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10 Artificial Intelligence innovations impacting the filtration industry

By Doug Walker November 29, 2021

Features

Artificial intelligence is gaining importance in various applications of daily life, including the filtration industry. The application of AI is increasing in the domain of membrane-based filtration and treatment and is recognized as an energy-efficient water management process.

AI processes find application in membrane desalination, forward osmosis, industrial filtration, and other filtration treatments in many modern industries such as

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manufacturing, wastewater treatment, and petrochemicals.

Here are 10 of the top artificial intelligence innovations impacting the filtration industry in 2021 and beyond.

1. Molecular Dynamic Simulation Helps Monitor Water Treatment Plants

Artificial intelligence techniques such as deep, dense neural networks, recurrent neural networks, and deep learning frameworks find extensive application in the wastewater treatment industry.

These applications include functions such as the filtration of sediments, deposition of the sludge, and maintaining the optimal balances of microbes in the sludge plant treatments.

By leveraging AI tools, it is possible to optimize the treatment based on seasonal variations and reduce environmental damage and pollution.

2. Computational Fluid Dynamics Aids Desalination

Conventional water sources are getting depleted every day. Thus the need for computational methods and newer technologies to manage water supply and desalination is on the rise. For example, artificial intelligence techniques leverage computational methods to ascertain how to filter sodium chloride from water.

Though the graphene nanometre pores are used in the process, the pore sizes that vary between 1.5 and 55 amperes are performed with the help of deep learning techniques

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and machine learning algorithms. The techniques can also be of great use in altering the thickness of the membranes, membrane porosity, pore size, feed temperature, and feed flow rate. These are based on computational fluid dynamics, a branch of AI.

3. Neural Networks Make Sewage Treatment Plants More Efficient

The industrial process of wastewater and sewage treatment is an uncertain and time-varying process. Recently neural networks are being used to assess the reuse potential of wastewater. Neural networks are specifically designed to render accurate predictions of the nitrogen content in the wastewater and evaluate the efficacy of the wastewater filtration and remediation practices.

4. IoT Solutions Improve Water Filters

Internet of Things (IoT) solutions can help raise the performance of water filtration systems used for both residential and commercial purposes. Having an intelligent and communicative water filtration system has tremendous advantages as it comes with both real-time and historical data.

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Operators will know the status of the filter and will be able to enhance its maintenance remotely. This will help save time and resources. It also helps improve productivity and foster faster decisions that are based on clear and coherent data.

5. Predictive Maintenance for Industrial Filtration Systems

Industrial filtration systems aim to prevent fine metal chips and other debris from contaminating coolants and oils. Industrial CNC machine coolant filtration systems also help extend the life of the machines by filtering harmful debris from the coolant liquids in the machines. Thus, clean fluid flows back into the machine and prevents expensive repairs.

Artificial intelligence gives insight into wear and tear on the filters and can predict when maintenance is needed to prevent damages, costly repairs, and unexpected downtime.

6. Machine Learning Gives Insight Into the Industrial Filtration Market

With the help of AI-powered machine learning algorithms, it becomes easy to have an in-depth assessment of the industrial filtration market with a distinctive focus on its drivers, restraints, and opportunities.

The data it gathers will also offer insight into the filtration units' manufacturing, shipment, price, and revenue.

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Wastewater Treatment Plant: Photo by Michal Jarmoluk on Pixabay.

7. Wastewater Filtration Management

The evolution of filtration of wastewater treatment plants in industries is tremendous. From the use of sand and anthracite filters, it has grown to micro and ultra-filters that target to filter colloids, pathogens, and other specific contaminants.

Today, filtration parts that are made through injection molding like brackets, filter housings, and filter assemblies can be created through an AI-driven process recommender system that can improve precision in production.

Furthermore, with the incorporation of advanced measures that are powered by

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artificial intelligence, industries have found ways to reuse wastewater and mitigate their environmental footprints. There are also developments to create efficient, selective, and intensive filtration options.

8. Developments in Digital Water

Digital water will be a big name in the filtration industry moving forward. It has been managed in industries with the help of software tools such as data analytics, data visualization, and predictive analytics. In digital water, hardware sensors are used to track water filtration, levels of impurities, water quality, flow, and pressure.

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AI is the holy grail of digital water and can be of great use in cutting down the waste of water, improving the treatment of wastewater, and maintaining healthy water infrastructure.

9. Regulating Blue Energy

The term “blue energy” refers to osmotic power, which is energy gathered by combining different streams of water. Large amounts of energy can be harvested by intersecting two different sources of water. Sources such as rivers and oceans, and a check on their salinity, are offered by pressure-retarded osmosis and reverse electro-dialysis, and artificial intelligence tools are regulating both these processes.

10. Automated Controls For Water Treatment Plants

The increasing need for high-quality drinking water is the motivation for developing automated controls for water treatment plants. Although the membrane filtration techniques are considered safe against microbial contamination, the quality of the final water is not guaranteed.

Thus to improve the quality of the entire treatment plant, AI-based tools such as cytometric monitoring and membrane bioreactor (MBR) controls can be of great help.

The Bottom Line

Artificial intelligence is powering diverse industries, and the filtration industry is no exception. AI plays a pivotal role in water management and facilitates efficient, effective filtration of elements to make water fit for commercial, residential, industrial, and large-

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scale use.

AI makes possible a powerful and widely applicable set of data tools that help make resources both financially and environmentally sustainable.

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About the author: Doug Walker is an Online Marketing Expert that has built successful eCommerce businesses from the ground up, worked with enterprise-level organizations such as Dell, Intuit, Coldwater Creek, and FindLaw/Thomson Reuters, and consulted for small law firms and businesses. Over the past 13 years, Doug has taken a customized, proprietary approach to digital marketing and has written several articles to help maximize revenue and dominate online niches.

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