Innovative projects in the Industry 4.0 sphere of PSAU

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Unified information platform for the management of material resources of territorial communities. This project is aimed at creating a unified digital information space using a cloud ERP for managing all processes and resources of territorial communities as non-industrial enterprises in the context of building a landscape of Industry 4.0 technologies. Domestic ERP Universal offers the advantage of being able to manage enterprises with different accounting schemes in one database, makes it possible to scale the system to most enterprises in the future, use a combination of artificial intelligence and Internet of Things technologies.

Segmentation of analogue meter readings using neural networks. One of the constraints to the implementation of the concepts of Smart City, Industry 4.0, etc. is the need to integrate analog energy metering. Often their replacement with digital devices is not cost-effective. One option to overcome this barrier could be a combination of AI and IoT technologies. The project proposes options for solving the image segmentation problem of displaying digital indicators of analogue meters using neural networks.

Electrotechnical systems for bacteriocidal air disinfection. Air often becomes a source and transmitter of pathogenic microorganisms, infections, and viruses. Ultraviolet radiation in the range of 200 to 280 nm, depending on the dosage of exposure, inactivates all microorganisms. The development of electrotechnical systems for UV disinfection (ozone-free) will provide a comprehensive solution to the task of bactericidal air disinfection in various spheres of human activity.
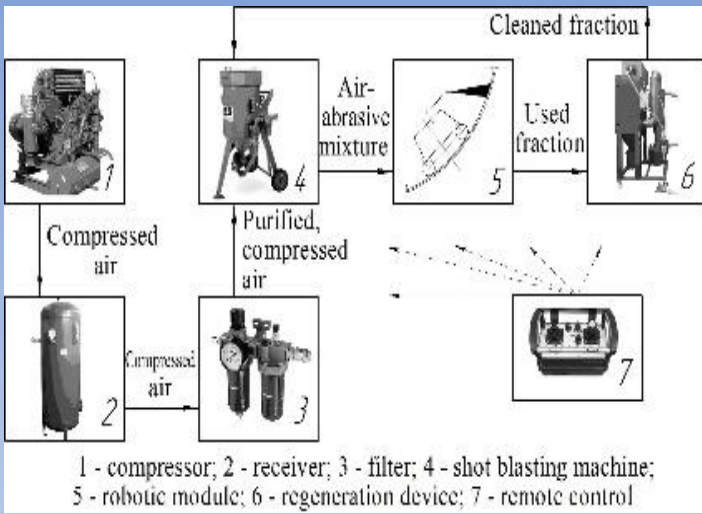
Complex of shot blasting processing of metal products. In mechanical engineering, there is a tendency to replace expensive metals in the manufacture of large-sized products with more affordable carbon steels with corrosion-resistant non-metallic coatings on working surfaces. The strength of such coatings is ensured by the quality of surface preparation achieved by shot blasting. A robotic complex of remote processing of metal surfaces of free forms with compliance with the specified parameters is offered.

Cleaned fraction
Air-abrasive mixture
Used fraction
Compressed air
Purified, compressed air
Compressed air

1 - compressor; 2 - receiver; 3 - filter; 4 - shot blasting machine; 5 - robotic module; 6 - regeneration device; 7 - remote control

Groundwater level monitoring automation. To control groundwater flooding, it is necessary to determine its cause system. This can be done by analyzing the groundwater table depth change. Conducting such research is a rather long and time-consuming process, so it is necessary to create an automated system for monitoring groundwater. The placement of sensors that will automatically provide data on the groundwater level rise or fall in large areas over periods of time will enable identifying flooding causes and the development of effective control measures.

Areal flooding control
Wells with water level indicators
Wells with water level indicators