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Relevance of Mobile Automation Transport Robots

At the moment, there are many different vehicles ranging from small wheeled robots, trucks, trailers, all-terrain vehicles and heavy machinery. Moving means are applied in all possible areas starting up from transportation of people and goods to such urgent activities as reconnaissance, rescue and sapper works etc.

In certain areas, there is a necessity of automated management systems of this class. In emergency situations, the presence of an aggressive environment, with rescue and sapper works when human presence is undesirable, it is very important to use automated traffic systems.

The transport management process is quite complex and non-trivial. This is due to the complexity of the controlled object and it is essentially nonlinear, non-stationary and multi-dimensional. Additional tasks of managing these systems provide adequate data directly on the current state of the object. To solve this problem, different methods of positioning as ultrasound, laser sensors, computer vision, GPS-systems, and compasses, etc. depending on the required accuracy and resources are in common use now.

In some cases the problem of positioning can be solved by using computer vision. Computer vision is based on such necessary steps as clear understanding of the camera and the physical process of image formation, receiving simple conclusions based on the learning of a set of individual pixels, generating information from multiple images, the ordering of pixels in order to separate them or obtain information about the shape, object detection while using geometric information or probabilistic methods.

A developed positioning system will be based on intelligent control methods, which include the fuzzy logic theory, the theory of artificial neural networks and their combination. Nonlinearity of the proposed mathematical apparatus allows us to consider non-linear characteristics of objects and improve quality control of complex systems that cannot be repeated linear systems in nature.

At the moment, this direction is considered to be the most promising in the management of non-linear and non-stationary objects, because of increased speed, alternative approaches in providing input and output data, the links between them, a higher degree of approximation, etc.

It should be noted that since these approaches have been developed to solve practical problems, they could be resulted in creating more specific software and hardware platforms and will be able to be optimized for system design.