

Topic: Artificial Intelligence in Pakistan: its promise and perils

In the age of technology, where innovation knows no bounds, Pakistan stands at the crossroad of digital revolution. The artificial intelligence driven revolution holds many promises for Pakistan in healthcare, education, agriculture and industrial sectors. It would boost country's governance and economic growth. It has also potential to improve state's management against disaster vulnerabilities. In meantime, artificial intelligence possesses some perils for Pakistan. It has the potential to displace the jobs; the cyber security threats; the ethical concerns, and concerns related to human rights violation. No doubt, Pakistan is the blend of tradition and modernity seamlessly; therefore, there are high opportunities for the country

to have a bright side of artificial intelligence. It is possible through investing in Artificial intelligence-AI-education; supporting the research and development; developing an efficient regulatory framework; and promoting the ethical AI development. To sum up, Pakistan is going to witness a digital revolution led by ~~int-~~artificial intelligence. It holds many opportunities as well as some challenges in adoption of AI technology. However, through investing in education and ^{by} formulating regulations, Pakistan has enough potential to have a bright future with AI.

Before discussing the promises and perils AI has for Pakistan, it is necessary to understand the concept of artificial intelligence. Artificial intelligence is a computer science field which has the abilities to think, learn and make decisions. Its roots traced in the twentieth century, when scientist got the idea to create intelligent machines.

These intelligent machines can perform routine tasks which typically require human, such as, recognizing the language; differentiating the patterns, and solving the complex problems. It performs such tasks by compiling large set of algorithms and data based on experience.

In simple terms, artificial intelligence possesses human ability of thinking and learning from experience.

The latest technology of artificial intelligence holds many promises for the Pakistan, and these are discussed in the following section of this essay.

To begin with healthcare system in Pakistan, the artificial intelligence will revolutionize this sector. The healthcare sector of any country must be efficient in providing services, in this regard artificial intelligence can help in disseminating good services. It can help in faster diagnoses through x-ray, MRI or CT-scan with precise accuracy. It would also provide health services to

The remote areas effectively. Furthermore, it can make possible the early detection of diseases by continuously monitoring the patient data that would help in mitigating the risk of diabetes, cancer or heart attack like risk in early stages. Artificial intelligence can also be used in medical research where it can assess results from large datasheets of clinical trials. In short, artificial intelligence would bring a revolution in healthcare system of Pakistan.

Further, the utilization of artificial intelligence will boost the agriculture sector. Pakistan is the country which economy dependency is so percent on agriculture; here artificial intelligence will lift up this sector. It is the data provided by artificial intelligence can help in optimizing the irrigation, fertilization and pest control. It will also reduce the cost of production, and minimize the wastage either water or energy. It can

provide predictions related to crop yield which would help the farmers in better planning. Its utilization will be also beneficial in the management of livestock. It will track their location, improve management for their healthcare, which will ultimately help to grow agriculture sector. To sum up, the artificial intelligence will open new gateways in agriculture sector of Pakistan.

Beside agriculture, the artificial intelligence will enhance the mechanism of education in Pakistan. Quality education is the pre-requisite for country's prosperity. Artificial intelligence will help both teachers and students in getting quality education. For teachers, it can help out to make the lesson plan effective, it will also possible to make attractive creation of content for better understanding. For students, it can provide quality material and access for remote area students. Also,

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it can assist in personalized education for a student according to his/her strengths and ~~the~~ capability of understanding. One significant contribution of artificial intelligence in education will be the special learning mechanism of special children to make them productive part of the society. In a nutshell, artificial intelligence will significantly enhance the education system in Pakistan.

Not only education, but artificial intelligence will also augment the efficiency of industries in Pakistan through smart automation. The industrial sector in Pakistan lags behind in many ways, and artificial intelligence can provide aid to build up better industrial productivity. It would enhance the manufacturing efficiency through quality control mechanism with high precision, which would improve the production. It will also reduce

the energy consumption and led to achieve the goals of sustainable development. By controlling the supply-chain demand, it will provide aid to optimize production; mitigating the risk of overstock and to build up a sense of better competitiveness in the international market. It will eventually foster the country's economy. In summary, the utilization of artificial intelligence will pave the way for industrial growth in Pakistan.

At economic level, artificial intelligence will grow the economy of Pakistan, potentially. The prosperity of the country depended on good economy. There would be new windows for innovation through artificial intelligence. The artificial intelligence driven setups can develop new tech and solutions. It will create new jobs and will attract investment. Furthermore, it can provide skill training program to

equip the workforce. As the youth of Pakistan accomplish 63 percent of population, it would make significant contribution to uplift them through innovative startups. It would also help to predict the new trends and enterprises which will assist workers to find better job and have their share in economic growth of country. In short, artificial intelligence will flourish the economy in Pakistan.

At governance level, the artificial intelligence will enhance the e-governance in Pakistan. It can make the delivery of services effectively. These could be chatbots and virtual assistants which would make decision according to circumstances and help the person with better option. Also, the automatic transactions can reduce the manual paperwork, speeding up the process of getting licenses, permits and certificates. It would

detect the grounds and loopholes in the system, and improve the governance. Further, the people of remote areas would get the accessibility to services in a speedy manner. It would also enhance the public engagement with the government's officials and offices that they are governed well. Overall, the e-governance will be improved with the help of artificial technology.

Beside improving e-governance, artificial intelligence will also improve the disaster management in Pakistan. Pakistan is a vulnerable state for disasters like flash floods, earthquakes, landslides etc. In this regard, artificial intelligence can provide early warning systems which will reduce the casualties and economic loss. It can help out in risk assessment and remote sensing for better management. The communication and coordination

through artificial intelligence will help the experts to address the grievances of victims. Moreover, the resource allocation and emergency healthcare would be disseminated effectively with the usage of artificial intelligence. To conclude, artificial intelligence in Pakistan will improve the sector of disaster management.

So far it has been discussed that artificial intelligence has significant potential just Pakistan. The following segment of this essay throw light on some perils that may exist in Pakistan related to artificial intelligence.

First, there is a high potential of job displacement once Pakistan adopt artificial intelligence. The main factor behind this could be the skill gap between workforce and procedure of latest technology. The

automation of routine tasks can reduce demand for manual labor. It can impact the low skilled jobs and sectors like agriculture and manufacturing, ^{where} these people are less likely to adapt with new technology. Such skill mismatch may lead to unemployment or underemployment for many workers. Overall, the ~~adaption~~ adoption of artificial intelligence can displace workers from their jobs.

Second, there is a potential of cybersecurity threats. The criminals can utilize the platforms of artificial intelligence for manipulation. There could be malware propagations against particular officials. Also some threats such as password cracking; fake videos or audio recording; and cyberbullying can prevail. On the other hand, the disinformation campaigns can manipulate public opinions. Furthermore, the data breaches in the

system can cause huge ^x financial losses. Summing up, a pool of artificial intelligence related to cybersecurity exist for Pakistan

Third, some ethical concerns lies while Pakistan ^{will} adopt artificial intelligence. In Pakistan, some biases already exist such as gender bias, ethnicity biases or socioeconomic status. In such situation the complex artificial intelligence algorithms may perpetuate these prejudices. The nationalists can also use such platforms for their evil interests. The ethical challenges can depict the public trust related to individual's privacy or healthcare ethics. In short, adoption of artificial intelligence in Pakistan can face ethical challenges.

Next, human rights concerns also lies if Pakistan adopt artificial intelligence. It is freedom of expression, right to fair trial or privacy violation

through artificial intelligence. Moreover, the artificial intelligence surveillances as facial recognition can infringe on individual's personal space. Further, AI can ^{damage} the freedom of assembly by tracking the individual's movement. On a brief account, artificial intelligence may prevail the concerns related to human rights.