# Automation Based on Artificial Intelligence Accelerates the Cleaning of Territories and Improves the Environment

**Evgeniy Bryndin**

*Evgeniy Bryndin, Research Centre Nature Informatic, Technological Platform Future Medicine, Novosibirsk, Russia*

**\*Corresponding author**
Evgeniy Bryndin, Research Centre Nature Informatic, Technological Platform Future Medicine, Novosibirsk, Russia

**Abstract**
*Automation has repeatedly demonstrated improvements in employee conditions through the creation of new jobs, higher wages, new skills and reduced workplace injuries. Automation, artificial intelligence, robotics or any other advanced technologies are aimed at control, optimization, troubleshooting, safety and improvement. In an environment where the cleaning sector on average is experiencing an increase, the industry should consider automation as a huge opportunity to reduce the environmental and operational burden on a long list of cleaning tasks.*

**Keyword:** Artificial intelligence, Automation, Ecology, Cleaning.

## Tasks of artificial intelligence in cleaning the territory

According to forecasts, by 2022, the cleaning industry is expected to grow by 6.2 percent - and jobs in this sector are projected to grow by 7 percent by 2028 (Figure 1).
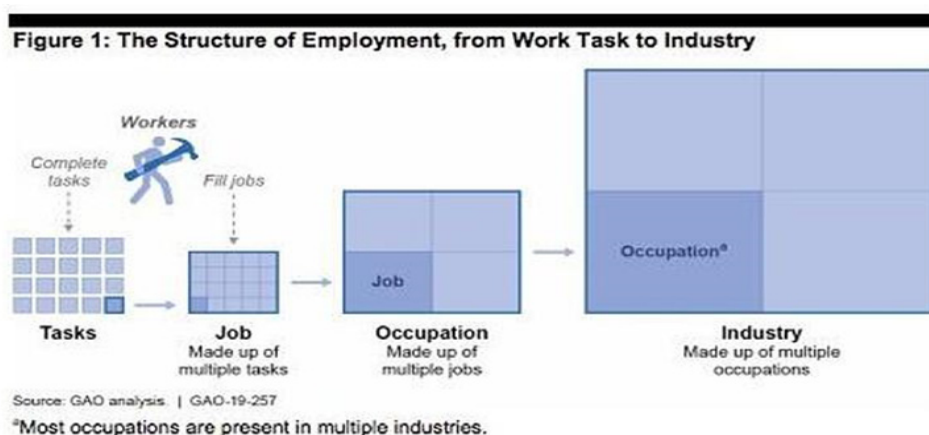


**Figure 1:** Employment structure in the cleaning industry.

Obviously, it must be automated in order to serve this growth. Automation is a promising solution. Consider a way to improve the efficiency of workplace automation.

Experts agree that automation complements the workforce. David H., professor of economics at the MIT (Massachusetts Institute of Technology), argues that despite technological failures over the past 200 years, human labor is not outdated. Automation and human labor are partners.

Tasks that cannot be replaced by automation are usually supplemented by human labor. Most workflows rely on a multifaceted set of resources: labour and capital; brains and muscles; creativity and repeatability; technical skill and intuitive judgment; effort and inspiration; compliance with the rules and reasonable exercise of authority. As a rule, each of these factors plays an important role.

Improvements in one do not eliminate the need for another. Artificial intelligence is better at solving these problems [1-6].

The cleaning industry relies on human participation in many areas of work. Jobs that technology can replace change over time:
- technology creates new deployment and maintenance jobs. Studies show that areas where automation can be deployed are experiencing a significant increase in their concentration of technological jobs;
- technology allows you to expand your business and, in turn, creates demand for more employees.

## Automation improves performance

Workers see automation as a chance for advanced training. It also makes them more active at work as they master the technology they manage.Take, for example, a job that requires a person to walk around the territory to see if the trash cans are full and need emptying. Deploying sensory technology can warn this worker when a particular trash can needs to be emptied, allowing him to simultaneously focus on something more profitable. Sensory technology can over time additionally collect data that informs the employee about making strategic decisions about the placement of these garbage bins.

Traditionally, cleaning had few opportunities for promotion. It also does not match the values  of the next generations when it comes to work. The younger generation is more appreciative of opportunities for advancement, learning and growth.

There is a dangerous side to manual cleaning of territories. In 2017, private sector employers recorded approximately 2.8 million non-fatal injuries and illnesses in the workplace. And the data show that injuries at the workplace cost $250 billion annually.Automated solutions in this area, such as self-contained vacuum cleaners and floor cleaners, allow workers to refrain from work that is prone to injury.Automation has dramatically improved security in various sectors. Typically, security is enhanced when cleaning providers remove employees from repetitive, manual tasks and transfer them to automation, where they provide less physical engagement [7-9].

Automation enables enterprises reinvest in the workforce
As companies introduce technology and find more efficiency in their business, they can think about where they will reallocate time and money. These resources can be reinvested in expanding services, operations, employee benefits, and more, helping tenant companies become more competitive and more attractive to potential employees, and helping cleaning companies differentiate and improve environmental cleaning standards.

Moreover, technology facilitates staff training. Many firms offer their employees training in adapting to changing roles and tasks, especially when tasks or roles have become technical. Managers of some firms say that training current workers for technical automation of a position is easier than finding workers with appropriate physical skills.

Productivity gains through automation also lead to higher wages for employees. As you know, high-performance firms generate more products per employee, which, in turn, allows them to lower prices, increase market share and pay higher salaries. The effect of labor productivity, due to cost savings and an increase in it through automation, increases the demand for work and wages when performing new or non-automated tasks.Automation allows area cleaners to attract new employees and retain them and reinvest them in their personnel.

Given how things are going today in environmental cleaning, it is vital that employers look at where they can introduce technology to create better jobs and a better workforce.

When employers use intelligent devices, they can measure results, collect information, and provide valuable data to customers. Cleaners can focus on places that need the most work.

Fewer recurring injuries and new skills in cleaning automation technology, more efficient allocation of resources are three aspects of how automation improves jobs.

People may or may not make mistakes, but automated devices do the same, every time. This guarantees the desired results.

Deploying technology means collecting data on how the work was done. You will find out how many square meters have been cleared, what areas have been removed. Artificial intelligence is better at solving these problems. Robots and artificial intelligence can effectively help correct errors to natural intelligence made in the field of ecology [10-14].

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