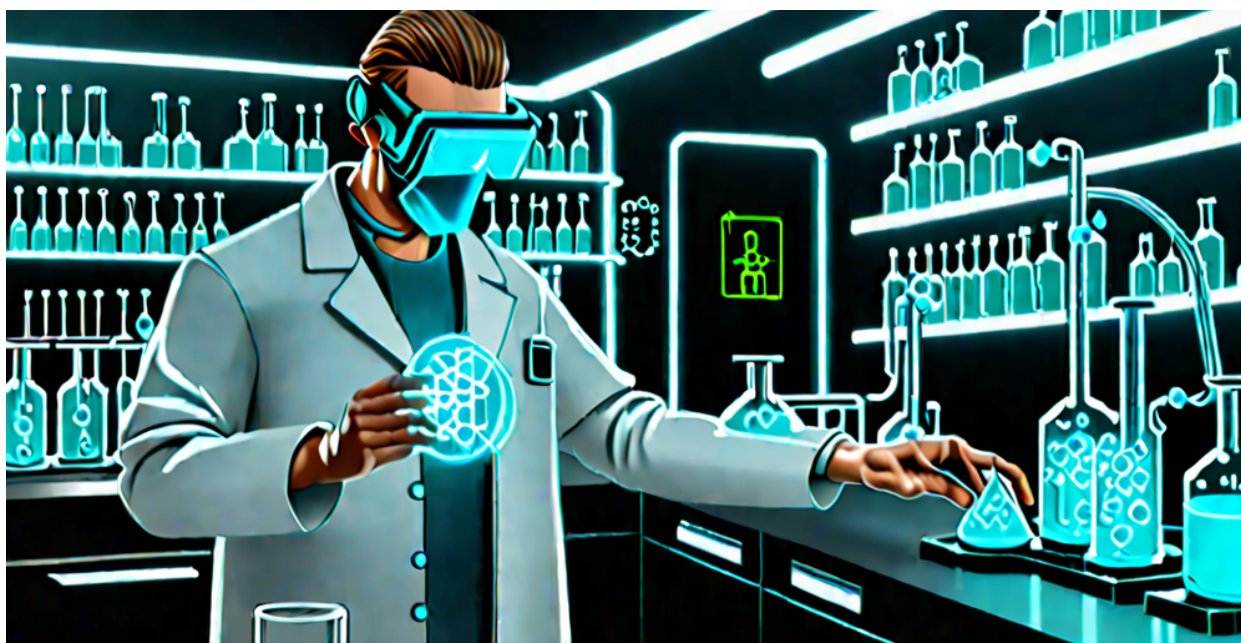The Augmented Human

AI In The Laboratory

By David Sutton Director of IT for Compounder's International Analytical Laboratory

The laboratory needs to be using AI as a path towards augmentation and not so much for automation.

AI is all the rage right now. From ChatGPT to DeepSeek R1, every company and organization is looking for a solution that AI is the answer. While many heads of IT are moving forward with varying solutions, the first question really should be 'Why'.

At first glance it's an easy enough question. Some will say, "to stay ahead of the competition". While others will say, "being more efficient". Brutally honest will say, "to reduce the workforce". It would be justifiable to accept these answers, but it's not really what AI is being built for. May I propose the obvious reason, the reason we tend to gloss over...to augment humanity.

Most labs are looking for AI to address staffing and quantity issues. In fact, a recent article in Sci Tech Daily raises these issues. Many of the instruments in the labs these days have automation. However, none of these automations are complete systems, working from receiving to testing to disposal. It's not that we should be pushing towards this goal; it's just the wrong job for AI.

Machine Learning VS Artificial Intelligence

Automation is a perfect use case for Machine Learning (ML). With ML, you can create an assembly line of chemical processing. It doesn't require advance computing and difficult programming. In fact, many ML automations are so simple they can be run on low-end computers. Most solutions in the lab could take advantage of ML automation.

AI is a different story. It's massively expensive and difficult to develop. It requires hardware that is almost cost-prohibitive in a lab automation scenario. What AI is better used for is qualitative analysis. Feeding AI with loads of passed successful results and a smattering of failed results will train the AI to see patterns. These patterns can then be extrapolated against current results and assert whether a result was conducted correctly.

A Better AI Use Case

Augmentation is the goal for AI. As humans, we have a hard time with objectiveness, and our own personal bias can get in the way. Using AI to augment humans can reduce that bias. This is to say that humans aren't the problem; they just need to have all the facts. AI is able to reduce large datasets into a more palatable packet of information that humans are able to work with better.

Take, for instance, Cisco, the network company. They just announced their AI product built-into their networking equipment. What was a difficult process for a network engineer to write rules for routing data packets around a network has become now a natural language request. Cisco's AI reduced the large number of commands to natural language for humans to perform complex tasks in a simple format.

In essence, the lab needs to do the same thing. Labs are filled with Standard Operating Systems, procedures, and methods. It takes months to get the average lab technician or chemist weeks to months to be trained in that lab. Lost productivity just to train or even retrain. A better way would have AI available for that individual to guide them through the process, providing highlights from procedures and simple checklists to perform. With in or even adjacent to the Laboratory Information Management System, AI would augment the process that the lab is performing. Being provided with each step or guideline every step of the way. Thus increasing production, providing better consistency, and faster turn-around times.

First Steps

Currently, Compounder's International Analytical Laboratory (CIAL) is building such a lab augmentation system. Over the last few months, we have started to train AI in our Standard Operating Systems, procedures, and methods. Since we are building a on-premises solution for the lab, it provides data protection and privacy for our customers. The AI will soon be able to provide our lab with guidance as they perform testing. While this is an adjacent application to our Laboratory Information Management System, it will nevertheless bridge the gap between procedure and practice.

In the coming year, we will be refining the AI training and thus more perfecting the augmentation. Indirectly, the hope will be to accomplish better testing consistency, reduce Out-Of-Spec results, and increase turn-around times for our customers.