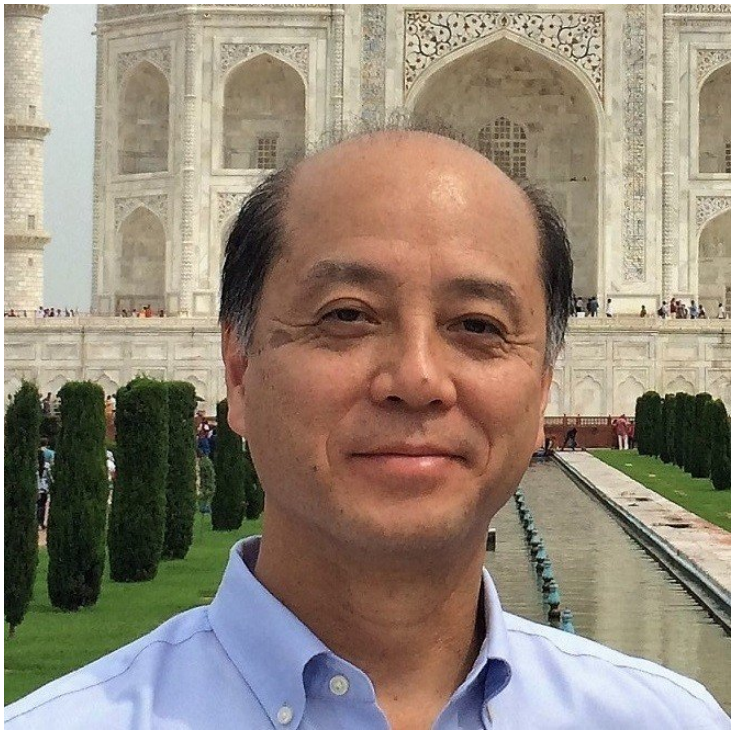
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How AI can help Soar Lab Productivity & Profitability

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Artificial intelligence (AI) is all around us. Every day, we see new uses emerge to help make everyday tasks more efficient and solve problems across multiple industries. From digital personal assistants like Alexa to self-driving trucks to automated manufacturing facilities, AI technologies are changing the way we live, work and do business. And now, this new technology can also help analytical scientists maximise the accuracy and repeatability of their Liquid chromatography (LC) analysis.



With an emerging wave of AI-powered innovations, ideas about what LC analysis should be, are beginning to change. It calls for an analytical environment that can deliver identical results regardless of whether the analyst is present in the laboratory or familiar with the operating procedures, as long as the analyst performs the same operations and data analysis.

Using new and exciting technologies to increase throughput, improve accuracy and protect valuable columns, Shimadzu has developed the concept of Analytical Intelligence which is delivering what is required for continued success. Analytical Intelligence is a smart analytical platform that incorporates artificial intelligence (AI), Internet of Things (IoT) and machine learning (ML) algorithms with advanced monitoring, self-diagnostics and auto-recovery capabilities.

This new analytical instrument concept consists of systems and software that simulate expert operators automatically determining whether conditions and results are good or bad, providing feedback to users, and resolving common problems. It improves data reliability by compensating for differences in instrument knowledge or experience between users. This idea isn't limited to automating an analytical workflow or performing remote operations. It enables anyone to obtain reliable data and analytical results by aggregating and automating the knowledge and skills of experienced analysts.

Analytical Intelligence goes hand in hand with Shimadzu's 'Excellence in Science' brand value proposition. Numerous 'world's firsts' which meanwhile, have become industrial standards, as well as increasingly sensitive measuring methods substantiate this claim. With these technologies, Shimadzu enables customers from the most diverse industries to develop new products and solutions to promote and support consumer, patient and product safety as well as environmental protection.

At Shimadzu, all new products are obliged to have less environmental impact than previous products, thereby contributing to reducing CO2 emissions. In particular, products at least 25 per cent smaller or at least 25 per cent lower energy consumption than previous products are certified as "Eco-Products Plus," promoting the commercialisation of instruments with excellent environmental performance.

As a first step, selected system solutions incorporating Analytical Intelligence include the Nexera series of (U) HPLC systems, the new UV-i Selection spectrophotometers and the Nexis SCD-2030 sulfur chemiluminescence detection system. The latest is the new, integrated i-Series LC system as it keeps the excellent performance of its predecessor but also addresses the demands of an increasingly varied range of users, locations, and approaches to analysis while always delivering highly reliable analytical results.

Significant progress has been made in automating analytical operations in an effort to improve productivity and prevent human errors. Nevertheless, differences in the functionality, performance, and operability of instruments and software and also in the level of analytical chemistry knowledge and expertise can affect the reliability of results and the condition of instruments. As a result core technologies such as mass spectrometry and biotechnology, which are widely applied in drug

discovery, medical research, and regenerative medicine, as well as optical measurement technologies and AI solutions will have a significant role to play in the coming years.

Mass spectrometry- Technological advancements in mass spectrometry have led to increased applications of this procedure. In addition, rise in private funding and government grants for R&D activities of mass spectrometry supplements the market growth. Strict monitoring and stringent rules set in the food and beverage industry by government authorities drive this growth further. The COVID-19 pandemic had a positive effect on the market due to high demand for multiple spectrometers from the pharmaceutical and biotechnology industries. However, the prolonged lockdown hampered the manufacturing activities, disrupted the supply chain, and increased the prices of raw materials.

Optical measurement technologies- Technological advancements have encouraged the development of several industries, owing to these advancements many industries are getting inclined towards automation for providing high-quality products. Many companies in diverse industries are using optical measurement instruments to maintain the accuracy of their products during the manufacturing process. In the pharmaceuticals and chemical industry, the increasing focus on the development of high purity grade products is expected to increase the demand for optical measuring instruments. Lately, the demand for video measuring machines (VMM) has been on a rise owing to their features such as high speed and increased accuracy. The advancement in science and technology is expected to propel market growth in the next few years. Furthermore, an increase in the number of patients having an eye-related problem is further expected to increase the use of optical measuring instruments for diagnosis purposes apart from their other uses in the healthcare industry.

AI solutions - AI in the healthcare market has historically been showcasing significant growth owing to the rapid adoption of AI and ML solutions in the healthcare sector. The onset of the COVID-19 pandemic proved to be an opportunity to showcase the prowess and sophistication AI can bring to the healthcare sector. During the second wave of the pandemic hospitals and clinics across the world made use of AI-based virtual assistants, inpatient care bots, and AI-assisted surgery robots to handle the continuous influx of patients, which would have otherwise overwhelmed the entire hospital operation cycle. With governments allocating funds to develop AI applications in the healthcare sector, the market is expected to boom over the course of 5 to 10 years.

In today's new normal, we wish that by combining our award-winning technologies along with your expertise and experience, we could work together and address the challenges that the pharma industry faces and realise our wishes for the well-being of mankind and the earth.

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