

## Patent Protection & Registration

[Patents](#) grant property rights on new and useful inventions, allowing the patent holder to prevent others from using, making, or selling that invention without permission for a limited time. U.S. patents are permitted by the U.S. Constitution and are designed to promote scientific progress and invention. By allowing inventors to profit from licensing or selling their patent rights, inventors can recoup their research and development costs and benefit financially from their inventing efforts. There are three main types of patents utility, plant, and design. Utility and plant patents can last up to 20 years, while design patents can last up to 15 years. When a patent expires, the patented material enters the public domain, making it free to use by anyone without a license. U.S. patents are issued by the [United States Patent and Trademark Office \(USPTO\)](#).

[U.S. Patent No. 11,644,390](#) entitled “Contextual Data Modeling And Dynamic Process Intervention For Industrial Plants” issued May 9, 2023 to Buckman Laboratories International, Inc. of Memphis, Tennessee. Invented by Narasimha M. Rao of Collierville, Tennessee; Arun Kumar Raju Ganesan of Germantown, Tennessee and John Carter of Mobile, Alabama. Abstract: Systems and methods are disclosed herein for contextual data analysis and proactive intervention in industrial plant processes. Each of multiple data streams in an industrial plant are mapped to a common hierarchical data structure, wherein the data streams correspond to respective values or states associated with unit operations, assets, and process streams in the plant. The mapped data streams define hierarchical process relationships between subsets of the unit operations, assets, and process streams. Real-time data is collected to populate at least one level of the hierarchical data structure for certain data streams, wherein future outcomes are predicted for downstream operations based on the collected real-time data for at least one data stream, and at least one other data stream having a defined hierarchical process relationship therewith. Upon ascertaining that predicted future outcomes correspond to issues requiring intervention, output signals are generated based thereon for operator alerts and/or automated control.