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Research on Intelligent Flight Software Robot Based on Internet of Things

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Instruction

2010 China Internet of Things Application Promotion Union pointed out that the robot is one of the 100 leading edge technology. 2015, the forefront of the field of robot top10 technology, including Internet of things embedded technology, simulation technology, large data technology, cloud computing robot, robot autonomy technology and so on. The robot uses the sensor technology in the key technology of the Internet of Things. In order to make life better and more convenient, the research of Internet of Things technology and application, focusing on research based on the Internet of intelligent flight spherical monitoring software robot technology. In this paper, you can use matlab simulation robot and programming algorithm, the use of advanced programming language to develop intelligent flight robots. The research results of intelligent flight monitoring software robot technology can be applied in academia and industry and medical transportation. This paper studies the intelligent flight monitoring software robot under the Internet of Things. Internet of things, also known as sensor network, the definition of things is: through radio frequency identification, infrared sensors, global positioning system, laser scanner and other information sensing equipment, according to the agreement, any items connected with the Internet To carry out information exchange and communication, in order to achieve intelligent identification, positioning, tracking, monitoring and management of a network. Intelligent flight spherical theory: spherical aircraft is mainly to help fly. Unmanned aircraft compared with the traditional manned aircraft, with a portable and transport light, good motor performance [1], low working environment requirements [2], low-altitude flight capability [3, 4] and other characteristics, quickly get The importance and favor of the nations of the world [5, 6, 7, 8, 9, 10]. As a mobile robot with spherical rolling movement, the spherical robot has the advantages of flexible movement [11], strong adaptability to environment [12], high movement efficiency [13] and so on. It has been paid more and more attention by researchers [14, 15, 16, 17, 18, 19, 20, 21, 22]. Robot theory: With the development of science and technology, people's research on robots is more and more in-depth, more and more mature, and gradually invented can help people take care of life, do simple housework robots, can automatically control, repeatable Programming, multi-functional operation of the robot, according to the order and conditions in advance, in turn, control the robot's mechanical action program-controlled robot, through the guidance or other ways to first teach the robot action, enter the work program, automatically repeat the work lady A robot, a numerically controlled robot that can teach a robot by numerology, language, and the like, a sensor-controlled robot that controls the movement of the robot by the information acquired by the sensor, a robot capable of adapting to the change of the environment, controlling the adaptive control robot of its own action, Experience "work experience, have a certain learning function, and the" learning "experience for the work of the learning control of the robot, as well as artificial intelligence to determine the action of intelligent robots and so on.

Method

The relationship between the Internet of Things and the robot is shown in Figure 1.

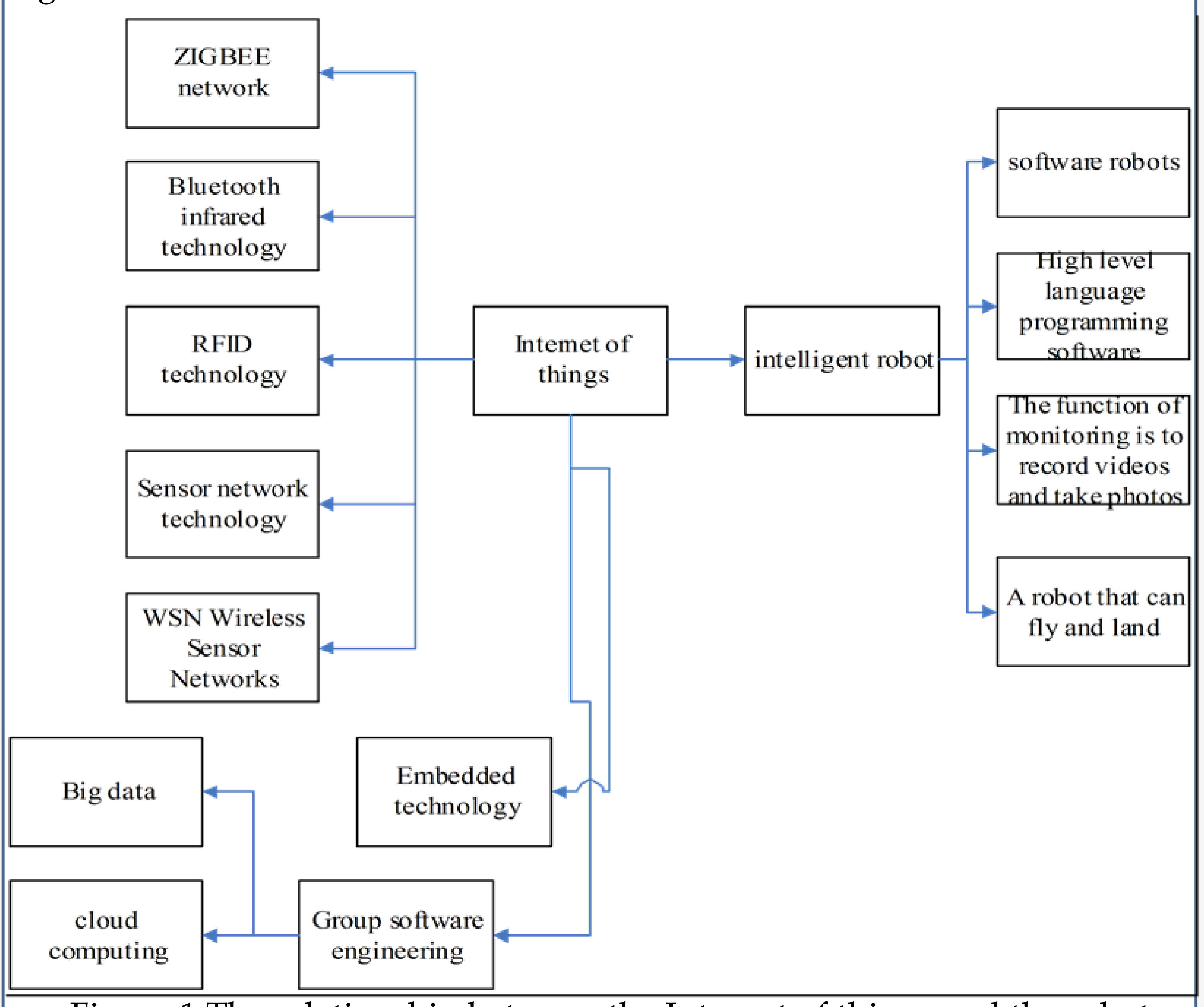

Figure 1 The relationship between the Internet of things and the robot

(1)path planning problems, in order to avoid the construction and verification of obstacles: The robot and the obstacles are equipped with sensors, can communicate with each other. The construction of the environment road map, the mobile robot in the process of running its own sensor system in real time to detect the path information to update the environment in real time road map, on the one hand, the sensor system can accurately access the obstacle information directly affect the environment road The accuracy of the update, on the other hand, is also critical to finding an efficient way to reconstruct the environment. The method of neural network can be used to solve the problem of increasing the controller's data processor and reduce the responsiveness of the robot. If the mobile robot detects an obstacle to regenerate the road map. (2)To build and solve the image of the local feature similarity of the dense matching (target recognition) to build and verify: According to the previously mentioned passive and active visual matching algorithm, the matching performance of the two is discussed and analyzed mainly from the experimental data. Experimental part based on adaptive weight filtering matching algorithm (passive): The first step is to discuss the experimental part of the adaptive weight filter matching algorithm, focusing on the accuracy and efficiency of the best local matching algorithm, and analyzing the influence of the algorithm parameters on the performance of the algorithm. (3)Visual navigation technology issues, target detection and obstacle detection of the construction and verification: For the first second little problem. Aiming at the requirement of autonomous navigation of unknown space intelligent robot, a design scheme of miniature visual assistant navigation system is proposed. First select the model of the sensor to determine the composition of the hardware and connection, given the system of working principle and process, the final system software development. Set up intelligent robot vision navigation platform.

Results and discussion

(1)path planning problems, in order to avoid obstacles to the solution:
The LS-SVM method in the neural network is mainly used to study the path planning and avoid obstacles. The existing methods mainly have the shape space method, the graph search method, the topological method, the determination grid method, the grid method and so on. These methods are usually computationally intensive and difficult to extend from two-dimensional optimization problems to three-dimensional optimization problems. Neural network processing speed is high, and has a certain fault tolerance, is an efficient environment roadmap reconstruction method, dealing with three-dimensional path planning problem does not bring additional complexity. (2)research and solve the image of the local feature

principle of image denoising, it is possible to reduce the noise of the parallax by filtering. From the results of low-pass filtering, it can be seen that although the overall noise is reduced, the edge detail of the object can not be well maintained. This phenomenon is called the edge widening effect. D The edge filter with edge preserving characteristics is used in the adaptive filtering model of the stereo matching cost function. E The bilateral filtering model is mainly the Gaussian kernel product of the spatial domain and the amplitude domain. Adaptive Filtering Weight Matching Algorithm Based on Minimum Spanning Tree. G is a method to achieve the matching cost function filtering by using the hierarchical clustering algorithm. By using the similarity of the amplitude in the local area of the image, a series of sampling samples are obtained by the hierarchical clustering algorithm, Like the region has a larger weight, on the contrary, to give a smaller weight. (3)Visual navigation technology issues, target detection and obstacle detection solution: For the first second small problem, you can use the experimental method to solve, that is, to build a robot visual navigation experimental platform. For the third little problem: A light flow method. Moving a three-dimensional motion scene in space to an image is represented as a two-dimensional optical flow field. Ideally, the optical flow in the image can detect the area of the object that is relatively moving with the camera in the scene and can calculate the size and direction of the movement of the object without knowing any information in the scene. Optical flow navigation technology is the use of optical flow field size and direction to determine the distance between the object and the camera, in order to obtain their own posture navigation information. UAV vision system only use the monocular camera optical flow field information can restore the structure of the scene information, so as to assist the UAV to achieve obstacles and close to the target object and other tasks. By using the optical flow method combined with the result of three-dimensional measurement (provided by stereo vision or inertial sensor), the distance information of the object can be obtained accurately, and the reference information can be provided for the local path planning and navigation of the robot. B Navigation based on scene recognition and segmentation. And human beings to achieve independent navigation in different ways, only the use of images or other sensors to obtain information on the distance in the environment to determine the information available path. For the perception of technology: A multi-sensor perception of external environment information, the need for a variety of data fusion through the way to achieve a unified description of the measured object. B Depending on the requirements of the robotic mission book, the combination of different sensors is selected. C to visual sensors, the integration of a variety of other sensors in one, the formation of smaller, lighter weight, more functional robot navigation system. Research on Target Detection Based on Generalized Hough Transform and Random Fern Classifier. (4)to solve and solve the target tracking technology solutions:
Research on Target Tracking Based on Online Learning Detection Mechanism. Target tracking based on overall area detection. Including single target tracking experiment and multi-target tracking experiment. Target Tracking Based on Local Area Detection and Segmentation.

Conclusion

Mobile robot is an important branch of robotics, and with the rapid development of related technology, it is toward the intelligent and diversified direction, widely used, almost penetrate all areas. Here the use of visual navigation, the robot based on the structure of the road environment to achieve road tracking, the target point of the dock, as well as tour guide comment, and achieved good results. Navigation robots are used in large exhibition halls, museums or other convention centers to guide visitors to visit along a fixed route, to explain to visitors and to engage in simple conversations. Therefore, the navigation robot must have the functions of autonomous navigation, path planning, intelligent obstacle avoidance, target point docking and location, voice explanation and simple dialogue with the visitor, and has the ability to respond quickly and adapt to the outside environment. The basic principle that we will use robotic robots as mobile robots (MobileRobot, MR) mobile robots is that the central processor, which is the heart of a mobile robot, uses multi-sensor information fusion technology to acquire robots themselves from multiple sensors The environment of the various information together, the integration of these information, so that the robot can understand their own state and their own environment, and real-time decision-making exercise control, in order to achieve the escape obstacles, to find the optimal path, To carry out autonomous movement and track tracking and other basic functions. Mobile robots can be divided into indoor and outdoor according to the working environment: according to the movement can be divided into wheel type, crawler, bipedal walking and no peristalsis, etc., of which the most commonly used wheeled mobile robot [71]. Environmental perception is the basic technology of mobile robots, mainly including two-dimensional and three-dimensional information processing, understanding. Data fusion and local path planning are the manifestations of high-level intelligent behavior in mobile robots. The former comprehensively understands the environment by synthesizing the information collected and processed by a variety of sensors, and the latter gives the action description of the robot according to the overall goal and the environment [72].Robot programming commonly used four languages are VAL language, AL language, IML language, SIGLA language. Robot project is the most common inspection line, tentacles obstacle avoidance, ultrasonic / infrared barrier, Bluetooth remote control and so on. Technical problems can be understood as technical shortcomings. Avoiding obstacles requires path planning. Autonomous planning and navigation based on some of the known environment path planning is usually used two kinds of strategies.

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