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в этом месте (представлял бы собой это состояние частицы), предположительные показания об окружающей среде совпадали с показаниями его датчиков. Присваивается вес каждой частице ω, пропорциональный указанной вероятности. Затем, робот генерирует набор новых частиц на основе предыдущего представления, с вероятностью, пропорциональной ω. Частицы, согласующиеся с показаниями датчиков, выбираются чаще, в отличии от частиц, несовместимых с показаниями датчиков. Таким образом, частицы сходятся к наилучшей оценке состояния робота. Робот становится все более уверенным в своем положении. Повторяя эти шаги, робот определяет свое местоположение с наибольшей вероятностью.

Работа выполнена в Томском государственном университете при финансовой поддержке Минобрнауки России, уникальный идентификатор RFMEFI57817X0241.

INTELLIGENT AUTONOMOUS SYSTEMS & CONTROLLING IN MOBILE ROBOTS

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The modern technology has made it possible for the discovery of many functional and utility devices like the smartphone and robots. With all of these revolution, technology has also made our lives easier, faster and better. This article will focus on how the intelligent systems can autonomous themselves like robots via application.

Intelligent Autonomous Systems are increasingly applied in various areas ranging from industrial applications to professional service and household domains. New technologies and application domains push forward the need for research and development resulting in new challenges to be overcome in order to apply Intelligent Autonomous Systems in a reliable and user-independent way. Research focus on the fundamental issues of high quality positioning measurements and integration of related enabling technologies of mobile robots for outdoor industries.

Mobile robots have the capability to move around in their environment and are not fixed to one physical location. Mobile robots can be "autonomous" (AMR - autonomous mobile robot) which means they are capable of navigating an uncontrolled environment without the need for physical or electro-mechanical guidance devices. Alternatively, mobile robots can rely on guidance devices that allow them to travel a pre-defined navigation route in relatively controlled space (AGV - autonomous guided vehicle).

Mobile robots have become more commonplace in commercial and industrial settings. Hospitals have been using autonomous mobile robots to move materials for many years. Warehouses have installed mobile robotic systems to efficiently move materials from stocking shelves to order fulfillment zones. Mobile robots are also a major focus of current research and almost every major university has one or more labs that focus on mobile robot research.

Robotics is a relatively young field of modern technology that crosses traditional engineering boundaries. Understanding the complexity of robots and their applications requires knowledge of electrical engineering, mechanical engineering, systems and industrial engineering, computer science, economics, and mathematics. New disciplines of engineering, such as manufacturing engineering, applications engineering, and knowledge engineering have emerged to deal with the complexity of the field of robotics and factory automation.

Robot Modeling and Control introduces the fundamentals of robot modeling and control and provides background material on terminology, linear algebra, dynamical systems and stability theory, followed by detailed coverage of forward and in-verse kinematics, Jacobians, Lagrangian dynamics, motion planning, robust and adaptive motion and force control, and computer vision. Both basic and advanced material is presented in a style that is readable and mathematically rigorous. The book provides relevant applications from industrial robotics and mobile robotics. Suitable for a one or two term course, this text is appropriate for undergraduate and graduate students from electrical engineering, mechanical engineering, computer science, and mathematics and can be used as a research reference. Many detailed worked examples and extensive problems illustrate theory and point the reader to more advanced topics.

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MERGING BRAIN COMPUTING INTERFACE (BCI) & NEURAL NETWORKS FOR BETTER AUTHENTICATION & RECOGNITION

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Brain Computing Interface (BCI) has been proved helpful for the different streams of technology, considering the sensitivity of data in the current era it is required to build new security protocols and authentication models. Just like other fields of technology Brain Computing Interface could also be useful for making the data security better by using BCI as an authentication method without any hard physical inputs. The focus of the issue shifts to 'recognition' of EEG signals pattern and making the authentication model self-learning to increase its efficiency. This leads us to involve Artificial Neural Networks in the authentication system to make it efficient and intelligent.

A brain computer interface (BCI), sometimes called a mind-machine interface (MMI), direct neural interface (DNI), or brain–machine interface (BMI), is a direct communication pathway between an enhanced or wired brain and an external device. BCIs are often directed at researching, mapping, assisting, augmenting, or repairing human cognitive or sensory-motor functions.

BCIs comprise an active area of research and could start to integrate advances from adjacent fields such as neuroscience, nanomaterials, electronics miniaturization, and machine learning. For example, one neuro-imaging research project is starting to make guesses as to what participants see during brain scans, purporting to be able to distinguish between a cat and a person. Merging this kind of functionality with BCIs might produce new applications. Other experimental BCI projects have been proposed. One is Neocortical Brain-Cloud Interfaces: autonomous nanorobots that could