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Bioinformatics Market - Global Industry Size, Share, Trends, Opportunity, and Forecast, Segmented By Product & Services (Bioinformatics Tools, Bioinformatic Platforms and Bioinformatic Services), By Type (Genomics & Proteomics, Simulation Studies & Molecular Modelling, Genetic Engineering, Others), By Application (Metagenomics, Drug Discovery, Precision Medicine, Others), By End User (Institutional Research, Industrial Research), By Region and Competition, 2020-2030F

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Abstracts

Market Overview

Global Bioinformatics Market was valued at USD 11.24 Billion in 2024 and is expected to reach USD 22.59 Billion by 2030 with a CAGR of 12.34% during the forecast period. Bioinformatics is an interdisciplinary field that merges biology and information technology. It establishes connections between biological data and techniques for information storage, distribution, and analysis, bolstering various areas of scientific research, particularly in biomedicine. Bioinformatics leverages software tools for tasks such as database formation, data management, data warehousing, data mining, and more. This data mining leads to technical discoveries and plays a significant role in the study of genetics and genomes. The market offers numerous bioinformatics tools, including protein functional and analysis tools, homology and similarity tools, sequence analysis tools, and miscellaneous tools.

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According to an article published by Stanford Medicine in January 2022, research conducted by Stanford scientists showed that a DNA sequencing technique could sequence a human genome in about 8 hours. Such developments can boost demand for genomics and, consequently, the bioinformatics sector. Bioinformatics data storage and analysis applications are capable of storing a large amount of genomic and proteomic information to facilitate research activities in fields ranging from aging and carcinogenesis to preventive therapy for genetic diseases. This factor is also expected to significantly contribute to the growth of this industry over the forecast period.

The field encompasses diverse and specialized domains of life science, including structural genomics, functional genomics, DNA microarrays, comparative genomics, and medical information. Consequently, these aforementioned factors contribute to the growth of the global bioinformatics market. Moreover, the rising demand for integrated solutions and systems, the integration of machine learning and AI in healthcare, and the investments made by software companies in bioinformatics solutions are expected to provide lucrative market opportunities for bioinformatics solution developers.

Key Market Drivers

Increasing Demand for Nucleic Acid and Protein Sequencing

The increasing demand for nucleic acid and protein sequencing technologies is expected to have a profound impact on the field of bioinformatics, fueling a surge in demand for bioinformatics tools and expertise. Nucleic acid sequencing (such as DNA and RNA sequencing) and protein sequencing are pivotal in advancing our understanding of genetics, genomics, and proteomics, and their applications span various scientific and medical disciplines. Nucleic acid and protein sequencing generate vast amounts of raw data. As sequencing technologies become more accessible and affordable, the volume of data being generated is skyrocketing. Bioinformatics plays a critical role in managing, analyzing, and interpreting these massive datasets, driving the demand for specialized software and tools. For instance, in June 2021, the U.S. Food and Drug Administration and the Center for Drug Evaluation and Research (CDER) sanctioned 26 new molecular entities (NMEs), which will drive the growth of research and development activities.

The use of sequencing data in personalized medicine, pharmacogenomics, and disease diagnostics is growing. Bioinformatics is essential for identifying genetic variations associated with diseases, drug responses, and treatment decisions. As genomic medicine gains momentum, so does the demand for bioinformatics solutions to make

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sense of the genomic data.

Key Market Challenges

Lack of Well-defined Standards and Common Data Formats for Integration of Data

The lack of well-defined standards and common data formats for the integration of data is a significant challenge that can potentially restrain the demand for bioinformatics. Bioinformatics relies heavily on the integration of diverse biological and biomedical data sources, including genomics, proteomics, clinical records, and more. Biological and biomedical data are generated using various technologies and platforms, leading to differences in data formats and structures. Without standardized formats, integrating data from different sources becomes challenging and time-consuming. This can result in data incompatibility issues, making it difficult to analyze and draw meaningful conclusions.

The lack of common data standards hinders interoperability between different bioinformatics tools and databases. Researchers often need to adapt or develop custom data conversion scripts or tools to bridge data format gaps, which can lead to inefficiencies in data processing.

Converting data from one format to another can introduce errors or loss of information, particularly when dealing with large and complex datasets. These errors can have significant consequences, potentially leading to inaccurate research findings or clinical decisions. Researchers and bioinformaticians spend a substantial amount of time and effort on data preprocessing tasks, such as data format conversion and normalization. This diverts resources from actual data analysis and research, slowing down scientific progress.

Key Market Trends

Artificial Intelligence (AI) and Machine Learning

AI and machine learning techniques will be increasingly applied to analyze complex biological data. These technologies can identify patterns, predict disease risk, and optimize drug discovery processes. AI and machine learning algorithms can clean, normalize, and preprocess biological data. This includes tasks such as quality control for sequencing data, removing noise, and standardizing data formats. This ensures that the data used for analysis is of high quality. Machine learning models are excellent at

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recognizing patterns within biological data. This capability is crucial for identifying significant genetic variations, protein-protein interactions, and gene expression patterns associated with diseases or drug responses.

AI and machine learning play a vital role in drug discovery by predicting potential drug candidates and optimizing drug development processes. These technologies can analyze molecular structures, predict drug-target interactions, and assess the safety and efficacy of compounds.

Key Market Players

3rd Millennium Inc.

Thermo Fisher Scientific, Inc.

Agilent Technologies, Inc.

BioWisdom Ltd

Quest Diagnostics (Celera Corporation)

Dassault Syst?mes SE

Illumina, Inc.

Geneva Bioinformatics SA

Perkin Elmer, Inc.

Lineage Cell Therapeutics (BioTime Inc.)

Report Scope:

In this report, the Global Bioinformatics Market has been segmented into the following categories, in addition to the industry trends which have also been detailed below:

Bioinformatics Market, By Product & Services:

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- Bioinformatics Tools
- Bioinformatic Platforms
- Bioinformatic Services

Bioinformatics Market, By Type:

- Genomics & Proteomics
- Simulation Studies & Molecular Modelling
- Genetic Engineering
- Others

Bioinformatics Market, By Application:

- Metagenomics
- Drug Discovery
- Precision Medicine
- Others

Bioinformatics Market, By End User:

- Institutional Research
- Industrial Research

Bioinformatics Market, By Region:

- North America
  - United States
  - Canada

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- Mexico

Europe

- France
- United Kingdom
- Italy
- Germany
- Spain

Asia-Pacific

- China
- India
- Japan
- Australia
- South Korea

South America

- Brazil
- Argentina
- Colombia

Middle East & Africa

- South Africa

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Saudi Arabia

UAE

Competitive Landscape

Company Profiles: Detailed analysis of the major companies present in the Global Bioinformatics Market.

Available Customizations:

Global Bioinformatics market report with the given market data, TechSci Research offers customizations according to a company's specific needs. The following customization options are available for the report:

Company Information

Detailed analysis and profiling of additional market players (up to five).

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