



Artificial Intelligence in Russia Issue 11, September 25, 2020

The Russia Studies Program

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Abstract

This report, the eleventh 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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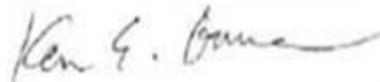
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September 2020



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Governance and Legal Developments

1. AI federal project adopted

In August, key stakeholders of the “Digital Economy” nonprofit organization (ANO) working group repeatedly stated that the release of the long-awaited AI federal project was imminent. The goal of the project, intended to aid implementation of Russia’s October 2019 National AI Development Strategy, is for the Russian “enterprises and citizens to use products (services), based predominantly on domestic AI technologies, that provide a qualitatively new level of activity effectiveness.” Its key activities seek to generate demand for Russia-developed AI products and services, stimulate human capital, and improve access to large datasets to stimulate AI development.

In July, Russian president Putin instructed his Cabinet of Ministers to approve a federal project by autumn and to ensure its funding through the budget of the Digital Economy national program. The federal project on AI will be one of the seven federal projects of the Digital Economy program. AI in Russia *has previously reported on the development of this federal project, to include statements by Russia’s president Vladimir Putin about the need to speed up its completion and rumors about the project’s structure, revised metrics, and funding cuts due to the impact of the COVID pandemic on the Russian economy. (Please see issues 4, 5, 6, and 9.)*

On August 27, the Ministry of Economic Development announced that the federal project has been adopted and the text of the summary document of the federal project appeared in some online publications. The various elements of the federal project are coordinated by the Ministry of Economic Development (responsible for the AI ecosystem), Ministry of Communications (AI implementation, development of datasets), and Ministry of Industry and Trade (production of equipment). The Emphasis is reportedly on developing research centers in the “strong AI” area, trusted computer systems, computer vision, speech synthesis and recognition, and ethical aspects of AI employment. We would note that the reference to “strong AI” in the sense of being equivalent to human intelligence, the goals of companies like DeepMind and OpenAI, seems overly ambitious and its reference in the document may represent goals short of what is more widely understood as “strong AI.”

According to reports, it is anticipated that the budget cuts to the federal project (as reported in issue 9 of *AI in Russia*) are set to stand. According to the project summary, the funding will be at 22.5 billion rubles from the Digital Economy national program, and 6.9 billion from the state

program “development of electronic and radioelectronic industry,” budget sources on digital transformation, and other extra budgetary sources.

The federal project has a range of desired implementation metrics to be met by 2024, including training of specialists in AI, growth in conference publication, AI readiness in priority areas of the Russian economy, the ability of the federal executive bodies to conduct activities to adopt AI and prepare datasets, and state support for small and medium AI companies. Following a strategic session on AI held on August 22, the leaders for digital transformation at the federal executive agencies developed action plans to implement AI into their departments’ and industries’ activities and submit the plans to the Ministry of Digital Development, Communications, and Mass Media for consideration. According to Deputy Prime Minister Dmitry Chernyshenko, “AI activities will be included in national and federal projects and departmental digital transformation programs. Each agency will have to develop roadmaps for implementing AI in the activities of its departments and industries.” While all federal ministries and departments are expected to integrate AI technologies into their activities, the priority sectors are agriculture, healthcare, industry, and transport. With regard to the last metric, on September 4, Russia’s prime minister Mikhail Mishustin announced that the Russian government would provide 12 billion rubles in support of startup AI developers over the next four years. *Please stay tuned for more details on the federal project in future issues of AI in Russia.*

Sources: “Федеральный проект по искусственному интеллекту будет готов к концу августа,” TASS, August 19, 2020, <https://futuresussia.gov.ru/nacionalnye-proekty/federalnyj-proekt-po-iskusstvennomu-intellektu-budet-gotov-k-koncu-avgusta>; “Оксана Тарасенко: «Поддержка отечественных разработок, основанных на ИИ – приоритет федерального проекта»” Ministry of Economic Development, Aug. 28, 2020, https://economy.gov.ru/material/news/oksana_tarasenko_podderzhka_otchestvennyh_razrabotok_osnovannyh_na_ii_prioritet_federalnogo_proekta.html; “Digital transformation leaders will prepare plans for implementing AI in government agencies,” [Руководители цифровой трансформации подготовят планы по внедрению ИИ в ведомства], *Finanz.ru*, Aug. 22, 2020, <https://www.finanz.ru/novosti/aktsii/rukovoditeli-cifrovoy-transformacii-podgotovyat-plany-po-vnedreniyu-ii-v-vedomstva-1029525467>; “Небольшим IT-компаниям в сфере ИИ выделят 12 млрд руб. за 4 года,” *Interfax*, Sept. 1, 2020, <https://www.interfax.ru/business/724085>; text of the AI Federal Project Summary from https://www.tadviser.ru/images/5/5b/2_5373326957167511384.pdf.

2. Government plans to improve public confidence in AI

The Russian government is working on a plan to increase its citizens’ confidence in AI technologies through a number of methods. The project mandates the government to develop and approve an act in 2021 that would grant subsidies for activities that increase confidence in AI, including the creation of a popularization campaign to highlight the use of AI in both digital channels (social networking sites, online media) and traditional channels (radio,

offline). Additional means include the formation of an AI trust index, which would measure annually the percentage of respondents who express a willingness to use AI technologies in everyday life, and plans for lectures on AI topics with at least 170 AI lectures proposed through 2024. Part of the popularization process would also include setting up an online portal on AI, with development scheduled for 2021.

Source: “Власти планируют повышать доверие граждан к ИИ через СМИ и соцсети,” TASS, Aug. 27, 2020, <https://futureussia.gov.ru/nacionalnye-proekty/vlasti-planiruyut-povysat-doverie-grazdan-k-ii-cerez-smi-i-socseti>.

3. AI in medicine to balance innovation and privacy

A draft companion law to the federal law on “regulatory sandboxes,” formulated by the nonprofit organization (ANO) Digital Economy, will allow for the collection and analysis of patient data and the subsequent use of AI to recognize text and images and make diagnoses. Within the next three years, the law provides for leading medical universities and startups to create and test relevant new technologies, though experts warn about the danger of hacker attacks, which could lead to misdiagnosis and the leakage of patients’ personal data.

On August 14, the working group on the normative regulation of the digital environment supported the draft law, and in the near future the Ministry of Economic Development will send the companion law to the government for consideration. If approved by the cabinet, the State Duma will then need to consider and approve the law.

According to the draft law, AI will be utilized to analyze medical images; assess the risks and likelihood of disease; understand handwritten text, including prescriptions and other physician documents; and remotely assess a patient’s condition. The explanatory note for the law states that medical devices using AI need to use a large quantity of patient data, but current legislation does not provide an effective method of processing such data since there is no ability to obtain so-called “seamless consent,” meaning that the subject of the personal data need give consent only once.

Some medical experts expressed approval of the law. According to Evgeny Kadushin, co-founder of the Algom Company, which is a member of the group “Association of Developers and Users of AI in Medicine,” the Russian government has not yet found proper formats, registration regimes, or ways to exploit expert systems that help doctors, so it is necessary to test products using the experimental legal regime. Mikhail Belyandinov, the co-founder and CEO of BestDoctor, said that the use of AI helps reduce the number of doctor errors and the use of such technologies makes it possible to conduct a selective or total review of all medical records; screen for MRI, CT, or x-ray images; and help medical officials make decisions.

However, not everyone involved in the medical field had a positive outlook on the developments. Denis Yudchits, CEO of Mobile Medical Technologies, expressed concern that the use of AI to make diagnoses would lead to the loss of doctors' skills, akin to how pilots lost skills after the advent of autopilot. While autopilot technology has ultimately made flying safer, in the event of a technical failure pilots can no longer cope with many situations that would not have posed a problem for pilots in the past. Dmitry Aleksenko, the sales director of TechLab, emphasized the need to protect personal data when employing AI in the medical field and worried that, if hackers leak patient data, fear of additional cases could cause a long delay in the introduction of AI technologies.

Experts also offered predictions for the future of these technologies and tempered their expectations for its introduction. Belyandinov said that the medical community tends to be quite conservative, so there will not likely be a demand for AI technologies immediately upon their availability. Artem Kapninsky, the commercial director of Celsus, a developer of solutions for analyzing medical images using AI, said that doctors will not be replaced by AI for at least 50 years. Aleksenko echoed this notion, stating that technological development is a long process, so, for the foreseeable future, AI will serve as simply a doctor's assistant.

Source: "Искусственный интеллект поможет врачам с точным диагнозом, но утечки информации не исключены," *Izvestiya*, Aug. 25, 2020, <https://iz.ru/1052067/anna-ustinova-anastasiia-gavriliuk/mashinnoe-mnenie-programme-doveriat-sbor-dannykh-o-rossiiskikh-patcientakh>.

4. Sberbank officials discuss AI efforts

The Russian national savings bank company Sberbank has increasingly come to focus on digital technologies, having organized an artificial intelligence laboratory within the organization. As discussed in past issues of *AI in Russia*, Sberbank is one of Russia's top companies working on consumer AI products and was the primary author of the national AI strategy that was unveiled in October 2019. It is a member of several other national initiatives to develop markets in ML and big data.

In an extensive interview, Alexander Vediakhin, the coordinator of the laboratory, discussed some of its key focus areas, as well as the ethics of artificial intelligence and its likely future trajectory. Because of the Covid-19 pandemic, the laboratory has begun to pay increasing attention to the role of AI in medicine. It has leveraged its long-standing expertise in computer vision to assist in medical diagnosis, particularly in helping doctors review CT scans for potential pneumonias and other signs of coronavirus infection. After a week of training, the algorithm is now at a level where it can perform as well as a good radiologist with a decade of experience. It can therefore be directed to provincial areas that have adequate scanning equipment but lack a sufficient number of specialists. The model is designed not to replace doctors but to assist them in their decision-making. The laboratory is also working in other

medical fields that require imaging, such as mammography and EKGs. It has also developed an online Covid symptom-checker for public use and an electronic medical assistant that can provide a menu of potential diagnoses to the doctor. Many of these innovations are currently awaiting regulatory approval. *Please see past issues of AI in Russia on the employment of AI technologies in the pandemic response.*

In discussing the ethics of AI, Vediakhin highlighted a distinction between critical and non-critical fields, arguing that while the former should be left under human control, the latter can be safely handed over to AI systems. Examples of critical systems include driving a car and making final healthcare decisions. In these areas, AI systems can provide assistance rather than make the decisions. Eventually, once the systems have had enough training, they could be allowed to make critical decisions, but only on the basis of rules provided by humans. This is why the development of driverless cars has been relatively slow. The development of AI cannot be stopped, but it is vital to create proper parameters for this development. The key is to put the rights, interests, safety, and well-being of humans at the center of all conceptions of AI development. The possibility of developing a fully sentient AI, “like in Terminator or the Matrix” is unclear and even if it were possible would be a very long way away, he noted.

The current focus is on developing transfer learning, where an AI could apply experience from dealing with one problem to solve other problems. For example, while AI systems can handle voice recognition and visual recognition, they are not currently able to unify this information into a single knowledge base. Experts believe that such an advance is still some time away. One survey of experts showed a 50 percent likelihood that AI systems will be better than humans in most spheres in 45 years, and a 100 percent likelihood in 125 years. But in certain fields, such as translation, writing school essays, or driving trucks, AI will be superior to humans in the next decade. Sberbank is actively involved in transfer learning, improving the ability of neural nets to learn the Russian language, for example. Its laboratory is working closely with a laboratory on neuroscience and human behavior.

According to reports, In the banking sphere, 100 percent of credit decisions at Sberbank are now made with AI assistance. This has greatly increased the speed of decision-making, with decisions now being made in seven minutes. As a result, the bank has given out 274 billion rubles in loans with AI assistance.

Sources: Irina Li, “Первый зампред Сбербанка: искусственный интеллект — это про счастье,” TASS, Aug. 27, 2020, <https://futerussia.gov.ru/nacionalnye-proekty/pervyj-zampred-sberbanka-iskusstvennyj-intellekt-eto-pro-scaste>; “Sberbank Corporate University held a session on AI,” Aug. 22, 2020, <https://pledgetimes.com/sberbank-corporate-university-held-a-session-on-ai/>; “ИИ в Сбербанке выдал бизнес-клиентам кредиты на общую сумму 274 млрд рублей,” TASS, Aug. 27, 2020, <https://futerussia.gov.ru/nacionalnye-proekty/ii-v-sberbanke-vydal-biznes-klientam-kredity-na-obsuu-summu-274-mlrd-rublej>.

Military and Security Developments

5. Neural networks considered for UAV-enabled pipeline maintenance

The Zala Aero Group (<https://zala-aero.com/en/>), a subsidiary of the Kalashnikov company, is using a neural network-based software system to analyze images taken by UAVs of Russian pipelines. The company reports that the system can analyze up to 5,000 aerial photographs in a short time (time not specified), increasing the efficiency of this type of UAV mission by 30 percent. The system analyzes the geometric characteristics of the pipelines to determine whether there is some sort of irregular shape that could possibly lead to disruption. Zala Aero Group specializes in UAV production focused in part on building systems capable of operating in remote environments, such as Russia's far north and the Arctic.



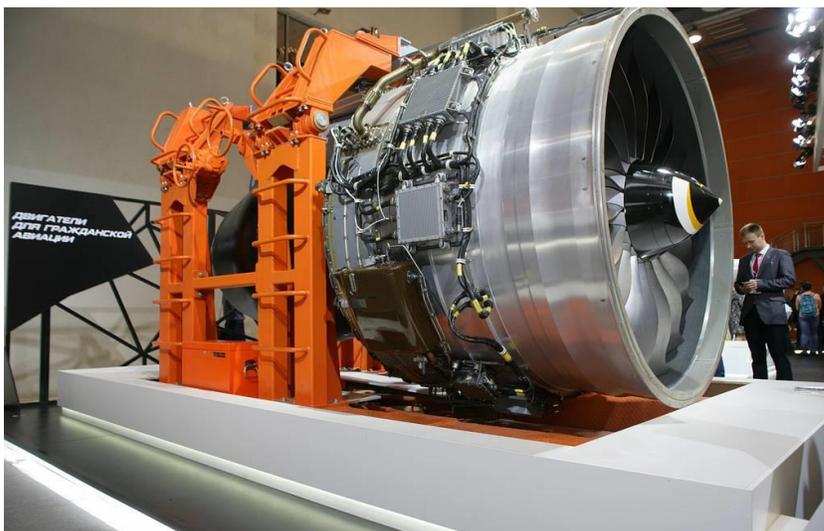
Source: "Starting from July 2020, ZALA AERO GROUP will begin regular air monitoring of infrastructure facilities of LUKOIL-Komi LLC," Sept. 2020, <https://zala-aero.com/en/news/zala-uas-survey-the-arctic-and-antarctic-regions//>

6. AI-enabled design of aircraft turbines

The United Engine Corporation (UEC - <https://www.uecrus.com/rus/>), a subsidiary of Rostec Corporation, is utilizing AI in both the design and use of its manufactured turbine engines. Most recently, the company announced that its PD-14 turbine, used in the Irkut MC-21 passenger jetliner, will incorporate AI-enabled software to analyze the performance of the turbine in

flight. Valery Teplov, UEC's chief production officer, stated that four to six hours of flight generates approximately two terabytes of information and that AI enables UEC to analyze these data.

Earlier in the year, UEC announced that it was using a platform developed by Russian AI company Zifra (www.zifra.com) in the development of the engine for its Yak-130 combat jet training aircraft and light fighter. The Zifra Internet of Things Platform (ZIIoT) learns from a database of previous testing parameters and information to build a mathematical model of the tests. The company uploads new components to the model, creating a "digital twin" that they can subsequently test under varying conditions.



Source: "New PD-14 plane engine to be equipped with artificial intelligence elements," Sept. 2020, <https://tass.com/economy/1198401>; "Russian UEC to Deploy AI Module in Yak-130 Engine Production," June 2020, <https://www.zifra.com/news/media/russian-uec-to-deploy-ai-module-in-yak-130-engine-production/>.

7. AI in defense against hostile drones

In an interview with *Krasnaya Zvezda*, the head of Russia's Military Academy of Aerospace Defense stated that the academy is developing a system to predict the most likely path that adversary drones will follow to a target over specific terrain. By determining the most likely routes, the Russian military can mitigate their effectiveness by placing air defense systems along those routes. The impetus behind this system is the Russian military's experience in Syria. On several occasions, Russian military bases in Syria have come under attack by opposition forces.

Source: "В России разработали систему прогнозирования маршрутов движения дронов противника," TASS, Aug. 2020, <https://tass.ru/armiya-i-opk/9232665>.

Corporate and Market Developments

8. NIST recognizes Skolkovo company for AI developments

According to independent testing conducted by the US National Institute of Standards and Technology (NIST), the Skolkovo Fund company VisionLabs won praise in several categories in the fields of computer vision and machine learning. According to Russian reporting, in an assessment that included over 140 companies from around the world, VisionLabs' solution was the best in four categories: (1) Visa – studio photo for documents; (2) Border – pictures taken at passport control in airports; (3) Visaborder – comparison of images from the two previous categories; and (4) Mugshot – “police photo” or a portrait for any card index. In previous NIST tests, VisionLabs took first place in the Mugshot category as well as being in the top three in the Visa category. The company's algorithms were between two and two-and-a-half times faster than all the main competitors. The tests showed that VisionLabs' solution was one-and-a-half times faster than other top vendors, while requiring four times less computer memory. *Please see issue 6 of AI in Russia for a discussion of the Skolkovo ecosystem of companies.*

Sources: Vitaly Shustikov, “VisionLabs: First Place, Third Time,” Skolkovo press release, Aug. 26, 2020, <https://old.sk.ru/news/b/articles/archive/2020/08/26/visionlabs-first-place-third-time.aspx>; “Технология резидента «Сколково» по распознаванию лиц признана лучшей в мире,” *AI-News*, Aug. 25, 2020, https://ai-news.ru/2020/08/tehnologiya_rezidenta_skolkovo_po_raspoznvaniu_lic_priznana.html; “Ongoing Face Recognition Vendor Test (FRVT),” NIST, Sept. 8, 2020, https://pages.nist.gov/frvt/reports/11/frvt_11_report.pdf.

9. Skolkovo company seeks to improve ML

According to reports, the “Nanosemantika” AI development group has launched the “NLab Marker” industrial platform and service, which provides for easier manual manipulation and training of neural net and machine learning algorithms. The platform allows for manual processing for specialists through tools that can highlight objects in videos, transcribe audio recordings, and mark up images. This higher-quality and more refined training data captured through these markup tools can then be used for machine learning purposes while limiting dataset errors. The CEO of “Nanosemantika,” Stanislav Ashmanov, said that the product was created for his own company's internal usage, but that they are releasing it to the wider public market because “we see the demand for industrial data markup platforms that allow companies with a strong Data Science department to flexibly implement any markup tasks and

independently administer this process.” “Nanosemantika” is a member of the Skolkovo Information Technology Cluster. *Please see issue 6 of AI in Russia for a discussion of the Skolkovo ecosystem of companies.*

Source: “Платформа резидента «Сколково» поможет собрать данные для обучения ИИ” [Skolkovo resident platform will help collect data for AI training], CNews, Sept. 8, 2020, https://www.cnews.ru/news/line/2020-09-08_platforma_rezidenta_skolkovo.

10. Skoltech scientists publish joint article with French and Japanese researchers

Researchers based at Russian, French, and Japanese academic institutes published an article in the journal *IEEE Systems, Man, and Cybernetics*, showing that deep neural net learning may be the most promising algorithmic structures for better assessing mental stress through brain-computer interfaces (BCI). The study suggested that Riemannian geometry-based classifiers and convolutional neural networks are appropriate means of assessing and estimating cognitive and affective mental states.

Brain-computer interfaces connect the human brain with computing devices that can control artificial limbs or transportation devices such as wheelchairs. Non-invasive electroencephalography (EEG) is used to monitor the electrical activity of the brain that can theoretically then be converted into useful commands for these devices. Raw EEG data have significant measurement problems, however, making accurate readings of these continuous signals very difficult.

The study authors suggest that further experimental research involving more advanced AI systems and deep neural nets will likely lead to new breakthroughs in measuring emotional states through BCI systems. The study authors include Andrzej Cichocki, head of the Tensor Networks and Deep Learning for Applications group in the Biomedical Data Mining Laboratory at Skoltech in Russia, and Aurelien Appriou and Fabien Lotte, both of the Bordeaux-Sud-Ouest INRIA Research Center.

Source: “Машинное обучение помогло оценить умственную нагрузку,” *AI-News*, Aug. 24, 2020, https://ai-news.ru/2020/08/mashinnoe_obuchenie_pomoglo_ocenit_umstvennuu_nagruzku.html; Aurelien Appriou, Andrzej Cichocki, and Fabien Lotte, “Modern Machine-Learning Algorithms: For Classifying Cognitive and Affective States From Electroencephalography Signals,” *IEEE Systems, Man, and Cybernetics Magazine* 6, no. 3 (July 2020): 29-38, <https://ieeexplore.ieee.org/document/9141493>.

11. China and Russia cooperate on AI in transportation

Fitsco, a Chinese rail transit signaling system provider, and Cognitive Pilot, a joint venture of Russia's Sberbank and Cognitive Technologies Group, announced a strategic alliance for sharing solutions for smart city planning and other AI-enabled transportation network technologies. This expands and deepens a partnership that had previously existed since the late spring, when the two began cooperating on a new advanced driver assistance system for Chinese light rail. According to reports, the new alliance will cooperate in research and development focused on both upgrading existing transport infrastructure and using new digital technologies for public transport improvements. Autonomous driving, smart roads, and AI-based urban public transport are all elements of this broad band of research between the two ventures. China's massive expansion in urban transport networks is a key driver for this exchange, given plans for a full and integrated transport system with AI components to be established by 2035. The expansion and modernization of Russia's transport networks continues as well: the government-owned investment company VEB.RF plans to spend US\$ 60 billion on infrastructure by 2030.

The CEO of Cognitive Pilot, Olga Uskova, was quoted as saying, "This alliance will help both companies accelerate the development of the new smart reality, consisting of the combination of smart infrastructure technologies developed by Fitsco and smart transport technologies from Cognitive Pilot. It will also help achieve significant cost efficiencies in the development of new technologies for urban mobility and public transport automation."

Source: "Fitsco and Cognitive Pilot form strategic alliance to develop ITS in Asia and Russia," *Traffic Technology Today*, Sept. 11, 2020, <https://www.traffictechanologytoday.com/news/public-transit/fitsco-and-cognitive-pilot-form-strategic-alliance-to-develop-its-in-asia-and-russia.html>.

12. Russian AI market continues to grow

According to reports, the market for AI-based research and technology is growing quickly despite economic pressures from the ongoing global pandemic. The most recent update of the "AI Spending Guide" produced by the International Data Corporation research agency suggests that global spending on AI products will double within four years, reaching a market size of USD 110 billion. Previous issues of the guide had assessed the Russian AI market at USD 172 million, but with a growth rate of 30 percent annually. Official estimates of market size rely on contested definitions of software products that count as AI based, however. Recent estimates suggest that regardless of total market size, AI market growth in Russia will be around 7 percent and the market will reach over USD 200 million.

ABBYY Analytics, a major source of AI technology and development for large companies in Russia, noted that the number of new projects had doubled since the previous year, with a strong concentration of new developments in banking, especially, as well as wider industry and commercial retail. AI has been particularly used in developing means to use Natural Language Processing on unstructured documents and data used in procurement, accounting, HR management, and customer support. Although economic troubles have reduced some investment in the immediate term, pandemic conditions have provided new incentives to find ways to use AI systems to reduce and minimize human labor exposure. These can include using AI-based solutions to automate call centers for healthcare, online food ordering and processing, and, for the state, facial recognition, public surveillance, and automatic contact-tracing systems.

Interviews with AI researchers and heads of companies involved with AI products suggest that the Russian AI market is little different from the global market, although government interest in AI surveillance and urban transport solutions is higher in Russia and China than in Western countries. Viktor Konokotin, the head of the Machine Learning Group at Jet Infosystems, noted that because “all projects using machine learning and computer vision are of a long-term nature, the effects of quarantine did not suddenly become noticeable.” The Russian government remains keen to support the Russian AI marketplace and has directed all state ministries to develop roadmaps for integrating AI into their processes and modernization projects, as well as to ensure that seed money can be found to promote the growth of small, startup AI firms.

Sources: “В 2021 г. российский рынок ИИ вернется к двухзначным темпам роста,” [In 2021, the Russian AI market will return to double-digit growth rates], CRN, Sept. 2, 2020, <https://www.crn.ru/news/detail.php?ID=147880>; “Аналитика Abbyy: российские компании стали вдвое чаще использовать программных роботов с ИИ,” [Abbyy Analytics: Russian companies have become twice as likely to use software robots with AI], CNews, Aug. 18, 2020, https://www.cnews.ru/news/line/2020-08-19_analitika_abbyu_rossijskie; “Рынок Искусственного Интеллекта Растет В Условиях Пандемии,” [Artificial Intelligence Market Grows Amid Pandemic], Volbusiness.ru, growth, Aug. 13, 2020, <http://www.volbusiness.ru/news-page/13045>; Andrea Minonne, David Schubmehl, and Takashi Manabe, “Worldwide Artificial Intelligence Spending Guide,” International Data Corporation, 2020, https://www.idc.com/getdoc.jsp?containerId=IDC_P33198.

Education and Training Developments

As discussed in past issues of *AI in Russia*, the demand for AI professionals in Russia greatly outstrips the supply, and education of the future digital workforce is part of the government's national AI strategy.

13. New AI/ML courses aimed at school students of all levels

A new course focused on AI and machine learning is reportedly being implemented across Russian schools between 14 and 27 September as part of the “Digital Lesson” (which can also be translated as “Numbers Lesson”) initiative. The project is organized by the Ministry of Education, the Ministry of Digital Development, Communications and Mass Media of Russia, and the nonprofit organization (ANO) “Digital Economy.” The new course's partners include Sberbank and the Contribution to the Future Charitable Foundation. The online lesson will reportedly guide students through stages of a data science career, advancing from algorithm creation to product completion.

The “Digital Lesson” project was first implemented in 2018, and is presented in the form of online games targeted for three student age groups: those in elementary school, in middle school, and in high school. This year's coursework also includes lessons on social networks (November-December, partnered with @Mail.ru), cybersecurity (February 2021, partnered with Kaspersky Labs), unmanned vehicles (March 2021, partnered with Yandex), and digital production (April 2021, partnered with 1C Programmers' Club). At the end of each course, students receive a certificate. According to CNews, the program is implemented in all 85 districts of Russia and was recently made available in 100 countries with Russian-speaking students.

Sergei Kravtsov, minister of education of Russia, was quoted as saying, “Digital Lesson is a useful activity that can help to convey relevant information to schoolchildren even from the most remote regions of our country. Today, the knowledge of digital technologies and the principles of artificial intelligence is required by everyone, without exception.”

Sources: “Принципы работы искусственного интеллекта изучат школьники Карачаево-Черкесии на "Уроке цифры"” [Children will program drones at the "Digital lesson"], CNews, Sept. 8, 2020, https://www.cnews.ru/news/line/2020-09-08_na_uroke_tsifry_deti_budut;
“Принципы работы искусственного интеллекта изучат школьники Карачаево-Черкесии на "Уроке цифры"” [The principles of artificial intelligence will be studied by schoolchildren of Karachay-Cherkessia at the "Digital Lesson"], Interfax Russia, Sept. 11, 2020, <https://www.interfax-russia.ru/south-and-north-caucasus/news/principy-raboty-iskusstvennogo-intellekta-izuchat-shkolniki-karachaevo-cherkesii-na-uroke-cifry>;
“всероссийский образовательный проект в сфере цифровой экономики” [All-Russian educational project in the field of digital economy], УРОК ЦИФРЫ, urok@data-economy.ru.

14. Rosatom invests in education and training

State Atomic Energy Corporation Rosatom has been active in investing in education and training programs in the fields of artificial intelligence and data science. According to a September 3 press release on Rosatom’s website, Tsifrum (a Rosatom company) and the Far Eastern Federal University (FEFU) have decided to create a joint virtual reality / augmented reality (VR/AR) laboratory on Russky Island. Tsifrum is a private institution designed to help digitalize the nuclear industry. Research products will include modeling of the Primorsky Territory, digitization of the Northern Sea Route, and training of specialists in end-to-end digital technologies. FEFU has an existing NTI Center for Neurotechnologies, Virtual, and Augmented Reality Technologies, which was established in 2017.

According to a September 14 TASS article, Rosatom has also partnered with the Russian Quantum Center (RQC) to launch the first international school of quantum computing, located at the Sirius Education Center in Sochi. The first training program, which will run from September 14 to 21, will include presentations from top researchers from Moscow State University, MIPT, Oxford and Harvard Universities, and the Niels Bohr Institute, with 74 students, graduates, and postgraduate students in attendance. According to the article, RQC was the first in the world to launch a quantum blockchain (in 2018), and now, with the support of Rosatom, it is creating a quantum computer in Russia.

Additionally, Rosatom has been involved in the regional stages of the Digital Breakthrough competition. For example, according to a September 17 press release on Rosatom’s website, 142 teams of IT specialists took part in the regional competition in Nizhny Novgorod, where they were asked to create prototypes for a financial portal for Rosatom’s partners in the nuclear industry. In the Southern Federal District, participants were asked to develop a digital personal assistant to interface with Rosatom employees as they complete online training. *We have noted the Digital Breakthrough competitions in prior issues of AI in Russia.*

Sources: “Участники «Цифрового прорыва» создадут интеллектуальный сервис для цифрового обучения сотрудников «Росатома» [Participants of the Digital Breakthrough will create an intelligent service for digital training of Rosatom employees], CNews.Ru, Aug. 8, 2020, https://www.cnews.ru/news/line/2020-08-20_uchastniki_tsifrovogo_proryva; “Росатом и РКЦ запустили первую международную школу по квантовым вычислениям” [Rosatom and RQC launched the first international school on quantum computing] TASS, Sept. 14, 2020, <https://nauka.tass.ru/nauka/9447715>; “Росатом и ДВФУ создадут лабораторию виртуальной и дополненной реальности на о. Русский” [Rosatom and FEFU will create a virtual and augmented reality laboratory on about. Russian], Rosatom, Sept. 3, 2020, <https://rosatom.ru/journalist/news/rosatom-i-dvfu-sozdadut-laboratoriyu-virtualnoy-i-dopolnennoy-realnosti-na-o-russkiy-/>; “Росатом поддержал проведение второго регионального этапа Всероссийского конкурса «Цифровой прорыв»” [Rosatom supported the holding of the second regional stage of the All-Russian competition "Digital Breakthrough"] Rosatom, Sept. 17, 2020, <https://www.rosatom.ru/journalist/news/rosatom-podderzhal-provedenie-vtorogo-regionalnogo-etapa-vserossiyskogo-konkursa-tsifrovoy-proryv/>.

15. MIPT continues advanced coding program

According to an August 24 Regnum article, the Moscow Workshops Project held an advanced coding training program on September 5-12. During this time, hundreds of students from more than 10 countries were remotely immersed in AI coursework offered in both English and Russian. The workshop also featured a coding competition made up of five rounds, in which participants had only five hours to solve a number of problems. A day dedicated to building soft skills, such as resume writing and interviewing for internships, was also included in the program. The Moscow Workshops Project originated from the Moscow Institute of Physics and Technology (MIPT) and has hosted training camps for seven years, reaching more than 3,500 students from 60 countries.

Sources: “Discover the World Programming Workshop 2020,” Discover the World, <https://discover.it-edu.com/world/en/>; Naza Saleh Zahi, “Moscow Workshops проведет онлайн-сборы по алгоритмическому программированию” [Moscow Workshops will hold an online training camp on algorithmic programming], 360 TV Russia, Sept. 4, 2020, <https://360tv.ru/news/obschestvo/moscow-workshops-provedet-onlajn-sbory-po-algoritmicheskomu-programmirovaniyu/>; “Moscow Workshops проведет онлайн-сборы по алгоритмическому программированию” [Phystech project launches international gathering on artificial intelligence], Regnum, Aug. 24, 2020, <https://regnum.ru/news/innovatio/3044269.html>.

Spotlight: Marker Unmanned Ground Vehicle



Soldier demonstrating target designation capability of the Marker (<https://fpi.gov.ru/projects/fiziko-tehnicheskije-issledovaniya/marker/>).

The Advanced Research Fund (FPI) and NP Android Technology (developer of the Fedor robot) are jointly developing the unmanned ground vehicle (UGV) Marker for the Russian Ministry of Defense, describing it as a “soldier’s assistant on the battlefield.” FPI is using the platform to test a variety of UGV technologies, including machine vision, communications, autonomous movement and navigation, and group swarming technologies. The Marker’s modular technologies enable researchers to test a variety of capabilities for both the Marker and other UGVs. The company is also testing voice recognition software to enable eventual control by human voice. FPI currently has plans for five variants of the Marker: two tracked models; two wheeled models; and a fifth model, which will incorporate previous research results.



Companies involved in Marker's design. In the center: ARF logo. Clockwise from the top: Southern Federal University, GosNIIS, Sozvedie, Plaz, Kvant, and Android Technology logos. Source: CNA.

Oleg Martyanov, the director of the National Center for the Development of Technologies and Robotic Basic Elements, FPI's lead research center on the Marker, recently commented on the Marker's potential swarm capability. He described a scenario in which five Marker platforms pursue a particular task autonomously, sharing information between them. He also mentioned the use of neural networks in describing the technologies involved in the Marker platform. The ultimate goal, he said, was to "teach" the Marker to perform tasks independently at great distances from the operator.

As a fighting vehicle, Marker can employ a wide array of weapons, including a large-caliber machine gun (7.62mm), anti-tank guided missiles, and grenade launchers. As demonstrated in a video (link below), a soldier can designate targets to Marker from the soldier's weapon. The Marker will also be able to launch its own organic drones (quadcopters) for both reconnaissance and as loitering ammunition capable of engaging targets. A video advertising the Marker's military capability can be found at: <https://fpi.gov.ru/projects/fiziko-tekhnicheskie-issledovaniya/marker/>.



Marker-associated quadcopters (<https://fpi.gov.ru/projects/fiziko-tekhnicheskie-issledovaniya/marker/>).

Source: Олег Мартьянов: в будущем будет не армия терминаторов, а армия умных "Маркеров" [There won't be an army of terminators. There will be an army of Markers], <https://tass.ru/interviews/8831445> June 29, 2020; FPI at <https://fpi.gov.ru/projects/fiziko-tekhnicheskie-issledovaniya/marker/>.

In Brief: Concept for Developing AI and Robotics Regulations Until 2024

On August 19, 2020, Russian prime minister Mikhail Mishustin signed an order approving the “Concept for the development of the regulation of relations in the field of AI technologies and robotics until 2024.” The government developed this concept in accordance with the National Strategy for the Development of AI for the Period Until 2030, approved by presidential decree on October 10, 2019. The concept consists of five parts:

1. General provisions: goals of the concept; goals and objectives of regulation; principles of regulation and problems; and the directions of regulation;
2. Industry-wide issues: data circulation; legal responsibility when using AI and robotics systems; the export of AI and robotic systems; insurance institutions; security (including information security); terms and definitions in the fields of AI and robotics; and international documents in the fields of AI and robotics;
3. Sectoral areas for improving regulation of the use of AI and robotic technologies, like medicine, industry, transport, state and municipal administration, urban planning, space activities, and financial legislation;
4. Regulatory measures to financially stimulate the development of the industry, including mechanisms for public-private partnership;
5. Mechanisms for implementing the concept, which will contribute to the creation of a comfortable regulatory environment for the development of AI and robotics.

The concept defines the principles for regulation of relations that develop in connection with the development and application of AI and robotic systems as follows:

- Stimulation of the development of AI and robotic technologies by regulatory means as the main vector for the development of regulation in the designated time period;
- Regulatory impact, based on a risk-oriented, interdisciplinary approach and providing for the adoption of restrictive norms if the use of AI and robotic technologies carries an objectively high risk of causing harm to participants in general relationships, human rights, and the interests of society and the state;
- Expansion of the use of regulation and self-regulation tools, and the formation of codes of ethical rules for the development, implementation, and application of AI and robotic technologies;
- A human-centric approach, which provides that the ultimate goal of the development of AI and robotic technologies, guided by regulatory influence, is to ensure the

protection of human rights and freedoms guaranteed by Russian and international legislation and to improve the well-being and quality of life of citizens;

- Assessment of the impact of AI and robotic technologies and systems on all sphere of human life, society, and the state, based on scientifically verified research with the involvement of a wide range of scientists;
- Ensuring a balance of interests of developers, consumers, and other persons in the AI and robotics fields, and defining the boundaries of their responsibility for possible negative consequences of the use of AI and robotic technologies;
- Technological sovereignty, which provides for the necessary level of independence for the Russian Federation in the fields of AI and robotic technologies, taking into account the state policy in the field of IT development and import substitution;
- Support for competition, which provides for equal opportunities for all, including small- and medium-sized businesses, to apply experimental legal regimes and government support measures, and to access data from state and municipal information systems necessary for developing AI and robotic systems;
- Assessment during the development of regulatory legal acts and other documents in the fields of AI and robotic technologies of socio-economic consequences and risks due to constant development of technologies, taking into account both the positive and negative international experiences of regulation;
- The obligation when using AI and robotic technologies to reasonably assess the risks of causing harm to human life and health, the implementation of threats to the country's defense and state security, and the adoption of measures aimed at minimizing such risks and threats.

The concept also states that technological development should be based on basic ethical standards and include the following:

- Priority for human well-being and safety, and protection of fundamental rights and freedoms;
- Prohibitions on causing harm to a person taken on the initiative of AI or a robotic technology system;
- Controllability of a person (to the extent that this is possible, taking into account the require degree of autonomy of AI and robotic technology systems and other circumstances);
- Compliance with the law, including safety requirements (i.e., the use of AI systems should not, with the knowledge of the developer, lead to violation of legal norms);
- Prevention of unlawful manipulation of human behavior.

Source: “More on the government’s concept for regulating AI relationships,” [Подробнее о правительственной концепции регулирования отношений, возникающих в связи с ИИ], D-Russia.com, Aug. 27, 2020, <https://d-russia.ru/podrobnee-o-pravitelstvennoj-koncepcii-regulirovaniya-otnoshenij-voznikajushhih-v-svjazi-s-ii.html>.

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