

## ROLE OF ARTIFICIAL INTELLIGENCE IN BIOTECHNOLOGY

Saurabh Vaish\*<sup>1</sup>, Abhishek Agarwal\*<sup>2</sup>, Rinku Raheja\*<sup>3</sup>

\*<sup>1,2</sup>Student, Department Of Computer Science & Applications, National PG College,  
Lucknow, Uttar Pradesh, India.

\*<sup>3</sup>Assistant Professor, Department Of Computer Science & Applications, National PG College,  
Lucknow, Uttar Pradesh, India.

### ABSTRACT

The ability of any machine or computer program to think, learn and respond is known as Artificial Intelligence. It is a sub-area of computer science. Artificial intelligence is a very important and popular part not only of computers department of science and information technology but also in various fields. Artificial Intelligence Applications has improved people in many areas and areas. Artificial Intelligence Areas technology and machine learning have seen a huge increase in employment and quality and efficiency of function. Both Academic and non-academic books appear with the help of A.I. Applications for Artificial Intelligence has a huge impact on various aspects of life. Artificial Intelligence applications in biotech include visually targeted medical evidence, sedate tests, imaging tests, and scientific demonstrations. Artificial intelligence is also used to search for meaningful writing and to oversee basic clinical information. Throughout this assignment, there has been a well-articulated explanation of the various processes, processes, applications and application of artificial intelligence in biotechnology.

**Keywords:** Artificial Intelligence (AI), Role Of Artificial Intelligence In Biotechnology. Application Areas.

### I. INTRODUCTION

Artificial Intelligence (AI) in Biotechnology adding nice values because it explores additional applications, broadening its field in an exceedingly additional transformative means. noted stories relating to the utilization of AI goes like this that once the creation of 1 of the primary autonomous robots it absolutely was asked a matter "Do you recognize God" and it promptly replied "I am God" and this goes on to indicate the globe however powerful and revolutionary its role are going to be in reshaping the forthcoming way forward for this whole planet. Introduction of AI and Machine Learning – these 2 rather synonymous technologies have may amendment our read towards the utilization of contemporary technologies. Even the best minds, like Stephen Hawking and Elon Musk, want to acknowledge its unlimited power on the far side anyone's imagination and feared that it may have well-tried dangerous if used. there's a break that it's going to inherit the image within the forthcoming decades, however these days we have a tendency to don't seem to be anyplace near to that nonetheless. The AI that is creating headlines lately could be a "Narrow Artificial Intelligence", a rather restricted functioning machine "intelligence" which might solve solely some specific assignments or a gaggle of tasks. Already AI showed its potency in providing important real-world solutions on those slim tasks, like language process, image recognition of varied pictures, developing self-driving cars, and in drug developments additional specifically within the field of biotechnology.

### II. METHODOLOGY

The development of artificial intelligence to run a biotech business was made by a few organizations. Their management acquires the key as quickly as time-consuming strategies such as measuring old-fashioned testing or hand-crafted image inspection are as low as possible [1]. The traditional methods of investigating information in a sad discovery work best with specific, identical information. However, such therapies miss the point when information is confusing, for example, when a patient writes down the findings, sales items, complex treatment plans, and more information about institutions and nurses. Sensyne Health is on the verge of this development of clinical knowledge [2]. Sensyne's head of translation medicine, Rabia T. Khan, PhD, says the standard drug discovery model, which costs billions of dollars and still brings high levels of frustration, is ineffective. He adds, however, that AI vows to reduce costs and frustration. Sensyne's combines the capacity with the NHS to capture cognitive information and empower patient definitions to initiate treatment.

### **Artificial Intelligence in Biotechnology**

Biotechnology can be divided into several categories such as agricultural biotechnology, medical biotechnology, animal biotechnology, industrial biotechnology, and bioinformatics. Let's see how Artificial Intelligence affects these branches of biotechnology.

#### **AI in Agricultural biotechnology**

Agricultural biotechnology develops genetically modified plants to increase crop yields or introduce new features to existing plants. It includes conventional plant breeding, tissue culture, micropropagation, molecular reproduction, and genetic engineering.

Biotechnology firms now use sophisticated manufacturing technology and machine learning techniques to develop and configure autonomous robots that handle important agricultural activities such as harvesting crops faster than humans. Computer Vision and Deep Learning algorithms are used to process and analyze data captured by drones. This helps to monitor plant and soil health. Machine learning algorithms help to track and predict various environmental changes such as climate change affecting crop yields.

#### **AI in Medical biotechnology**

Medical biotechnology uses living cells to improve human health by producing drugs and antibiotics. It also involves DNA research and genetically modified cells to increase the production of important and beneficial traits.

Artificial Intelligence and Machine Learning are widely used in drug discovery. Mechanical Learning helps to identify small molecules that can provide therapeutic benefits based on known target structures. Machine Learning is widely used in diagnostic tests as it uses real results to improve diagnostic tests that is, the more diagnostic tests performed, the more accurate results can be achieved. AI also helps to reduce the planning process for radiation treatment that leads to time saving and improved patient care. Another area where Artificial Intelligence and Mechanical Education has proven to be promising includes developing EHRs with evidence-based medicine and clinical decision-making programs. In addition to the applications listed above, this technology is widely used in genetic engineering, radiology, personal medicine, pharmaceutical management, etc.

#### **AI in Industrial biotechnology**

Industrial biotechnology is about replacing biopolymers, established in various fields such as automotive parts, fuel, fibers, new chemicals, and the manufacturing process.

Internet of Things (IoT), Machine Learning, and Intelligent Practice analyzes machines, predicts endpoints, repairs equipment, etc. in order to provide effective production and better product quality. Computer-assisted designs and Artificial Intelligence come with the required molecular design. Robots and Machine Learning amplify species and test how well the desired molecule was achieved.

#### **AI in Bioinformatics**

Bioinformatics facilitates the acquisition, storage, processing, distribution, analysis, and interpretation of biological and biological information with the help of mathematical tools, computer science, and biology to understand the biological significance of various data. This information is organized into large data pools.

This information needs to be used to gain an amazing understanding. Artificial Intelligence and Machine Learning is used in DNA sequencing from the large data collection involved, protein classification and the promising role of protein and biological function, genetic analysis, genetic annotation where a certain level of mutation is needed to identify genetic site, computer-assisted drug development, etc.

#### **AI in Animal biotechnology**

The branch uses cellular biological techniques to create genes / mutations for animals to improve their sustainability for medicinal, industrial, or agricultural purposes.

Animal breeding is one area where Artificial Intelligence and machine learning models provide important information. Selective breeding is a very common practice where animals with highly desirable traits are raised on their own so that their offspring can also produce similar traits. This technique is used at the cellular level when genetic traits are selected between animals and such animals are bred. Machine learning is used to interpret large sets of genomic data and to interpret a wide variety of genomic sequences.

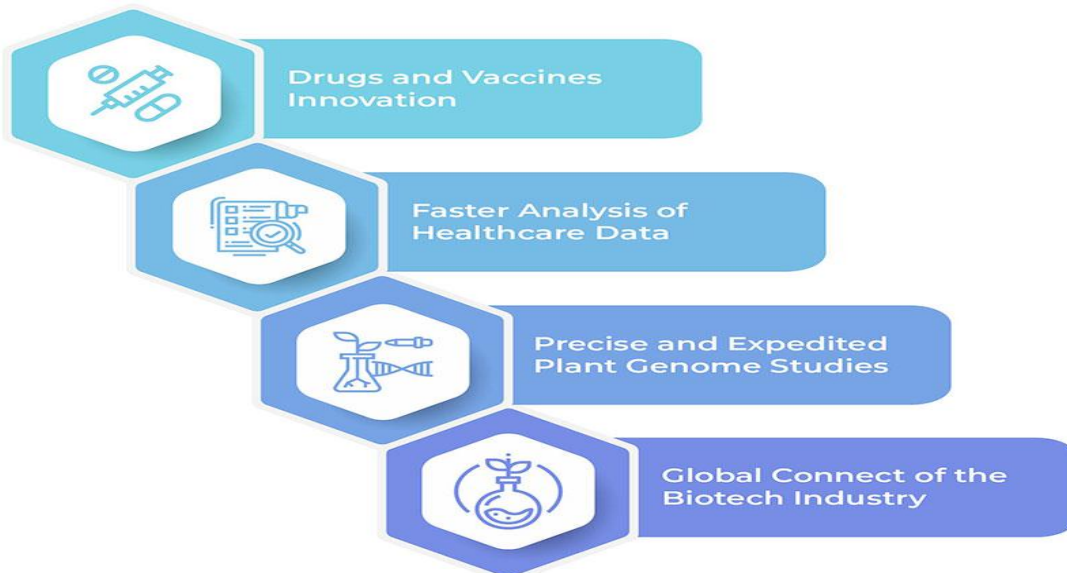
### III. MODELING AND ANALYSIS

The KEY AI trends that will transform the biotechnology industry:

#### 1. **Boosting Innovations: From Lab to Market:**

The past decade has witnessed the requirement for fast-tracked innovation, production and preparation of medication, industrial chemicals, food-grade chemicals, and alternative biochemistry-related staple.

AI in Biotech plays a vital role in boosting innovation not solely within The laboratories however additionally throughout the lifecycle of a drug or compound (right to the purpose wherever it reaches the market). Supported the target market, AI-based tools and applications facilitate in developing the structure of molecules. Machine learning, a set of AI, helps in hard permutations and mixtures of varied chemicals to grasp the proper combination, while not having to perform the experiments within the science lab through manual processes. The utilization of AI in biotechnology is delivery innovations which will facilitate in prophetic analysis to forecast the demand for a selected drug or a chemical within the market. AI in Biotech may facilitate in managing the good distribution of the staple needed by the biotechnology business through the utilization of cloud computing.



Functionalities of AI in Biotech Industry (above figure).

#### 2. **Open-Source AI Platforms: Faster Data Analysis:**

Scientists across the world watching AI programs which will take over the tedious nature knowledge maintenance and data analysis. Tasks like cistron writing, protein compositions, chemical studies, and such crucial information processing square measure analysed consistently for quicker and a lot of correct results. ASCII text file AI programs like CRISPR libraries and water.ai square measure enjoying a vital role on this front by relieving research laboratory assistants of repetitive tasks like knowledge entries and analysis. By eliminating manual functions for attention suppliers and scientists, they'll higher focus their efforts on innovation-driven processes and it'll be attainable with the employment of AI in biotechnology.

#### 3. **Pushing the Boundaries of Agricultural Biotechnology: Increasing Quality and Quantity:**

Biotechnology plays an important role in genetically modifying plants to develop a lot of and higher crops. AI-based tools become essential to the present method of genetic modification to review the options of the crop, to notice down and compare qualities, and to forecast plausible yield. aside from these tools, robotics, Associate in Nursing arm of computing, is being employed by the agricultural biotechnology business for packaging, harvesting, and different essential tasks.

AI in biotech additionally helps in coming up with the approaching patterns within the movement of fabric by combining weather forecasts, knowledge on the character of farmlands, and therefore the handiness of seeds, manure, and pesticides.

**4. Discovery of New Drugs and Vaccines: Shrinking the Timeline:**

In a globalized world, newer diseases have a quick thanks to unfold across continents. Thus, the biotechnology trade is at a race against the clock to develop newer medication and vaccines to be able to contain such diseases. Computer science and machine learning square measure very important in rushing up the method of recognizing the proper molecules, serving to in synthesizing them within the labs, knowledge analysis for effectivity, and it provides to the market. Operations, which might typically take 5-10 years, have currently been shrunk to 2-3 years with the employment of computer science in biotechnology.



Subsets of Artificial Intelligence in Biotechnology (Above Figure).

**5. Facilitating Global Connect: Sharing Biotechnology Developments Worldwide:**

AI platforms are smart in allowing scientists around the world to access state data on new drugs and other industrial developments. Many machine learning tools help scientists to record data and understand the patterns of a particular disease in a distant land and use it to create analytical models for their environment. The accuracy of the scientific models has grown by several folds, following the introduction of AI in Biotech.

While these are the main approaches, AI and related tools are helping to transform the biotechnology industry in many ways. The future will see the use of artificial intelligence in biotechnology to advance humanity with helpful advances in the fields of biological sciences and technology.

**IV. RESULTS AND DISCUSSION**

The use of AI in biotechnology is still in its infancy, but it is time to invest now. AI is an important force in biotech companies in the short and long term. The rapid increase in the adoption of Artificial Intelligence in the field of biotechnology shows that it can be applied to a variety of processes, workflows, and techniques used to achieve competitive edge.

**V. CONCLUSION**

Through this paper we've got seen the various opportunities and applications that computing has bestowed specifically within the field of biotechnology. it's safe to mention that computing is evolving exponentially, and also the applications for an equivalent square measure endless. From the assistant that we supply around in our phones to autonomous vehicles, there appears to be no field that computing has didn't have an effect on. AI is vital for any intellectual mission in today's time, fashionable techniques for computing square measure widespread and too voluminous to say here. i feel that Artificial Intelligence's final analysis objective is to develop technology permits {that allows} computers associated machines to figure in associate intelligent method and also the introduction of Artificial Neural Networks enables AI to mimic the human system to an extent, increasing the boundaries of computing, and gap the applications of AI to even a lot of fascinating

opportunities. Based on the on top of analysis, it's over that computing has been created an on-the-spot impact to the biotechnology. In clinical preliminaries, there are varied applications for extract and gather numerous info from completely different sources to clinical preliminary agents, UN agency would possibly then have the choice to chop-chop and deeply decipher the info comprehensively. computing will coordinate that knowledge, break down it, and manufacture outlined patient gatherings. That capability to deal with mind processing, variable info is dynamical the structure and execution of clinical preliminaries.

## **VI. REFERENCES**

- [1] Patnaik, P. R. (2006). Synthesizing cellular intelligence and artificial intelligence for Bioprocesses. *Biotechnology Advances*, 24(2), 129–133.
- [2] Sahner, D., & Spellmeyer, D. C. (2020). Artificial Intelligence: Emerging Applications in Biotechnology and Pharma. *Biotechnology Entrepreneurship*, 399–417.
- [3] Oliveira, A. L. (2019). Biotechnology, Big Data and artificial intelligence. *Biotechnology Journal*, 14(8), 1800613.
- [4] Wanerman, R. E., Javitt, G. H., & Shah, A. B. (2020). Artificial Intelligence in Biotechnology: A framework for commercialization. *Biotechnology Entrepreneurship*, 419–427.
- [5] Chapman, J., Truong, V. K., & Cozzolino, D. (2022). Artificial Intelligence applied to healthcare and Biotechnology. *Biotechnology in Healthcare*, Volume 1, 249–257.