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Leveraging technology for knowledge-based research

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The deluge of scientific information from scientific laboratories has been growing at an exponential rate since the outbreak of COVID-19 last year. The pandemic has opened up opportunities to learn about new scientific research, which in turn help create more robust solutions. There is a continuous quest for knowledge among the bench scientists to be aware of the new findings in other research laboratories, which are published in peer-reviewed scientific journals. The importance of these new findings in research laboratories from across the world in the future implications of discoveries cannot be denied.

Most of the journals trace their origins to different countries and often published in their native languages. In addition, patents registered could also be region or country-specific. In the year 2020, for instance, China had the highest number of patents which were all in the Chinese language, overriding several US patents. A major challenge for the scientific community is to retrieve appropriate scientific information in a short time and with minimal effort.

Knowledge-based organisations are the key facilitators in this process. They apply their deep domain expertise and advancement in technologies such as Artificial Intelligence and Machine Learning to make research available to all via databases, R&D centres, and the web. They appropriately bucket these articles, which helps in retrieving the right article to an in-depth analysis of research articles and collecting the information. Often, these documents come with major errors, which are rectified by subject matter experts in the team, and in the case of non-English articles, translation is required.

Biology is a complex subject and integrating biological contents is a challenge. Community standards are constantly evolving and knowledge-based organisations contribute significantly to data standardisation, developing new standards, and data integration. Only integrated data will make it usable and analysable.

These research databases in life sciences are used by millions of scientists all over the world. In this context, ontologies (structuring the unstructured data) also play a major role in semantic enrichment, retrieval, and integration of data across terminologies and databases. They form the basis for the standardisation of concepts which is an indispensable part of data integration.

Analysis of the content for universal benefit is an important final step in the knowledge industry. Healthcare is an important domain that makes use of life science databases. Genomics data of individuals are increasingly used to personalise treatment protocols. In some cases, even differential RNA expression of patient samples (transcriptomics) are used to tailor

design therapy. Knowledge-based companies have the know-how, technology, and trained staff to quickly analyse patient data and build a model for the aberrant expression which are used for therapy.

As technology advances, other omics data like metabalomics and pharmacogenomics are seen to drive personalised medicine. With the strong foundations in analysis and processes built over the years, organisations will contribute significantly in the field of healthcare over the years.

Dr Usha Mahadevan, Chief Scientist, Molecular Connections, Bengaluru