



# The Intersection of AI and Personalized Medicine: Advancing Patient Care

Jacob Onireti\*

Department of Biomedical Engineering, Istanbul Technical University, Istanbul, Turkey

## DESCRIPTION

The healthcare sector is about to undergo a change thanks to personalized medicine, a strategy that adjusts medical care to each patient's unique traits. Personalised medicine's primary goal is to optimise medication therapy according to each patient's unique genetic, environmental and lifestyle characteristics. By incorporating Artificial Intelligence (AI) into this approach, medical professionals are changing the way they recommend treatments, making them more effective and individually tailored to the needs of each patient. A new era of healthcare is being ushered in by doctors using AI to analyse enormous quantities of patient data and develop highly customised treatment plans. This will allow medicine to be as unique as the people it is meant to cure. The core of AI's contribution to personalised medicine is its capacity to analyse and analyse massive datasets in a way that is far more advanced than that of humans. Healthcare professionals now have access to comprehensive genetic data about their patients thanks to the quick advancements in genomic sequencing. AI systems are able to examine this genetic data and spot trends that can point to a patient's potential reaction to specific medications. AI can reduce the trial-and-error process that sometimes accompanies traditional therapies by predicting which pharmaceuticals are most likely to be helpful for a given person based on their genetic differences. This is especially essential for treating complicated illnesses like cancer, where genetic changes greatly influence the course of the illness and how it reacts to different treatments. Predicting the likelihood of negative drug reactions is one of AI's main benefits in personalised medicine. Not every patient reacts to drugs in the same manner and some people may have negative side effects because of their genetic composition. By examining a patient's genetic profile in conjunction with information from other sources, like lab results and medical histories, AI can assist in identifying these risks early on. This predictive ability enables physicians to modify drugs or dosages to reduce the possibility of side effects, resulting in safer and more efficient therapies. Patients with specific genetic markers,

for instance, may metabolize medications differently, which could result in either an overdose or an underdose.

AI's accuracy in spotting these differences can assist in customizing medication treatments to make sure they are both safe and effective. Oncology is one area where AI's influence on personalised therapy is most noticeable. Patients with cancer have always received the same treatments regardless of their genetic variations, according to a one-size-fits-all approach to cancer treatment. But thanks to artificial intelligence, physicians can now screen tumors genetically to find certain mutations and forecast how the cancer will react to various therapies. This saves patients from receiving harmful or ineffective treatments by enabling doctors to suggest the best course of action for each patient. By evaluating clinical trial data and finding prospective treatments that might be useful against uncommon or challenging-to-treat tumors, Artificial Intelligence (AI) can occasionally also help in the creation of novel drug candidates. This individualized strategy has already demonstrated encouraging findings in terms of bettering patient outcomes and lowering the typical side effects of chemotherapy. The use of AI to pharmacogenomics-the study of how genetic variations impact an individual's response to drugs-is another fascinating development. AI can choose the best medication for a person based on their individual genetic composition by evaluating genetic data, increasing medication efficacy and lowering the risk of negative side effects.

This is especially essential when treating long-term illnesses like diabetes, autoimmune disorders and cardiovascular disease, where patient outcomes might differ significantly. AI can also assist in identifying individuals who might be susceptible to drug interactions, preventing negative side effects from occurring when medications are taken together. The accessibility of AI-powered personalised medication presents another difficulty. Although the technology is developing quickly, it is not yet widely accessible. Healthcare workers must be trained to use these cutting-edge tools efficiently and infrastructure must be heavily invested in for AI to be implemented in the industry. Furthermore, patients in lower-income or resource-constrained

**Correspondence to:** Jacob Onireti, Department of Biomedical Engineering, Istanbul Technical University, Istanbul, Turkey, E-mail: oniretijacob@426ac.tr

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areas may not be able to obtain AI-powered medicines and genomic testing due to their excessively high costs. It will be essential to provide more accessible and scalable systems that

can be used globally in order to make personalised treatment available to everyone.