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THE ROLE AND PROSPECTS FOR THE USE OF ARTIFICIAL INTELLIGENCE IN THE DEVELOPMENT OF THE POSTAL AND PARCEL INDUSTRY IN THE REGION

Palvanbayev Umidbek Uktam ugli
orcid:0000-0001-6139-5753
Independent researcher at Urgench State University, tel:+998999620813
e-mail: palvanbayevumidbek@gmail.com

Annotation:
This article examines the impact of artificial intelligence (AI) on the postal and parcel industry in the region, analyzes the current challenges in solving the problems of developing new directions in this area, and develops proposals for the future use of artificial intelligence in postal services.

Keywords: postal, artificial intelligence, parcel, automation, robotics, logistics, warehousing, transportation**.**

Mintaqada sun’iy intellektning pochta va posilka sanoatini rivojlantirishda tutgan o‘rni va foydalanish istiqbollari

Palvanbayev Umidbek O‘ktam o‘g‘li, orcid:0000-0001-6139-5753
Urganch Davlat Universiteti mustaqil izlanuvchisi, tel:+998999620813
e-mail: palvanbayevumidbek@gmail.com

Annotatsiya: Ushbu maqolada mintaqada pochta va posilka sanoatiga sun’iy intellekt (AI)ning ta’siri o‘rganilgan va bu sohada yangi yo‘nalishlarni ishlab chiqish muammolarini hal qilishning dolzarb vazifalari tahlil qilingan bo‘lib, istiqbolda pochta xizmatlarida sun’iy intellektdan foydalanish bo‘yicha takliflar ishlab chiqilgan.
Kalit so‘zlar: pochta, sun’iy intellekt, posilka, avtomatlashtirish, robototexnika, logistika, ombor, transport.

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Роль и перспективы использования искусственного интеллекта в развитии почтово-посылочной отрасли региона

Палванбаев Умидбек Уктам угли, orcid:0000-0001-6139-5753
Независимый исследователь Ургенчского государственного университета, телефон +998999620813,
e-mail: palvanbayevumidbek@gmail.com

Аннотация: В статье рассматривается влияние искусственного интеллекта (ИИ) на почтово-посылочную отрасль региона, анализируются текущие проблемы решения задач развития новых направлений в этой сфере, а также разрабатываются предложения по перспективному использованию искусственного интеллекта в почтовых услугах.

Ключевые слова: почта, искусственный интеллект, посылка, автоматизация, робототехника, логистика, складирование, транспортировка.

INTRODUCTION.

Artificial intelligence is not a new concept to us today. The past decade has seen rapid growth in AI with rapid investment. Artificial intelligence (AI) has become ubiquitous around the world, and the fact that investment in AI is expected to increase by 62% to $110 billion[1] by 2024 is a testament to how quickly this field is becoming a part of our lives. Artificial intelligence can be applied in many areas, including: transportation, manufacturing, healthcare, education, media, and customer service. In the logistics and supply chain sector, companies are using artificial intelligence to improve and automate the process of creating supply chains. Artificial intelligence (AI) can automate supply chain processes such as demand forecasting, predictive maintenance, and production planning. Global e-commerce platforms are growing at an unprecedented rate as more and more people love to

[1] ttps://techcrunch.com/2025/02/11/ai-investments-surged-62-to-110-billion-in-2024-while-startup-funding-overall-declined-12-says-dealroom/#:~:text=AI-,AI%20investments%20surged%2062%25%20to%20%24110B%20in%202024,startup%20funding%20overall%20declined%2012%25&text=Venture%20capitalists%20are%20gobbling%20up,the%20wider%20spectrum%20of%20technology.

shop online. Instead of spending time and effort going to the store to shop, they can buy everything on e-commerce sites and have the purchased products delivered to their home within a few days. The overall goal of the research is to identify the important role of artificial intelligence in the postal and parcel industry, identify the benefits of AI for the logistics industry, how AI affects the sorting process, as well as identify the final destination and risk when implementing artificial intelligence.

LITERATURE ANALYSIS

A number of scientists have conducted cutting-edge scientific research on the effectiveness of using artificial intelligence and digital technologies in the development of postal communication services. For example: Russell S. in his study "Artificial Intelligence: A Modern Approach" focused on solving problem situations and automatically planning work processes through artificial intelligence[1], Poole D. in his study "Computational Intelligence: A Logical Approach" studied the formation of the ability to perceive the environment using artificial intelligence and the formation of the ability to think about the information received during the work process [2], Agrawal, A. in his study "Studying the Impact of Artificial Intelligence: Prediction and Reasoning, Information Economics and Politics" paid special attention to the fact that artificial intelligence not only predicts the outcome of the work, but also makes decisions about the work planned to be performed with its help[3]. Oskars Vismanis In his research, "Robotic System for Post Office Package Processing," focused on the effective use of artificial intelligence in sorting mail and parcels[4]. A number of studies on postal services have also been conducted by several scientists in Uzbekistan. For example, T.Z. Teshabayev, in his research paper "Problems and Prospects for Creating a Digital Ecosystem in the Postal Service of Uzbekistan" [5], touched upon the effectiveness, problems, and analyses of the use of digital technologies in the provision of postal services in Uzbekistan. During this research, conclusions and recommendations were developed, examining how to increase the effectiveness of artificial intelligence in developing the postal and parcel industry in the region.

RESEARCH METHODOLOGY

Focuses on the role of artificial intelligence (AI) in studying the impact of postal services on economic growth in Uzbekistan. The study used analytical methods and statistical analysis. Local and international research and statistical data are used as an empirical base. The results of this study serve as a basis for developing practical recommendations for improving postal services, introducing digital innovations, and developing the postal sector in the country.

RESULTS AND DISCUSSION

The digital revolution has had and continues to have a profound impact on every industry and profession in the world. The global postal industry is also being impacted by electronic exchange services and e-commerce, and is witnessing a decline in mail volumes, negatively impacting postal revenues. But it is the development of alternative electronic services and e-commerce that is creating many opportunities for the postal sector, and postal companies around the world are creating a huge number of small packages and letters that they need to deliver to consumers door-to-door. According to experts from the Universal Postal Union (UPU), under market pressure, postal services in many countries quickly innovated and introduced a wide range of digital postal services in 4 main groups: e-mail and e-government services, e-commerce, payment, e-financial solutions, and support services, with e-government support services and e-commerce being effectively implemented in many countries.

AI is also revolutionizing the postal system. Today, most postal operators use barcodes as postage stamps. This records information about sender and recipient addresses, as well as customer requests for delivery type, such as priority or standard mail. This allows for faster sorting, additional reliability, and reduced labor at postal centers. Some operators, such as USPS, the Italian Post Office, and DHL, are already using a very new technology in their postal systems - Radio Frequency Identification (RFID).[2] Although currently more expensive and less environmentally friendly than barcodes, this presents an opportunity for the postal sector to be innovative. Radio-

[2] https://www.idtechex.com/en/research-report/rfid-for-postal-and-courier-services-2011-2021/253

ID allows for real-time tracking of letters. It can detect delays in letters and parcels, and find solutions to improve performance. In addition, thanks to artificial intelligence, postal operators hope to revolutionize logistics. The new strategy involves vehicles, letter boxes, and even each piece of mail being tagged with an RFID or barcode. Using detectors at the sorting center, the information about the mailing address or its address is sent to a server. Centralizing information in real time allows for better resource allocation. For example, vehicles are automatically registered when entering a sorting center's warehouse and then routed to an empty lot.

The fact that 78% of global companies in the world currently use artificial intelligence or 82% of global companies are exploring the use of artificial intelligence in their organizations, and that the global artificial intelligence market is expected to reach $1.85 trillion by 2030[3], indicates how important artificial intelligence is becoming for any industry.

Today's mail sorting technologies include advanced optical character recognition (OCR)[4], which allows the machine to classify handwriting to understand printed letters and addresses. This allows the machine to classify handwriting to understand printed letters and addresses. For example, the sorting technology developed by Siemens, currently used by Deutsche Post, can read 90 percent of handwritten addresses.[6]

Many postal service providers in our country, including Uzbekistan Post JSC and BTS Express Cargo Service LLC, have implemented technologies that include software and devices that allow for full control of the process from the moment a shipment is received to its delivery to the customer, operating online.

Another important step in the postal industry is the use of barcodes. Every year, millions of letters and parcels are sent by postal companies. Therefore, a convenient technology is needed to optimize the time, effort and money spent on monitoring and tracking them. Barcodes are emerging to solve this problem. Barcodes use

[3] https://explodingtopics.com/blog/companies-using-ai
[4] https://www.charactell.com/resources/ocr-in-postal-services-and-shipping/#:~:text=Optical%20Character%20Recognition%20(OCR)%20is,as%20other%20types%20of%20documents.

different encoding or symbology protocols, which differ in terms of usage restrictions or standardization.

Barcodes are designed to solve this problem. Barcodes use a variety of encoding or symbology protocols, which vary in terms of usage restrictions or standardization.Shtrix kodlari bu muammoni hal qilish uchun paydo bo‘ladi.

Figure 1

Figure 1. Examples of barcodes used in postal services

There are two most commonly used types of barcodes: One-dimensional or linear barcodes: they are codes represented by a series of parallel lines of varying thickness with a one-dimensional readout. And two-dimensional barcodes: they use different symbols (rectangles, dots, hexagons and other geometric shapes). This matrix format allows for the recording of additional information.

Recent developments in robotics could be a game-changer for the logistics industry. Robots can now recognize, select, manipulate and place a variety of objects at different locations. The technologies developed in recent years have proven to be essential in overcoming the challenge and will enable further advances in logistics and possibly adapt to the demands of other industrial applications, thereby increasing productivity, reliability and profitability. The advantage of this solution is that, in addition to increasing productivity (the robot, for example, does not need

to eat, take breaks or work out) and accuracy, it also preserves the condition of the packages in the first place, as the robot uses a simple lift and deposit mechanism rather than carelessly dropping the package.

Amazon has 750,000 Kiva robots in its warehouses. These are robots that move shelves toward operators. These autonomous robots walk on a floor covered with QR codes, which allows them to locate themselves in order to transport shelves containing products to customers. Each robot can carry up to 26,500 kg and has an autonomy of 4 to 5 hours on a 5-minute charge. Thanks to this, Amazon has reduced human labor in the warehouse by 70 percent.[5]

Figure 2

Figure 2. Kiva robots in an Amazon warehouse

Today, many courier services calculate their freight rates not only based on the actual weight of the item being transported, but also on its volume or density. If the specific gravity or mass exceeds the actual weight, shipping or freight charges are calculated based on this.

CONCLUSIONS AND SUGGESTIONS

Based on the above information, we can conclude that the integration of advanced technologies such as robotics and artificial intelligence in the provision of postal services in our country will lead to a significant increase in the quality and timeliness

[5] https://www.aboutamazon.com/news/operations/amazon-robotics-robots-fulfillment-center

of postal services in our country if the stability of postal services is focused on efficiency, transparency, and customer satisfaction, and if such technologies are used in all enterprises providing postal services. In particular, as we have seen in our research, by using artificial intelligence or robotics, which are used by many advanced postal service providers around the world, postal service providers in the region can achieve the following:

- AI technologies can help postal operators optimize logistics processes, improve customer relationships, and diversify their business;
- Security and privacy measures: Ensuring the security and privacy of postal items is becoming increasingly important. This is why, with the help of artificial intelligence, postal operators can implement security measures such as encryption, tamper-resistant packaging, and secure delivery methods.

As the industry continues to adapt to the demands of a digital world, collaboration, innovation, and a commitment to sustainable practices will be essential in shaping the future of postal automation in the country.

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