

## LANGUAGE, COMMUNICATION AND ARTIFICIAL INTELLIGENCE

*У статті проаналізовані факти роботизації і проникнення штучного інтелекту у різні сфери діяльності і, відповідно, перспективи розвитку освіти, лінгвістики, комунікації та пов'язаних з нею професій, функціонування мови, особливості породження мови в умовах взаємодії людини і роботів.*

**Ключові слова:** штучний інтелект, комунікація, мова, лінгвістика, робот

*В статье проанализированы факты роботизации и проникновения искусственного интеллекта в разные сферы человеческой деятельности и, соответственно, перспективы развития образования, лингвистики, коммуникации и сопряженных с ней профессий, вопросы функционирования языка, порождения текста в рамках взаимодействия человека и робота.*

**Ключевые слова:** искусственный интеллект, коммуникация, язык, лингвистика, робот

*The article deals with the facts of robotization and artificial intelligence proliferation into vast sectors of human activity, therefore, with prospects of education, linguistics, communication and communication-related professions. The vision of communication, language functioning and text generation within human-to-robot interaction is highlighted.*

**Key words:** artificial intelligence, communication, language, linguistics, robot

Artificial Intelligence (AI) is much spoken about due to the breakthrough in research and technology and the consequences it might have for the society, civilization, globally, and for the language teaching, language learning, communication and linguistic research, in particular.

In the new millennium when technologies and computers diversified and became drastically cheaper, and the amount of online communication exploded, IT (Information Technologies) converged with communication. As a result during the last ten years the abbreviation IT has been rivaling with ICT (Information Communication Technologies). Now ICT converge with AI. The McKinsey Global Institute claims AI is contributing to a transformation of society "happening ten times faster and at 300 times the scale, or roughly 3,000 times the impact" of the Industrial Revolution.

Experts do not believe that in the nearest future computers will obtain human-level intelligence but numerous articles and concerns over AI aftermath are frightening [6, 7]. The extreme scenario is smart robots and other self-learning machines might self-improve beyond human control and, finally, outperform humans. One of the recent facts is the escape of humanoid robot in the Russian city Perm, in 2016. There are other concerns about intelligence surveillance which obviously threaten privacy, about cybersecurity threats to smart cities which become too dependent on AI etc. One of the evident proofs of the imminent robot invasion is the employment of robots in China as more or less human-like waiters and waitresses. The first robot-only factory is being built in China's Dongguan factory city. It will entail the reduction of 90% of workers. Royal Caribbean's luxury cruise ship *Anthem of the Seas* recently installed a robotic bar – Shkr Makr. In May 2016

in the USA employees and trade unions demanded minimum salary increase from US\$ 9. 25 to US\$13. Businessmen, in their turn, started thinking about large-scale implementation of robots which have no demands about salary increase. This fact might trigger immediate robotization of business, as some experts predict.

Generally, many experts worry that like many decades ago automation in industry and agriculture caused mass extinctions of jobs, AI and robots will replace repetitive skilled labor. In line with the forecasts, in the forthcoming 10–20 years 30–35 % of jobs will be lost due to automation and robotization. Some futurologists predict that robots of all types could fully replace humans by 2045. Yuval Noah Harari, a lecturer of the Hebrew University in Jerusalem, in his new bestseller *Sapiens: A Brief History of Humankind (2011)*, predicts the rise of the useless class – humans who can't work because there's always a cheaper and better robot. [6].

At the moment, there is an education problem as no one knows what to teach and to study at the college, because no one knows what skills learned at 20 something will be relevant at 40 something. Some experts believe despite total jobs reduction teachers, doctors and judges as professionals will survive. But in education the situation is not as simple as that as ICT and AI are being widely implemented in schools and universities. In Singapore robots are employed as teacher's assistants in primary schools to practice interactive teaching of Z-generation. One of the major AI-related problems is identified by Dave Coplin, chief envisioning officer at Microsoft UK, who claims that AI will "change how people relate to tech and to each other. " Robots introduced some new problems, for instance, blurring human individuality. Anthropomorphic appearance in social robots is said to be a threat to Human Distinctiveness [1]. Gender issues in robotics turned out to be relevant as well. Meanwhile physical shape of robots is being constantly improved. Poppy, the latest humanoid robot, created by a 3D printer, has a biologically inspired walking motion that will make it possible to improve human-to-robot interaction. It has an articulated spine with five motors – almost unheard of in robots of this size. The spine not only allows Poppy to move more naturally, but helps to balance the robot by adjusting its posture [15].

Those who are skeptical about forthcoming AI invasion should keep in mind that Google, Microsoft, Facebook, Samsung, Toyota and other international companies are investing billions of dollars into AI and robotics research looking for augmented revenue. IT companies, in their turn, partnered with automobile manufacturers to produce self-driving cars. Driverless cars are to make up to 75 % of all traffic by 2040 leading to unemployed drivers and the transformation of all the infrastructure around the job. Experiments and research with self-driving cars aimed at recognizing and differentiating between cars, bikes, people, animals and other objects as well as the road surface might result into breakthrough in image classification, in robots' vision and hearing. Of utmost importance are the innovations connected with cognitive abilities of robots. The *Roll, EasilyDo, 24Me, Google Now, Google Home, Google Assistant, Face Maker, HelloGBye* and other applications make a step towards new brain for AI via cloud computing and precision manufacturing. Subsequent waves could transform vast sectors of the economy,

science and society. When Steve Jobs died some articles and obituaries stressed the fact that innovations in automobiles and mobile phones go hand in hand, both benefit from this cooperation and make impact on communication. Thus, partnership of AI, IT and automobile manufactures is expected to change the world radically.

Numerous clusters and compounds with *robot* as a component are mushrooming in English (*humanoid robot, anthropomorphic robot, intellectual robot, human-like robot, so-called robo-advisers, lady-bot, mer-Bot, chatbot, robot-only, agrobotics, agrobot* etc.). The situation resembles the extensive coinage of IT terms 10–20 years ago.

Robots have been helping doctors perform surgery for years. Now robots are being trained to take care of patients, injured people, old people. Robots undergo personalization being given first names. For example, Romeo can walk, see the three-dimensional environment, hear and speak, respond to requests of old people. It can cope with speech synthesis and speech recognition [17; 20]. Croatian researchers introduced Robot Rene to observe and diagnose autism in young children [2; 16]. IBM's supercomputer Watson is connected with a dozen hospitals in the US offering recommendations on the best treatments for a range of cancers. Google artificial intelligence project DeepMind is building software to detect early signs of kidney disease [4–5].

Robots entertain customers at shopping centres. Pepper Robots are employed to sell iPhones in Tokyo [14]. RoboThespian was designed for human interaction in a public environment. In Russia Promobot operates in shopping centers memorizing promo-information, helping customers with navigation, keeping in memory images of the people it communicated with. Robots can communicate with clients within fixed speech patterns in museums or at reception in hotels. In Japan, Otonaroid is working a "science communicator" and will speak directly with visitors. Kodomoroid is a "broadcaster" that reads news reports [9; 11]. Robots like Mermaid dive and explore seas and oceans. Robots are found even at such conservative institutions as church, at monasteries. In Japan people grow so attached to their robot dogs that they hold funerals for them when they "die" [3].

Robots are used in mass media, in automated journalism, in particular, to generate stories from the data. Cloning widely used in modern mass media de-personalized reporting and news making. It might be rendered as a shift, inconspicuous for readership, towards automated journalism. Moreover, automated journalism is more effective in terms of narrowcasting and targeting. Robots can generate a readable text already and find plots humans miss and ignore. The latter might herald new stage in *tellability* of stories. Experts believe one day a robot will win the Pulitzer prize. Thus, journalism is one of the professions threatened by robotics.

In business robots have been used for years in financial speculation and finally outperformed traders. Now leading banks (Goldman Sachs Group Inc, Morgan Stanley, UBS Group and others) are implementing AI to improve personnel recruiting, identify candidates with preferred merits and, thus, minimize financial losses. AI is able to analyze and select CV and video, interview applicants on-line and off-line and analyze professional achievements, communication and argumentation, rhetorical skills, confidence etc. *Koru* and *Rhetoric Image* will obviously entail HR managers redundancy.

NAO robots have been used for research and education purposes in numerous academic institutions worldwide: in 2015 over 5,000 NAO units are in use in more than 50 countries. An *iCub* robot was designed to act within cognitive learning scenarios [13; 19]. The *iTalk* project teaches the robot to speak using methods similar to those used to teach children and is a key part in the learning process of the human-robot interaction [10]. These scientific and technological advances could have a significant impact on the future generation of interactive robotic systems. In human-robot interaction one more aspect of human behavior turned out to be of vital importance – emotionality, the ability of robots to emit expressions [8; 18]. Robots being rational and technocratic are progressing and soon will be able to sense our mood, emotions and behavior.

How AI and robotics affect communication and text generation, in particular? Microsoft published a textbook with a set of recommendations on text generation [12]. As Microsoft is one of the leaders and authorities in IT, and together with other giants implements ICT and AI to organize, regulate and standardize communication, simplified texts they offer will become a sample, a matrix for others and will prevail in the on-line communication which becomes more and more dominant in the 21<sup>st</sup> century.

*Microsoft Manual of Style* focuses on text readability, ergonomics and effective communication. Text generation is subordinated to the slogan "*Improve your content's clarity, accuracy, consistency!*" Generally laconic condensed style is recommended "because users scan text, make every word count [12, p. 8]. Among other grammatical recommendations are use of Active Voice which is clearer than Passive Voice. Passive voice can be a problem for localization as well as some languages use passive voice rarely [12, p. 177, 180]. Among other preferences Present Tense, Indicative Mood to convey information and Imperative Mood in procedures.

Recommendations on plain language are as follows: use words accurately and consistently; use everyday words when you can, and avoid formal language that you wouldn't use when speaking to someone in person; do not invent words or apply new meanings to standard words; do not use slang; use short, plain words as much as possible; omit needless words; limit the use of prepositions and articles; do not use articles unless required for clarity [12, p. 207]; use context to reduce ambiguity.

Emotional component of online communication is becoming more and more important and in Microsoft manual is presented as attitude: Be inspirational / Be emphatic/ Be responsible/ Be polite, supportive and encouraging. Use contractions to create a friendly, conversational tone. Use please and thank you judiciously. Use sorry only in error messages that result in serious problems for the user. Don't try to be funny.

Modern western society claims to be egalitarian, tolerant and politically-correct, therefore substantial part of recommendations is devoted to bias-free communication, avoidance of stereotyping (Do not use racial, cultural, sexual, and other stereotypes [12, p. 12] and promotion of particular lexical units, for example, gendered ones: *chair, moderator* instead of *chairman, humanity, people, humankind* instead of *mankind, sales representative* instead of *salesman, workforce, staff, personnel* instead of *manpower*. It is recommended to avoid generic masculine pronouns. Other politically-correct requirements for text generation are as follows:

- Use a variety of first names, both male and female that reflect different cultural background.
- In art, show men and women of all ages, members of all ethnic groups, and people with disabilities in a wide variety of professions, educational settings, locales, and economic settings.
- Do not use stereotypes relating to family structure, leisure activities, and purchasing power. If you show various family groupings, consider showing nontraditional and extended families.
- Don't make generalizations about people, countries, regions and cultures, especially if the generalizations could be considered derogatory, and avoid culturally sensitive terms.
- Be mindful of globalization and cultural consideration before you use colloquialism or idioms.

People with disabilities are given special attention. The main idea is avoidance of labels: use the words *people with disabilities* instead of *the disabled*, *cognitive disabilities* instead of *slow learner*, *has cerebral palsy* instead of *CP victim*, *has mental retardation* instead of *retarded*, *has multiple sclerosis* instead of *is affected by MS* etc.

Microsoft Manual offers lots of other vocabulary preferences thus rivalling with English dictionaries.

These facts give numerous arguments in favor of growing impact of IT companies, AI and robotics. Communication which was supposed to be the privilege of humans is privatized by machines. Humans have to find the answer how they can stand ahead in this changing world.

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