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FEATURES OF COMMUNICATION BETWEEN ROBOTS IN A GROUP UNDER CONDITIONS OF A LIMITED NUMBER OF CHANNELS

Recently, a number of robots or other automated systems are being used to solve a number of problems in industry and service. The interconnection among separate elements of these complex distributed systems is usually operated on the basis of wireless receivers operating at different frequencies with different

protocols and exchange speed depending on the required amount of transmitted information among the information elements. So, in the case of using a pre-selected principle of communication embedded in the robotic systems of the receiver group, there may appear a problem of channel failure. Therefore, there is a task of redistributing traffic among the elements of the robotics group with a limited number of channels, the priority of the transmitted information being taken into account.

In general, we have the following basic parameters of wireless communication in a group of robots:

- the number of channels (both frequency and temporary ones) that can be used by a group of robots;
- maximum boundary data exchange rate on each channel
- number of robots in the group;
- average amount of data transmitted by one element of the system per unit of time;
- the location of the separate elements (robots) relative to each other.

The problem will be considered without reference to the possible level of obstacles, assuming that a given maximum boundary speed is already set taking into account the obstacles in the area of robotics system operation.

In addition, it is necessary to consider such a parameter as the decision making center for the work of group elements, distinguish self-organized distributed systems and systems with the central element of decision making.

Given transmission delays, traffic can be divided into three categories:

- Real-time traffic that includes audio and video information critical to transmission delays.
- Transaction traffic, when transmitting this type of traffic delays should not exceed 1second.
- Data traffic, when transmitting this traffic category delays can have actually any value and can reach even few seconds.

The priority queue method is most commonly used to provide delays-sensitive temporary guarantees. There is no single standard for this method. Each manufacturer of network equipment implements its own queuing algorithms in its products. For example, the FIFO algorithm, where the router receives packets faster than it can send them through a given port, puts the packets in a queue. Then they are sent in the order of receipt, i.e. the principle of "first in, first out" is implemented.

Random Early Detection (RED) provides an alternative to FIFO queues. This method allows to mitigate the effect of packet loss even at very high loads.

Another priority queue is an algorithm in which multiple FIFO or RED queues form a single queue. In this case, traffic is sent in the order of strict priority: the first - high priority traffic, the second – medium priority, etc.

Weighted Fair Queuing (WFQ) is a special case of CBQ when classes correspond to independent threads. Currently the QoS technology is the most optimal one, and is quite widely used in various telecommunication networks.

Thus, an effective way of ensuring the necessary traffic parameters in the network of a group of robots is to organize a dynamic system of priorities, depending on its load.

A method of supporting QoS in mobile networks of transmission systems of grouped robotic systems based on variable traffic priority is proposed. It provides for the allocation of flows based on the required resources and assigns such priorities that flows can be selectively dropped or diverted during congestion. Nodes independently monitor the levels of high-priority processes and signal corrective mechanisms when these values go beyond specified limits.

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