

vector graphics, raster graphics, fractal graphics, three-dimensional graphics (3D). Computer animation brings static virtual models to life by giving them movement and action.

Practice makes perfect. When you are first learning, it takes some time to get your animations as smooth and precise as you would like. Repetition will eventually make the tedious aspects quick and natural, which will then let you focus on the more in-depth nuances and personality of your animations. Research is the key and constant advanced training in exploring the field of Artificial Intelligence and all relevant issues as well.

UDC 372.881.1

THE CITY OF THE FUTURE: AI (ARTIFICIAL INTELLIGENCE) POTENTIAL

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***Abstract.** The article considers possible concepts for the development of the city of the future and ideas for solving the problems of the modern city. The development of the proposed concepts is important both for improving the quality of life of the urban population and for promoting new scientific technologies around the world.*

Keywords: information technologies, smart city, global transport problem, variety of houses, water recirculation system, single-seat aircraft, surveillance cameras, eco-friendly environment, sensors, artificial intelligence.

Information technologies are used in a variety of fields, including the urban economy. The development of such services has led to the formation of the concept of a 'smart city', in which processes critical for a locality are implemented on the basis of modern IT infrastructure. As a rule, this assumes the presence of extensive backbone networks to which various objects of the city are connected. In addition, a data center and a single control center for urban systems are needed – this is the brain of a 'smart city', where information flows from various sensors – nerve cells of a digital metropolis.

Currently, many concepts of a 'smart city' have been invented in connection with the need to solve the problems of a modern city. To solve the global transport problem, the idea of using only underground parking to preserve urban space for more important objects is proposed – modern automated underground parking. It is also often suggested the idea of building a variety of houses that do not have the same details, and which are painted in eye-pleasing colours – different looking houses.

Another concept is the use of a water recirculation system in residential buildings, which is allowed for economical use of water. In winter, such a system will provide the apartment with heat, and in summer, such a system will allow using water for condensation – regulating the temperature in the apartment – water recirculation system.

In addition to the water recycling system, it is proposed to place waste shredders in the apartments, with the help of which the waste will be sorted and, in the future, will be burned to generate energy.

Currently, single-seat aircraft on autonomous control are already being tested, which would solve the global transport problem and would help solve the problems of a modern city.

To reduce the number of crimes in the city of the future, the concept of the ubiquitous placement of autonomous surveillance cameras that will track suspicious actions of citizens, identify them and notify the police of violations of the law on their part is being considered – autonomous surveillance cameras.

In the city of the future, the problem of carbon emissions will be solved by building houses from eco-friendly materials, and their costs will be automatically calculated by a special system.

As technology develops, people need officials less and less to form an objective picture of what is happening in the city. In the future, compact, multifunctional and cheap electronic sensors will appear that assess the quality of water, air, measure the temperature of the environment, the degree of ultraviolet radiation and other conditions. Citizens themselves will be able to compile reports on the indicators of the urban environment that concern them, without waiting for local authorities to do so, and send them using applications in mobile phones to centralized information

processing servers – cheap electronic sensors.

In the future, we will have close interaction with the urban environment through artificial intelligence. The development of AI will transfer a lot of routine operations to machines and will allow you to robotize most processes. The field for the application of these technologies will expand.

Artificial intelligence (AI), like many revolutionary technologies in human history, will have a profound impact on societies. From this viewpoint, we analyze the combined effects of AI to raise important questions about the future form and function of cities.

Combining knowledge from computer science, urban planning, and economics while reflecting on academic and business perspectives, we propose that the future of cities is far from being a determined one and cities may get into trouble if the deployment of AI is not carefully controlled or it can spin out of control. This viewpoint presents a fundamentally different argument, because it expresses a real concern over the future of cities in contrast to a number of publications whose authors exclusively assume city populations will be attracted to cities in search of work.

These processes will lead to the expansion of the territory. The city of the future will be inevitably characterized by the expansion of the territory due to the population growth.

Since the climate in many countries does not allow the efficient use of solar panels, the main alternative source of energy will be wind power. The city will also be supplied with energy by the so called ecoparks – through the processing of solid waste and wastewater.

It is highly likely that many of the smart city concepts being developed can easily become a reality in the coming decades, which will be facilitated by the development of technologies and the process of urbanization characteristic of our time. Other concepts may not be able to be implemented, but they can help in the development of existing ones.

Much academic research focuses on improving the form of cities, so they can fulfill their presumed future function: adapt to the urban migration pressures of people in search of work. Cities already implement information technology (IT) infrastructure to enable AI applications for increased work efficiencies. Cities are spending a lot of money on smart infrastructure to prepare for the AI implementation, integrating AI into their urban service delivery options, waste management, energy utilization, crime prevention, environmental planning, among others.

One example is planning for connected autonomous vehicles (CAVs). Self-driving cars promise to improve efficiency and safety in cities, to reduce congestion and commute times, and to free up work time during commutes by 2040. With apps like Uber and Lyft, and ride-sharing services like Zipcar, we prepare for the advent of CAVs that function in cities. Cities already are experiencing decreases in their parking revenue and are selling off space in downtown to real estate developers in search of valuable workspace. The pressure on work and vice versa living space to avoid the time-consuming commute is reflected in ever-increasing land prices.

In short, all trends lead to downtowns becoming more work-focused, cities are being equipped with AI infrastructure and redesigned to accommodate additional people, but we wonder what work remains for humans to do in cities? Isn't the vigorous argument for CAVs to increase commuting and working efficiency incomplete without accounting for job replacement effect? What is the function of cities if AI does what it is supposed to do?

The future of cities will depend on how the different levers and resulting push and pull dynamics interact. Neither one of the possible new ways of life demand cities, instead they require human interactions and access to nature. The moral imperative makes the advent of AI seem inevitable (if we are capable of providing much safer, more efficient, and reliable systems – we must). The competitive advantage argument (others will develop it anyway) is amplifying this development even though the potential risks of large-scale effects due to connectivity issues are massive. For example, one hacker can bring mobility to a standstill, or deployment mistakes hinder widespread adoption. Finally, the legal systems, regulatory bodies, and insurance companies may need several decades to catch up to technological development.

If governments introduce AI, we must create the foundations for ethical cities. The redistribution of resources through social contracts such as conditional base income that stabilizes our socio-economic systems may be one among many others. Cities will develop differently across the globe, given their local industries. Companies will replace tasks for which they spend less than human labour. If technology is too expensive or human labour is too cheap in a given market, the status-quo will prevail. Thus, we will see a higher level of automation in advanced economy cities, while in much of the emerging markets cheap labour will initially prevent AI mass introduction in cities.

How will cities look like in the future? To the best of our knowledge, academic and business

publications have argued for continued urban growth and created plans for the form and function serving additional populations. In contrast, we provide a counterviewpoint, arguing that artificial intelligence may turn our metropolises into ghost cities and the future of cities is far from being a determined one.

Whether or not cities turn into ghost cities depends on the rate of AI adoption, policy regulations, and other unpredictable events, such as COVID-19. Thus, research is needed that combines different AI developments such as autonomous vehicles, integrates different push-and-pull dynamics explained above. We must analyze at what level of AI penetration the viability of cities is endangered. We should further lay out other mobility futures that account for AI's disruptive impacts. Research should also exemplify what could happen and analyze what is already happening to certain industries that begun the AI transformation, e.g., pharmacy.

In the best possible employment of AI, the A no longer stands for 'Artificial'. Instead, just plain intelligence is offered, to be employed in real-world problems like increasing the quality of city air, or decreasing noise pollution. People in this way relearn what intelligence can be.

Ethical AI algorithms are available for free or at least off-the-shelf, and possibly as black boxes. Any black box should either be possible to open up for inspection (unlike a car engine or an Apple computer today) or be interpretable as is, without much effort. Without this, there will not be enough acceptance. There is also a flipside to this thinking. As we start placing demands on the transparency of AI decision making, we also need to start thinking seriously about whether or not the same principles should be applied to human decision making.

Much human decision making today can be considered, or can at least be experienced as, equivalent to black-box algorithms. Humans cannot explain their reasoning behind driving, speech, mistakes during product assembly or development, painting, employment decisions, disaster response, city planning, etc. Not to mention systemic effects such as climate change, overfishing, migration, contagious disease outbreaks, or employee burn-out, which are all unintended consequences of many individual human decisions.

Who would ever want a human to make a decision if the machine can, at least on the average, make a better decision and be more transparent with its decision process? There are currently bias problems in AI that require transparency, accountability, credibility, and trust. People need to believe AI can provide or constitute the best possible system, and be prepared to transfer rights to the system. If they do not believe this, it is probably not true. People need to trust both data and algorithm, and possibly authorities too.

Open data provided by cities fuel initiatives for further sharing that data, in top-down (government control) as well as bottom-up (citizen control) fashion. Open data should also be compared to general shareable data, in a 'lose control vs. loose control' perspective. Following standards of today might be less important in a city where much more data and information can become easily available to all citizens.

In cities, all incident reporting is automated or just a click of a button away, thanks to the massive amounts of data available, analyzed with the help of AI techniques. The AI becomes the ear, as it helps cross both digital and physical streets. Any city needs start-ups to create a playground for the new ecosystem.

Bias problems require transparency, accountability, credibility, trust. People should believe it is the best possible system, and be prepared to transfer rights to the system. People need to trust both data and algorithm, but is trust in authority required? Liability and fairness issues create expectations of value. Meta-intelligence, learning from the meta-level, is the solution.

УДК 372.881.111.1

ЛИНГВОМЕТОДИЧЕСКОЕ ОБОСНОВАНИЕ ОНЛАЙН-УРОКА АНГЛИЙСКОГО ЯЗЫКА В СРЕДНЕЙ ОБЩЕОБРАЗОВАТЕЛЬНОЙ ШКОЛЕ

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г. Москва, Российская Федерация*

Реферат. В статье рассмотрены ключевые особенности проведения урока английского языка в средней общеобразовательной школе в онлайн-формате с точки