



Artificial Intelligence in Russia Issue 16, December 4, 2020

The Russia Studies Program

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Abstract

This report, the sixteenth in a series of biweekly updates, is part of an effort by CNA to provide timely, accurate, and relevant information and analysis of the field of civilian and military artificial intelligence (AI) in Russia and, in particular, how Russia is applying AI to its military capabilities. It relies on Russian-language open source material.

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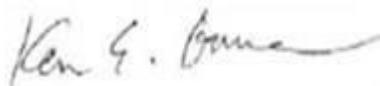
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December 2020



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Governance and Legal Developments

1. Personal data bill introduced in State Duma

On November 17, a bill that enables citizens to remove their personal data from the public realm was introduced in the State Duma. According to Anton Gorelkin, the Duma deputy who authored the document, if the bill were to pass, each site where a citizen registers would have to ask what data the user wants to make publicly available and transferrable to third parties. If the site violates the terms of its agreement with an individual, it would incur a fine.

Gorelkin cited the example of a Russian company working in the field of facial recognition, which used the VKontakte database to train its neural networks for several years. They ultimately collected millions of user photos from the social media site. The bill introduced in the Duma would make this kind of practice illegal, as third parties would not have the right to collect, buy, or receive information about users if those users did not agree to make their information publicly available.

Today, the burden of proving unlawful use of personal data is on the citizen alleging wrongful use of their data. Under the new law, each individual would have the right to require an operator to remove the personal data from public access without any additional stipulations and without proving that the public data had been illegally processed. Under the bill, site operators must provide users with an opportunity to give or deny consent for all categories of data in the agreement. Users may give consent directly to the operator or to the Roskomnadzor information system. The operator is not allowed to obtain consent for processing publicly available data by default or through a user's inaction. However, the bill does contain an exception that these rules do not apply if an operator needs to fulfill functions or duties imposed by the Russian government.

As discussed in past issues of *AI in Russia*, the use of personal data remains a matter of concern for ordinary Russians.

Source: "Bill on publicly available personal data and obligatory consent of citizens to transfer personal data to third parties introduced in the State Duma," D-Russia, Nov. 18, 2020, <https://d-russia.ru/v-gosdumu-vnesjon-zakonoproekt-ob-obshhedostupnyh-personalnyh-dannyh-i-objazatelnosti-soglasija-grazhdan-na-peredachu-pd-tretim-licam.html>.

2. Russian government seeks AI help to catch criminals, despite tech mistakes

On November 12, the Russian Ministry of Internal Affairs presented a project on the use of AI to search for criminals and detect serial crimes. According to the project design, in 2020 the ministry will begin preparing the technical specifications for implementing AI technologies in police work, and in 2023 it will begin developing the software needed to search for those who commit serial crimes and to identify criminals by using evidence left at the crime scene. While law enforcement agencies currently use manual practices to detect linkages between crimes, one aspect of this new project will allow officers to automatically identify interrelated features. To carry out the project, the ministry requested 55 billion rubles from the federal budget.

As seen in one instance, however, the use of AI technologies to solve crime is not yet foolproof. Recently, Moscow resident Anton Leushin said that police detained him after the facial recognition system belonging to the supermarket Auchan mistakenly identified him as a robber who had stolen tens of thousands of rubles from the store. If the mistake had not been discovered, Leushin could have been sentenced to eight years in prison.

Sources: “Interior Ministry wants to use neural networks to find serial criminals” [ВД хочет использовать нейросети для поиска серийных преступников], Kommersant, Nov. 16, 2020, <https://www.kommersant.ru/doc/4574268>; “The Ministry of Internal Affairs requested billions for artificial intelligence to search for criminals in Russia” [МВД запросило миллиарды на искусственный интеллект для поиска маньяков в России], PenzaInform, Nov. 16, 2020, https://www.penzainform.ru/news/global/2020/11/16/mvd_zaprosilo_milliardi_na_iskusstvennij_intellekt_dlya_poiska_manyakov_v_rossii.html; “Russian was almost imprisoned for 8 years due to an artificial intelligence error” [Россиянина едва не посадили на 8 лет из-за ошибки искусственного интеллекта], C-News, Nov. 12, 2020, https://www.cnews.ru/news/top/2020-11-12_rossiyana_edva_ne_posadili.

3. National standards development continues

On November 20, the Technical Committee for AI Standardization submitted a draft national standard titled “Information Technologies. Reference Architecture for Big Data. Part 2: Use Cases and Derived Requirements” for public discussion. The draft standard contains examples of the use of big data in various realms, including defense, healthcare, energy, science, deep learning, and social media. The information on AI application included in the document, much of which reflects American usage, is intended to assist in planning and implementing new domestic projects in areas similar to those included in the document.

Source: “The Technical Committee for AI Standardization (TK 164), created through the RVC, has submitted the first edition of the standard “Information Technologies” for public discussion” [Технический комитет по стандартизации «Искусственный интеллект» (TK 164), созданный на базе РВК, вынес на общественное обсуждение первую редакцию стандарта «Информационные технологии», AI-News.ru, Nov. 20, 2020, https://ai-news.ru/2020/11/tehnicheskij_komitet_po_standartizacii_iskusstvennyj_intellekt_tk_164.html].

4. Skolkovo staff discusses AI ethics

A recent article by the vice president for AI and mathematical modeling at the Skolkovo Foundation and an academic coauthor discussed ongoing ethics concerns in the AI field. Saying that AI is “an area of ontological uncertainty,” the authors suggest that basic questions such as what exactly “artificial intelligence” even is, make discussions of the subject difficult and confusing. In an important sense, lack of consensus on what AI is has hindered the development of ethical standards on which users can coordinate and which can be enforced in the broader industry and research field.

The authors highlight a number of problems, ranging from differences in opinion over what constitutes “intelligence” versus simpler automated data-processing systems, to the growth of humanities-trained AI researchers and workers who fail to understand engineering and technical operations, to tendencies towards retrofitting an “AI” label onto older or different technologies in the IT field for reasons of branding and profitability. They claim that the AI industry is a “Tower of Babel” in which no common understanding of the field exists, and that it is instead dominated by competing and incompatible concepts and frameworks.

The article discusses major problems in international agreements seeking to craft universal AI ethics standards, including UNESCO and Council of Europe reports on AI ethics which fail even to provide cohesive and limited understandings of the field, let alone to firmly identify a framework for understanding ethical issues. They argue that corporations in the industry would prefer the status quo, which helps them maintain monopoly power. This dynamic is “rapidly politicizing” discussions of AI ethics, which the authors believe is unnecessary given the actual, technical nature of the field. The article concludes by suggesting that Russia not engage too deeply in international disputes but instead look to its domestic AI field to craft a “methodologically competent, consolidated interdisciplinary approach to the regulation of intellectual systems based on artificial intelligence” that can perhaps serve as a later model for AI ethics overall.

Source: Maxim Fedorov and Yuri Tsvetkov, "Ethical Issues of Artificial Intelligence Technologies— How to Avoid the Fate of the Tower of Babel" ["Этические вопросы технологий Искусственного Интеллекта – как избежать судьбы Вавилонской башни"] CDO2DAY, Nov. 11, 2020, <https://cdo2day.ru/vid-sverhu/jeticheskie-voprosy-tehnologij-iskusstvennogo-intellekta-kak-izbezhat-sudby-vavilonskoj-bashni/>.

Military and Security Developments

5. Rostec develops intelligent control and surveillance systems

Rostec's Shvabe Holding subsidiary demonstrated the Zorky security platform at the Interpolitech-2020 technology exhibition in October 2020. According to the developers, the system is capable of recognizing faces, recording a person's body temperature, and tracking movements. Zorky consists of video cameras with adaptive IR illumination for video surveillance, neural network analytics, and built-in hardware crypto protection.

This platform allows operators to scale up their security requirements by adapting it to the features of a particular project or a security task—for example, providing perimeter security or maintaining oversight of isolated points such as ATM locations. Zorky can be operated from a centralized command and control location, or from a remote workstation.

According to Rostec, Zorky's intelligent system could be used for people control at checkpoints. The setup includes a thermal imager and image calibration technology that are especially applicable now while Russian organizations, government ministries, public and private companies, and facilities across the country are checking the population for COVID-19 symptoms. This complex can be integrated with a facility's existing control and management system. Once the employee's data are entered into a specialized database, Zorky can decide whether to let the person pass, based on the information collected. The system identifies the person's gender and age, recognizes whether the face is hidden behind sunglasses or a mask, and records video stream. Rostec claims that Zorky can also work automatically, without the participation of an operator.

At the same time, Rostec's Roselectronics Holding has completed the certification of an intelligent security system for aviation infrastructure facilities. This technology detects and recognizes objects using neural networks. The certification tests took place at the Simferopol airport in the Crimean Peninsula. This monitoring system consists of an active radar that detects moving objects and transmits commands to optical sensors that track the target movements in the visible and infrared ranges. The complex can also include thermal imagers with a temperature sensitivity of less than 50 millikelvin, allowing monitoring to be carried out in complete darkness.

According to Rostec, this system recognizes people and vehicles, records events, and provides information storage and access to archived data. It automatically generates commands for video cameras, and analyzes video data to recognize target classes using a trained neural

network. The system operates in an automatic mode with minimal operator involvement, has a flexible configuration of applicable work scenarios, and allows the operator to program work algorithms in accordance with customer requirements.

Rostec claims that this intelligent security system detects, recognizes, and tracks targets with an accuracy of 99 percent, significantly increasing the level of safety at a given site, which is especially important at critical infrastructure facilities. Apparently, “soft” contracts have already been signed for the supply of this system to three Russian airports. Rostec maintains that this technology does not interfere with an airport’s ground-based radio technical support or with onboard aircraft and helicopter equipment.

Rostec already provides a number of AI-enabled surveillance solutions for the country’s civilian and military markets. As the Russian government is investing and acquiring technology for population monitoring in the midst of an ongoing COVID-19 pandemic, Rostec developments could be another tool to maintain control over population movement and activity. At the same time, there appears to be a growing market for AI-enabled security applications that can be used by both civilians and the military.

Source: “Rostec unveils ‘Zorky’ intelligent control system” [Ростех впервые показал высокоинтеллектуальную систему контроля «Зоркий»), Shvabe.com, Oct. 2020, <https://shvabe.com/press/publications/rostekh-vpervye-pokazal-vysokointellektualnuyu-sistemu-kontrolya-zorkiy/>; “Rostec certifies an intelligent airport security system” [Ростех сертифицировал интеллектуальную систему охраны аэропортов], CNews.ru, Nov. 13, 2020, https://www.cnews.ru/news/line/2020-11-13_rosteh_sertifitsiroval_intellektualnuyu.

6. Russian military to get AI-enabled ISR drones

According to Russian Ministry of Defense (MOD) sources, the Russian military could soon acquire AI-enabled drones. The new UAV model is designed to detect the operation of adversary air defense radar and anti-aircraft missile systems. The UAV detects the target’s radio-electronic radiation and determines its location, as well as its tactical and technical characteristics. It can also determine the direction to the signal source, its approximate range, and its coordinates. Information from the UAV not only can be transmitted to the control point, but also can be broadcast directly to the aircraft or helicopters in a given combat area, warning them of danger.

Apparently, this latest UAV-based reconnaissance system was tested in the Southern Military District, and during the Kavkaz-2020 strategic exercises. The MOD claims that small UAVs would be almost invisible to enemy radar. The MOD also claims that these drones are equipped

with AI software and automated search processes that allow this UAV to conduct analysis and find targets in the shortest possible time.

Compared to ground-based radio reconnaissance technologies and systems, these UAV assets are more mobile, and can be quickly transferred to the desired location. Once these drones have identified the adversary assets, a strike could potentially be organized and launched immediately to take them out. Today, such ISR missions are flown by the IL-22PP Porubshchik manned aircraft with a crew of up to nine people. The use of new drones instead of manned aircraft to detect adversary air defenses would keep people out of danger during such missions. This new UAV system has no official designation at this point.

Today, Russian military operates a “Leer-3” UAV system based on an Orlan-10 UAV to detect and suppress cell phone towers, and to manipulate mobile signals and data in a designated area. It is possible that the new ISR missions described above could also be flown on an Orlan-10 drone, which has proved itself in Syria as the most numerous of MOD’s 2000+ drones in service. The mission described above also corresponds to the MOD’s claims that it seeks to use artificial intelligence as a decision-making tool first and foremost to help human operators analyze data and make sense of the rapidly evolving battlefield situation. For more on the MOD’s development and use of AI, please see past issues of *AI in Russia*.

Source: “Anton Lavrov, Roman Kretsup, Russian military to get AI-enabled ISR drones” [Разведка дроном: в войсках появились беспилотники-ищейки], IZ.ru, Nov. 19, 2020, <https://iz.ru/1089566/anton-lavrov-roman-kretcul/razvedka-dronom-v-voiskakh-poiavilis-besplotniki-ishcheiki>; “Russia’s New Drone-Based Electronic-Warfare System,” UASvision.com, Apr. 4, 2017, <https://www.uasvision.com/2017/04/04/russias-new-drone-based-electronic-warfare-system/>.

7. Russian government proposes ban on purchase of imported drones

The Russian authorities are going to restrict purchases of foreign unmanned aerial systems (UAS) for state and municipal needs. Mikhail Mishustin, Russia’s prime minister, announced the order on November 5, 2020. The restrictions should be in place by June 2021. Prior to that, Mishustin ordered a comprehensive detailed analysis of the market for the Russian unmanned aerial vehicle production. The Ministry of Industry and Trade, the Ministry of Economic Development, the Ministry of Transport, and the Ministry of Finance, with the participation of the National Technology Initiative’s Aeronet Working Group, will be responsible for the execution of this order.

The Ministry of Industry and Trade states that one reason for such restrictions on UAS acquisition is that small drones that operate at low altitude can receive fairly accurate and

detailed information related to state secrets by flying near or over certain locations and sites. Apparently, the Russian government is concerned that foreign UAS can immediately transfer such information abroad, bypassing any security checks. In August 2018, the government approved steps to regulate the operation of unmanned aircraft in Russia, including allowing flights at altitudes up to 150 meters. The Ministry of Economic Development is confident that before the acquisition restrictions are imposed, a comprehensive analysis of the competitiveness of domestic drone equipment and the ability of Russian manufacturers to meet the needs of customers will be required.

Currently, drone and UAV uses in Russia could include parcel delivery, precision farming, environmental monitoring, geodesy, forestry and water management, nature conservation, and urban planning, along with land and road management. Such widespread uses could inadvertently place them near specific locations that Russian government would like to keep closed to such drone traffic. It will be interesting to observe whether those restrictions will include the import of Chinese UAVs such as DJI models, which are some of the most numerous drone purchases by civilians and the Russian government. DJI drones are already used by the Russian Railways, Transneft, and Rosavtodor for surveillance and maintenance activities.

Source: “Russian officials will be banned from buying imported drones” [Российским чиновникам запретят покупать импортные беспилотники], CNews.ru, Nov. 17, 2020, https://www.cnews.ru/news/top/2020-11-16_chinovnikam_rossii_zapretyat; “China Daily: Chinese drones “flock” to the Russian market” [China Daily: китайские дроны «слетаются» на российский рынок], Russian.RT.com, Sept. 6, 2029, <https://russian.rt.com/inotv/2019-09-06/China-Daily-kitajskie-droni-sletayutsya>.

8. Rosmorport starts unmanned navigation trials

In November 2020, FSUE “Rosmorport”—a state company tasked with helping develop Russia's maritime transport infrastructure—used several dredging vessels to test unmanned navigation technologies as part of project run by the ANO “Industry Center MARINET” (part of the government-run National Technology Initiative). Specialized remote control technology was installed on the vessels, to be managed from a land-based command and control center.

The tests were conducted in the Kerch Strait. The distance from the dredging area to the offshore dump is about 30 km. According to the tests, this distance is to be covered by a vessel in remote or automatic control modes. Presently, the dredging caravan ships are checking the following parameters: the ability of the equipment to receive and broadcast information about the maritime environment; the interaction between the vessel at sea and the land-based command and control center; and the verification of embedded algorithms for remote and automatic control.

The plan is for the lead dredging ship to control all the vessels in the caravan simultaneously. This will optimize the number of personnel on board and improve coordination of their work. The Russian developers think that the introduction of unmanned maritime technologies could significantly improve the safety and environmental friendliness of sea transportation and operations, while reducing operating costs. Automatic and remote control of the vessels will also help reduce the human factor, which could increase navigation safety. In the future, FSUE "Rosmorport" is considering the possibility of using remote piloting, using autonomous workboats, and introducing unmanned aerial vehicles capable of reconnaissance in difficult sea conditions.

Despite the overtly civilian nature of the test, its location is fraught with geopolitical consequences. The Kerch Strait is a narrow body of water that separates the Black and the Azov Seas, and runs between the Russian continental landmass and the Crimean Peninsula. During the past two years, Russia has built a bridge to Crimea over the Kerch Strait in order to connect the peninsula—which it captured in 2014—with the rest of Russia, over the objection of Ukraine. In 2018, the Russian Navy also captured several Ukrainian military vessels that entered the Azov Sea via the Kerch. Given how much emphasis the Russian MOD is placing on unmanned maritime development in general, the progress of Rosmorport's unmanned test could be monitored by the country's military.

Source: "'Rosmorport" has started the unmanned navigation project trials" [«Росморпорт» начал испытания по проекту безэкипажного судовождения], *BMPD Livejournal Blog*, Nov. 17, 2020, <https://bmpd.livejournal.com/4189585.html>; Official website of the "Rosmorport," <https://www.rosmorport.ru/about/mission/>; "Tension escalates after Russia seizes Ukraine naval ships," *BBC.com*, Nov. 26, 2018, <https://www.bbc.com/news/world-europe-46338671>.

Corporate and Market Developments

9. Sber reports AI profits, discusses AI future

According to the Alexander Vedyakhin, first deputy chairman of Sberbank, AI is set to add over 60 billion rubles (\$788 million) to the company's 2020 profit. Reuters reported that, after investing 30 billion rubles in AI in 2020, Sberbank anticipated "the AI-driven economic effect to top 350 billion rubles (\$4.60 billion) in the next three years." Sberbank, which is 50 percent owned by the Russian government, is undergoing transformation from a bank to a technological ecosystem and seeks to eventually have 100 percent of its products be AI based.

Separately, AI head German Gref discussed AI developments in a recent meeting of the Security Council secretaries of the Commonwealth of Independent States. (CIS members include Armenia, Azerbaijan, Belarus, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, and Uzbekistan.) He highlighted Russia's efforts and strategies to develop AI technologies, noting also the importance of the AI Alliance, which includes Sber, Yandex, MTC, Mail.ru Group, Gazprom Neft', and the Russian Fund for Direct Investment. The AI Alliance was created in 2019; its goal is to be the center of AI development in Russia and to support the leadership of Russia and companies participating in the alliance on the global technological market.

In turn, Sberbank managing director of the Data Research Competency Development Department, Vladimir Averbakh, noted to RIA Novosti on November 17 that the mass incorporation of AI in Russian business processes would take five to 10 years. He said that about half of all Russian companies are contemplating adoption of AI-enabled technologies, but that it is still perceived as an area for risky investment. He noted that the upcoming conference "AI Journey 2020," set to take place in December (see upcoming issues of *AI in Russia*) will provide a useful platform for discussing AI trends and prospects across Russia's ICT sector.

Source: Andrey Ostroukh, Alexander Marrow, "Russia's largest lender Sberbank expects AI profit expansion," Reuters, Nov. 20, 2020, <https://www.reuters.com/article/russia-sberbank-ai/russias-largest-lender-sberbank-expects-ai-profit-expansion-idUSL8N2I559D>; "Sber reported on perspectives of AI" [Сбер представил перспективы искусственного интеллекта], ai-news.ru, Nov. 19, 2020, https://ai-news.ru/2020/11/sber_predstavil_perspektivy_iskusstvennogo_intellekta.html; "Timelines of mass implementation of AI in Russia have been determined" [Определены сроки массового внедрения искусственного интеллекта в России], 1prime.ru, Nov. 17, 2020, https://1prime.ru/telecommunications_and_technologies/20201117/832348528.html.

10. Samara University develops agricultural drones

Scientists from the Samara National Research University will develop a “smart” farming system based on small unmanned aerial vehicles. According to the university’s Department of Supercomputers and General Informatics research team, a compact modular airborne hyperspectrometer will be developed, which will be installed on unmanned aerial vehicles to obtain different types of information for an agricultural producer, such as the presence of weeds in the field or areas of crops damaged by insects and pests. This system will include a cloud platform for collecting, storing, and processing hyperspectral images, which will be analyzed by artificial intelligence. The project should be completed by June 2021.

Currently, several experimental hyperspectrometer samples have been manufactured. The Samara University specialists are optimizing the design and working out the technical process for its mass production. Flight tests with trial processing of hyperspectral imagery data are scheduled for spring 2021. According to the university, the hyperspectrometer weight will be only about 100 grams, which would allow it to be installed on practically any drone model in circulation. For a discussion of AI in agriculture, please see issue 15 of *AI in Russia*.

Source: Samara scientists will equip drones-agronomists with “space” vision (Самарские ученые вооружили беспилотники-агрономы “космическим” зрением) Interfax-Russia.ru, Nov. 16, 2020, <https://www.interfax-russia.ru/volga/news/samarskie-uchenye-vooruzhili-besplotniki-agronomy-kosmicheskim-zreniem>.

11. Skolkovo holds AI startup competition

A new “intensive,” or combined, accelerator competition and workshop for university students, called “Archipelago 20.35,” took place on November 7-21. The event was organized by the online platform and innovative educational network “University 20.35,” which is a project of the Skolkovo Foundation. The Archipelago 20.35 event had 100 teams from 10 universities (for a total of over 5,000 participants) that worked on developing AI-based projects for industrial purposes in coordination with state and private sponsor organizations. Around 30 state-owned and private companies are partnered with the program and will follow up on the results of the event. Among the universities participating are FEFU, NSU, SPbSU, TSU, Innopolis, Skoltech, SPbPU, MPEI, NSTU, and MIPT. Companies include Rostelecom, Gazpromneft, Wargaming, Novosibirsk Akademgorodok, VTB, Megafon, Russian Quantum Center, Power Machines, Kamaz, GLONASS, and RVC.

Projects of particular interest include those dealing with innovative uses of AI in the oil industry, games, biomedicine, finance, education, robotics, agriculture, medicine, art,

information security, energy, social and humanitarian technologies, e-sports, GIS, logistics, industrial production, and metallurgy, as well as quantum technologies and 5G networks. Teams were tasked with developing and refining new, market-ready projects in these fields, with the goals of developing contacts in the AI field, gaining access to state-backed R&D funding, and getting actual orders from corporate customers. All of this will be coordinated through a sustained platform organized through the University 20.35 framework. The event was described as an important means of training a new generation of AI researchers and engineers who would further develop the AI industry in Russia.

The proposals submitted for the event included many topics: new radiovisual technology for unmanned vehicles and security systems; new algorithmic models to predict COVID-19 through CT scans; software for robotics management systems for logistics warehouses; new perfumes; platforms to facilitate personnel recruitment through tailored, automated filtering; and a new database platform for crowdsourced analysis.

Source: "Intensive on the preparation of projects and startups in the field of AI will be held in Moscow" [Интенсив по подготовке проектов и стартапов в сфере ИИ пройдет в Москве] Content-Review.com, Oct. 23, 2020, <http://www.content-review.com/articles/51402/> ; "The first platform for collecting data for research was presented at the 'Archipelago 20.35'" [Первую платформу по сбору данных для исследований представили на "Архипелаге 20.35"], TASS-NAUKA, Nov. 16, 2020, <https://nauka.tass.ru/nauka/10018715>.

Education and Training Developments

12. Study details AI human capital shortage in Russian regions

According to a November 18 *Russian Planet* article, recent research in the Far East, Irkutsk, and Tatarstan suggests that there is a shortage of AI and end-to-end technology development, as well as technical experts, in each of the three regions. The study conducted interviews with 11 experts from the regions, and was conducted in line with the project “Artificial Intelligence: a quick start from scratch” («Искусственный интеллект: быстрый старт с нуля»). In each region, the study identifies a problem in retaining qualified technical experts, noting that the majority tend to leave for Moscow or other major cities.

While the Far Eastern Federal University is a national leader in training students in the field of AI at both the bachelor’s and master’s levels, it is the only such university in the region. The region has made significant contributions to the fields of computer vision, gamification, sound analytics, and business analytics using AI. However, like other regions, the Far East is limited by considerable brain drain of highly trained experts.

The situation in Tatarstan is a bit more favorable, because it has three leading institutions: Kazan Federal University, Kazan Technological University, and the “Innopolis” university near Kazan. In this region, AI tools could be used to leverage several industries, including banking, pharmacology, oil production, vehicle manufacturing, and the defense industry.

In Irkutsk, the main inhibiting factor is the lack of qualified personnel. Unlike the other two regions, it has no well-established programs to train specialists in IT and AI. The study highlights the need to develop programs at the bachelor’s-degree level. AI tools could be of great use in monitoring Lake Baikal, and in developing raw materials sectors (especially oil and gas).

Source: Dmitry Stepnov, “Russia is experiencing a shortage of personnel in the field of artificial intelligence” [Россия испытывает дефицит кадров в сфере искусственного интеллекта], *Russian Planet* [РУССКАЯ планета], Nov. 18, 2020, <https://rusplt.ru/society/rossiya-ispitivaet-defitsit-kadrov-5fb5464d.html>.

13. Sber hosts online AI conference

According to a TASS article, an international conference on artificial intelligence, called “AI Journey,” is being held online December 3–5. The conference is hosted by Sberbank, and attendance is free. A previous iteration in 2019 drew 9,000 participants, and this year’s turnout is expected to be much greater because of its online format. Day one of the conference focuses on science, with lectures on machine learning, natural language processing, computer vision, and artificial general intelligence (AGI). Day two concentrates on society, government, and business, with keynotes from Sberbank leadership and Russian deputy prime minister Dmitry Chernyshenko. Day three centers on the different Russian regions leading in AI, featuring experts from Vladivostok, Novosibirsk, Ekaterinburg, Sochi, Volgograd, Samara, Kaliningrad, and St. Petersburg.

On December 5, another program, “AI Journey Junior,” will be held for middle and high school students. According to the website, “The conference program is aimed at popularizing data science and artificial intelligence technologies among the younger generation.”

Preceding the conference was a three-part online competition testing computer vision, natural language processing, and knowledge graph skillsets. The prizes ranged from 100,000 to 200,000 rubles for the first three places. The competition was open to all age groups, but included special prizes for school children.

Source: “About,” Artificial Intelligence Journey, accessed Nov. 30, 2020, <https://ai-journey.ru/en/about> ; “Sberbank” will hold an online conference for schoolchildren on artificial intelligence” [“Сбер” проведет онлайн-конференцию для школьников по искусственному интеллекту], TASS, Oct. 26, 2020, <https://tass.ru/ekonomika/9821223>; “AI Journey 2020: learn everything about Artificial Intelligence and win a million rubles,” *Study in Russia*, Oct. 19, 2020, <https://studyinrussia.ru/en/actual/news/ai-journey-2020-learn-everything-about-artificial-intelligence-and-win-a-million-rubles/>.

14. Hackathon finals held in November

According to the Digital Breakthrough website, the competition’s finals were held in a hackathon format on November 27–29. Fifteen organizations (including Rosatom, Sber, the Ministry of Energy, the Russian Post, and Rostelecom) provided real-world prompts for tech solutions that would aid their business or agency. More than 350 teams competed for cash prizes and the opportunity to advance to the grand finals.

The competition’s grand finals will be held December 7–8. The grand finals provide an opportunity for the selected teams to present final pitches for the digital products they created, in person, in front of a panel of representatives from the 15 organizations and the event’s other partners. Prizes for the grand finals include job offers, contracts, and project investments.

Throughout the entire competition, which was held in regional blocks, there were 94,333 registrations. The total prize fund for the competition reached 50 million rubles, with an additional grant fund of 100 million rubles, and more than 2,000 winners. The Digital Breakthrough competition was covered in issues 9 and 11 of *AI in Russia*.

Source: “The largest hackathons in Russia! — The Final” [Самые масштабные хакатоны России! -- Финал], Digital Breakthrough [Цифровом прорыве], accessed Nov. 30, 2020, <https://leadersofdigital.ru/#topics>.

International Collaboration

15. Russia and India expand AI cooperation

The organizers of an artificial intelligence event backed by the Russian government have said that they expect to see increased collaboration between Indian and Russian companies under the BRICS umbrella. The “Artificial Intelligence Journey 2020” event, organized by Sberbank, will take place December 3–5 and is expected to have extensive participation from India, including three speakers of Indian origin. Alexander Vedyakhin, the first deputy chairman of the executive board of Sberbank, sees expanding cooperation between Russia and India in AI R&D, “as both countries aspire to gain leading positions in the global market.”

Source: “BRICS umbrella to increase India, Russia collaboration on artificial intelligence,” Zee News, Nov. 18, 2020, <https://zeenews.india.com/india/brics-umbrella-to-increase-india-russia-collaboration-on-artificial-intelligence-2325292.html>.

16. Huawei discusses Russia partnership

The Chinese company Huawei has continued to expand its cooperation efforts with Russian companies and the Russian government in the AI sphere. It has partnered with Rostelekom, Russia’s largest long-distance phone and internet provider, to develop a home Wi-Fi router especially designed for gaming. The router uses AI technology to prioritize the delivery of data packets to and from gaming servers, without unduly delaying other applications. The router can transfer data at speeds greater than 2 Gb/sec. The two companies have been working together since 2016 to develop the technology and are planning to expand the technology to other uses.

Huawei is looking to further expand its partnerships. To this end, it recently took part in a Russian Infoforum conference on the future of digital security, which included participation from Russian companies (e.g., Megafon, Rostelekom, Rosatom, and Russian Railways), and from government agencies (e.g., the presidential administration, the Foreign Ministry, the Federal Communications Agency, and the Federal Tax Service). The conference participants discussed global trends in digital technology, its incorporation in government services, and the practice of building information security systems in the new digital reality.

Ilya Levchuk, the deputy director for strategic marketing at Huawei’s Eurasian office, spoke on the topic of support for the information and communications industry in China and directions for successful cooperation with Russia. He noted that the COVID-19 pandemic has greatly increased the demand for digital services and has sped up the digital transition process in many

economic spheres. He further noted that in China the digital economy has already become the main driver of economic growth, accounting for 36 percent of the country's total GDP. The Digital China project expects greater development of digital infrastructure, including 5G, data centers, cloud computing and AI. Levchuk recommended that countries wanting to copy China's success adopt a legal framework for the digital economy on the basis of the EU's General Data Protection Regulation (GDPR), join international organizations focused on electronic commerce and cybercurrency, and focus on state-private partnerships. For Russia specifically, he advocated obtaining greater state assistance for 5G and cloud computing; speeding up the digital transition in key economic sectors such as medicine, education, energy, and mineral extraction; and putting an emphasis on digital education. He noted that Huawei is ready to provide support for Russian companies and government agencies looking to promote initiatives related to developing the digital economy. This can be done in the context of Huawei's existing strategy for cooperation in the digital future.

Alexander Zubarev, the director for information security at Huawei Russia, noted that Huawei had launched 10 scientific laboratories in partnership with Russian universities and research institutes. Priority areas include basic research in mathematics, physics, and chemistry; artificial intelligence; and secure software. The company is actively involved in supporting IT education and talent competitions for youth and students.

Oleg Sirotyuk, a leading expert on intelligent systems at Huawei, spoke about the company's "Atlas Solutions for a Smart and Safe City" program. He pointed out the importance of diversifying hardware platforms for artificial intelligence solutions, given that AI is increasingly intertwined with daily life and economic processes at the enterprise, industry, city, and entire country levels. The economy and human well-being are becoming increasingly dependent on the quality and reliability of AI systems. He highlighted that Huawei's hardware provides an alternative to closed solutions from American manufacturers.

Arthur Pärn, director for cloud solutions at Huawei Russia, devoted his speech to the information security of public cloud solutions. He noted that Huawei's approach ensures the security of public clouds by offering embedded security solutions at all levels of the cloud. These are network security solutions (built-in DDoS protection, firmware firewalls, web application firewalls (WAFs); protection of physical servers from unauthorized access, using HSM solutions; vulnerability scanners; access control and user authorization; specialized services for internal logging actions and differentiation of user rights; specialized services to ensure the protection of cloud PaaS solutions; and a database management system (DBMS). In addition, Huawei can provide end-to-end cloud security management through a globally distributed cloud information security center, including providing consultation on end-user cloud information security. He expressed confidence that a public cloud can at least provide the same level of protection for enterprise infrastructure and applications as on-premise solutions, as long as the provided tools are used properly and users correctly configure their

internal infrastructure located in the cloud. He argued that for small companies and start-ups, the cloud clearly offers many more affordable solutions for information security than they could implement on their own and with a limited budget.

Vitaly Tomilko, a senior manager at Huawei, spoke about the company's intelligent data transmission network intended for data centers. He described it as follows:

Huawei AI Fabric is a new generation network for transmitting RDMA traffic without packet loss. Huawei's unique iLossless algorithm intelligently and optimally matches streams and queues across data center switches. It provides the ability to combine storage networks, HPC networks and data service network into a single Huawei AI Fabric. Using Huawei's AI Fabric solution will reduce the capital and operational costs of maintaining and maintaining data center networks.

Source: "Rostelekom and Huawei offer AI router, " [«Ростелеком» и Huawei представили роутер «Игровой» с искусственным интеллектом], CNews, Nov. 17, 2020, https://www.cnews.ru/news/line/2020-11-17_rostelekom_i_huawei_predstavili; "На международной конференции Инфофорума «Будущее цифровой безопасности. Экспертный взгляд» компания Huawei представила рекомендации по развитию цифровой экономики России," *Vedomosti*, Nov. 10, 2020, https://www.vedomosti.ru/press_releases/2020/11/10/na-mezhdunarodnoi-konferentsii-infoforuma-buduschee-tsifrovoi-bezopasnosti-ekspertnii-vzglyad-kompaniya-huawei-predstavila-rekomendatsii-po-razvitiyu-tsifrovoi-ekonomiki-rossii.

17. Samsung IT Academy concludes competition

Samsung's IT Academy recently concluded its third annual Russia-wide competition for graduates of its university training programs. Samsung IT Academy is a long-term free social educational program, launched in 2017 and sponsored and organized by Samsung Electronics. The academy partners with 34 leading universities throughout Russia and Kazakhstan, with programs in three categories: the internet of things, artificial intelligence, and mobile development. The program consists of a free year of training, through programs devised by specialists at Samsung Research Russia, and focuses on developing practical skills through project activities. By the end of the academic year, Samsung IT Academy graduates independently develop individual projects and receive a certificate from Samsung.

Chong Jinguk, general director of the Samsung Research Center in Russia and vice president of Samsung Electronics highlighted that Samsung has invested in the IT Academy because of its belief that Russian specialists have great potential to occupy leading positions in the global IT industry. According to Dmitry Kurochkin, vice president of the Chamber of Commerce and Industry of the Russian Federation, the Academy project is aimed at unleashing the potential

of Russian youth in mastering the basics of programming. The Russian government hopes that the program's alumni will contribute to solving the challenges of digital transformation of Russia's economy and society. The goal is for the program's alumni to help solve the significant staff shortage felt throughout Russia's IT industry. Although university training is increasing, it is not sufficient by itself to address the shortage, according to the director of the Russian Association for Electronic Communications, Sergey Plugotarenko. He argues that for this reason, businesses such as Yandex, Samsung, and Google have a role to play in educating the workforce that is equal to that of traditional educational institutions.

The best project in the "internet of things" track was AutoPill, an automatic pill box for people with memory problems. Second place went to a system for monitoring empty seats in an electric train. In the "artificial intelligence" track, the winner was the Monitoring of Human Physical Activity project, which helps facilitate the calculation of physical exercise and helps keep a training log. Second place went to a project to recognize emotions from a photo of a face in a chat bot for the Telegram messaging software. In the "mobile development" track, the winning Ecobeauty app used a neural network to help users track their makeup routine. Second place went to a mobile game, "Laboratory Rats"—a detective story in which the player acts as a guard of a secret complex. (Please see past issues of *AI in Russia* for discussion of the Samsung IT Academy.)

Source: "Samsung names winners of interuniversity competition Samsung IT Academy" [Компания Samsung объявила победителей Межвузовского конкурса студенческих проектов «IT Академия Samsung»], Samsung, Nov. 12, 2020, <https://news.samsung.com/ru/samsung-it-academy-contest-2020>.

Spotlight: Variational Autoencoders, Algorithms, and Drones

Researchers at the National Technology Initiative (NTI) Artificial Intelligence Laboratory, which is housed at the Moscow Institute of Physics and Technology (MIPT), are working on a system for intelligent analysis of photo and video content for use in drones and situational analysis systems. The NTI is a Russian government initiative launched in 2014 to promote domestic high-tech development and entrepreneurship.

According to a press release, MIPT scientists are creating a technical vision system for intelligent processing of photo and video information based on deep learning technologies and neural networks. For example, it would be able to detect such imagery as aircraft wreckage in mountainous terrain or threats to objects, and to ensure safety while moving in traffic or traveling on the railway, and in other areas. The developers claim that this technology will use a neural network to independently search and analyze the necessary templates for training. This in turn would allow for processing much larger amounts of data than other machine learning methods, which often require manual marking of training images. The Russian researchers think that this new approach will enable such systems to adapt more quickly to their assigned tasks and will increase their operating efficiency. The laboratory will test the system in 2021. That said, CNA analysts are skeptical of its ability to perform meta-analysis of what dataset to train on in an embedded algorithm.

This development is based on a unique variational autoencoders (VA) technology, which allows searching for objects atypical for the given area in one image. Unlike existing systems for detecting objects using security cameras, the MIPT presents its invention as combining classic tools for analyzing photo and video streams with neural network algorithms. The Russian developers expect that the new technology will be effective in real-time recognition of objects moving at high speed against the background of a cloudy sky or forest—apparently, existing systems cannot yet overcome this barrier, because they are unable to analyze the distorted image. At the same time, MIPT's flexible architecture should allow this system to be built into small devices, including drones and mobile structures for work on the ground. MIPT researchers highlight that this system's key feature will be the ability to operate without access to satellite navigation.

CNA Note: Autoencoders, which were introduced in the early 1990s, work by deliberately imposing a (reduced dimensional) bottleneck in a network that effectively yields a compressed knowledge representation of an input. *Variational* autoencoders generalize the basic variant by allowing a probabilistic description of the latent space; that is, instead of using real-valued

bottleneck variables, the latent attributes are probability distributions. For this reason, VAs are typically used—as they presumably are in this Russian system—as a form of unsupervised learning for complex distributions. The ability of MIPT researchers to build their system into small devices does not tell us much about how well the system will perform. Russian scientists would need to reconcile a tradeoff between achieving desired results in a controlled laboratory setting and getting such results on a small GPU embedded on a drone in a real working environment.

The investment of Russian scientists and researchers in development of embedded/organic machine learning (ML) is growing in importance, especially in light of extensive MOD experience operating drones in Syria for C4ISR. There, Russian UAVs conducted an ever-growing role in ISR duties, monitoring ground movements and locations of friendly and adversary forces. Enabling the drones with the technology developed by the MIPT lab would give these aerial assets an even better capability to conduct ground analysis.

Source: “Russian scientists are working on a self-learning vision system for drones” [Российские ученые представят самообучающуюся систему технического зрения для беспилотников], TASS, Nov. 18, 2020, <https://nauka.tass.ru/nauka/10030519>.

In Brief: AI Alliance Unveils Website with AI Cases

The AI Alliance, consisting of Russian government-supported companies Sber, Yandex, MTC, Mail.ru Group, Gazprom Neft', and the Russian Fund for Direct Investment, unveiled a website, <https://ai-russia.ru/>, that seeks to present an open library of Russia's best projects involving AI-enabled technologies in different sectors of the Russian economy. The projects are verified and assessed in accordance with the economic effects that the AI-enabled tech has had on the company. It is expected that the website and the open library will continue to be populated. Some of the cases/companies presented on the website, alongside a call for companies to submit their "cases" of AI technologies, are as follows:

- VKontakte's social network's "Dolores" service, which automates responses for customer support requests.
- Sportmaster's sports stores Beorg Smart Vision system for the creation of a customer loyalty database.
- Burger King's HR assistant Voximplant for the automatic verification of HR recruiter daily tasks.
- AlphaStrakhovaniye insurance company's Dasha.AI technology to automate call-center customer requests.
- Rosseti Tsentri's analysis and forecasting of the likelihood and volume of unplanned corporate electricity usage.
- Carlsberg's SmartMerch predictive analytics system to improve transparency in the work of merchandising.
- Liza-Alert technology to sort images from the Beeline service provider's unmanned systems, so that volunteers of a search and rescue unit can locate missing people.
- Gazprom Neft' automatic selection of oil-producing layers in a structural model of the oilfield with the use of computer vision. (The list includes numerous other Gazprom Neft' technologies.)
- Sberbank's DomKlik service to provide automatic valuation for housing costs. (The list includes numerous other Sberbank technologies.)
- Radiologiya Moskvyy's Voice2Med service that allows automation of filling out medical forms for cancer therapy.
- Rosenergoatom's videoanalysis system to improve industrial safety.

- Motorika’s technology to classify hand movement on the basis of neural networks, to improve hand prosthetic technologies.
- Rosstat’s ML-model to provide an alternative assessment of population numbers as part of an all-Russian census.
- MTS wireless service provider’s smart chat bot for customer support. (The list includes numerous other MTS technologies).

Source: Official website of <https://ai-russia.ru/>, accessed Nov. 30, 2020.

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