc. 2017[cit. 2020-02-10]. Available from: https://gizmodo.com/palestinian-man-arrested-after-facebook-auto-translates-1819782902. **22**. Oded Y. Kapara on You? How Netanyahu Congratulating Israel's Eurovision Winner Turned Into a Digital Insult [online]. Haaretz Daily Newspaper Ltd. 2017 [cit. 2020-02-10]. Available from: https://www.haaretz.com/israel-news/netanyahu-congratulates-eurovision-winner-then-auto-translate-kicked-1.6077485.

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**Ономасіологічні словники як знаряддя перекладача:
прірва між теорією і практикою**

Current lexicographic practice is mainly focused on bilingual and monolingual explanatory dictionaries, which are semasiological by their nature. In contrast, onomasiological dictionaries, aimed at searching means of expression for a certain meaning, are scarcely represented among lexicographic resources. The latter are commonly compiled in form of inverted dictionaries and thesauri; onomasiological dictionaries in the strict sense, based on classificatory synoptic schemes, are rare. The few onomasiological dictionaries deal mainly with lexical units of a certain language, while there is an objective need of their usage in the practice of translation and other domains; the level covered by modern onomasiological dictionaries should also be extended from lexical to phraseological and even grammar levels.

Keywords: lexicography, onomasiology, macrostructrue, synoptic scheme, phraseology