



PHARMACEUTICAL SOLUTIONS

OVERVIEW

The continued advancement of Artificial Intelligence is dramatically changing the landscape of the Pharmaceutical industry. At Vertex, our expertise and agility provide our clients with direct access to the advanced technology needed to solve complex problems in biotech and pharmaceuticals. We provide affordable and effective cutting-edge technology for our clients to deploy and streamline their data systems without incurring the significant expenses associated with recruiting, training and maintaining an in-house team. Optimizing and automating processes increases the accuracy and efficiency of existing systems while paving the way for innovations and more advanced systems. Incorporating these cutting-edge technologies provides the competitive advantage necessary to succeed in the future landscape. We understand that innovation and optimization is a key part of our clients' success so we work closely with our clients to help them achieve their strategic data-driven goals.

TECHNIQUES

- ▼ Image Recognition
- ▼ Machine Learning
- ▼ Anomaly Detection
- ▼ Data Warehousing
- ▼ Data Visualization
- ▼ Automation
- ▼ Deep Learning
- ▼ Natural Language Processing

REAL-TIME ANOMALY DETECTION

Many times, standard engineering principles for early failure detection are not possible in continuous processing units. In these cases, multivariate statistical techniques are often employed to evaluate process failure. These methods quickly breakdown with increasingly complex systems. Machine Learning provides ideal techniques to generalize for new cases when the system is complex or data is not available causing traditional engineering techniques to be significantly more fragile. The ability to accurately detect anomalies in real time is crucial to managing the success and validation of these expensive efforts. Vertex helps their clients detect manufacturing failure with deeper insight and earlier in the pipeline by leveraging our extensive domain knowledge in Machine Learning, Deep Learning, and Continuous Automated Processes.

ANALYTIC DATA WAREHOUSING

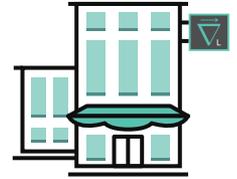
Streamlined generation of both high-level and technical reports is a crucial step in providing data-driven business decisions. Often, this process is slow and incomplete due to non-automated data silos which leads to miscommunication and many additional expenses along the product development life cycle. This approach is not scalable for future innovation utilizing advanced AI and machine learning methods. As analysts and machine learning scientists ourselves, Vertex approaches automated data sharing and report generation systems with a "future first" methodology to deliver solutions that are designed for instant implementation of machine learning technology. These systems are an ideal fit when traditional database services are not applicable or do not deliver the desired results.



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MULTIVARIATE CLASSIFICATION

Quality decisions are often made late in the development cycle. Deep learning has proven extremely effective in complex time series problems where traditional statistical analysis methods have failed. A recent example is in speech recognition, where the performance increase is over thirty-fold. Our expertise can save money and time in experimentation by facilitating early validation to link pre-candidate selection to product development. Vertex's researchers are time-series specialists with heavy domain knowledge in pharmaceuticals, automated medicine, and speech technology.



ADVANCED STATE ANALYSIS

Automatically determining failure in machines and production is crucial to production management and scale, but is not always possible. Many machines and processes are far too sensitive to employ traditional sensors and in some cases, the sensors simply do not exist. Adding autonomy to these machines and processes using custom image recognition checkpoints coupled with process serialization can increase the efficiency of the production pipeline. Deep learning is the state of the art in image recognition, currently allowing analysis that was never before possible (such as tumor segmentation, Pathology, and facial recognition) but it is rarely employed in industries that do not already specialize in that technology due to its extreme difficulty. With Vertex, you have a team already skilled in Deep Learning and industrial deployment.



AUTONOMOUS ROBOTICS

The ultimate goal of high-throughput automation is achieving an end-to-end "lights out" manufacturing process. While there has been progress on this front, the largest bottlenecks in automated processes are the various human checkpoints between machines and global integration between these systems. Traditional techniques are too fragile to handle the noisy data and realistic non-academic environments, thus human intervention has been essential until now. Vertex Labs employs modern Machine Learning and Deep Learning techniques that are robust to noisy data and can allow for less human intervention in the high throughput chemistry process.



The aforementioned solutions are intended to act as general overviews and descriptions of the applications of Vertex Laboratories' technical solutions, intellectual property and capabilities for the Pharmaceutical and Biotech industries. These solutions, descriptions and overviews are not intended to act in place of a formal proposal, contract or any other legally binding agreement. Although this document outlines some of Vertex Laboratories' capabilities, it does not list all possibilities of our techniques, intellectual property, and solutions, and no way implies that our solutions are not customizable for our clients specific needs, and should be understood as a general overview. For more detailed information on how Vertex Laboratories' solutions may be applied to your specific workflows, please contact us using the information below.