

# Foreword and Editorial

## International Journal of Smart Home

We are very happy to publish this issue of an International Journal of Smart Home by Science & Engineering Research Support soCietY.

This issue contains 36 articles. Achieving such a high quality of papers would have been impossible without the huge work that was undertaken by the Editorial Board members and External Reviewers. We take this opportunity to thank them for their great support and cooperation.

The paper “An Analysis of Regional Economy and Resources and Environment Coordinated Development Based on PSR Model - a Case Study of Zhongyuan Urban Agglomerations” adopted the coordination degree analysis methods to calculate and evaluate the resources and environment coordinated development of nine central cities in Zhongyuan Urban Agglomerations from 2006 to 2013. Results showed that: (1) from 2006 to 2013, the statuses of the nine central cities in Zhongyuan Urban Agglomerations were in moderate coordination, elementary coordination, on the verge of imbalance and moderate imbalance, the economic development and the resources and environment statuses were not optimistic; (2) from 2006 to 2009, those cities’ statuses were in moderate imbalance, on the verge of imbalance and elementary coordination, the overall development coordination degree was not high, could not reach the state of coordinated development. Luoyang, Jiaozuo, Xuchang and Luohe’s coordinated development situation was not up to standard, whose status was in moderate imbalance; (3) from 2010 to 2013, the nine cities were on the verge of imbalance, elementary coordination and moderate coordination, coordinated development was improved.

In this paper, “Realization of Solar Sensing Device” the solar sensing device used to measure the solar radiation whether it is same in all directions or maximum in the particular direction to convert it into the more electricity. The solar servo control tracking device using a pyranometer is disclosed. The device includes: a solar panel; a tracker having a solar panel driving motor driving the solar panel; a tracker controller controlling the tracker; first pyranometers measuring a solar azimuth in EW and detecting solar radiation of 380 nm to 840 nm wavelengths; second pyranometers measuring a solar azimuth in NS and detecting solar radiation; and a third pyranometer measuring a solar azimuth in the CE and detecting solar radiation. The tracker controller includes: signal amplifiers amplifying detection signals in three azimuths by the pyranometers; signal processors filtering the amplified detection signals by limiting a voltage; and a main control microcomputer outputting a control signal to the solar panel driving motor to stop the solar panel when the solar radiations are same and the solar radiations in one direction are maximum.

In the study “Cooperative Distribution Algorithm of Green Supply Chain Considering the Risk Aversion of Manufacturers”, Considering production and marketing coordination between supply chain enterprises, this paper specifies a multi-agent supply chain concurrent negotiation model for two-stage supply chain in the supply chain environment. Coordinator is used to search optimal proposals based on particle swarm optimization (PSO) and send these proposals to other threads. Proposal strategies based on retention value and time are put forward by learning retention value of rivals through Parzen-window estimation. Simulation experiment is conducted to test negotiation performance

of the model. Compared with ordinary models, the model makes two improvements as follows: (1) PSO is inserted into coordinator to improve negotiation efficiency; (2) Proposal strategies are effectively supported by Parzen-window estimation and enable agents to consider the retention values of rivals. Further researches need to be done to study trust relationship between agents and influence of external environment on supply chain negotiation solution.

In the article “Integration for Heterogeneous Manufacturing Information Systems Based on Semantic Entity”, to support semantic integration for heterogeneous information systems in manufacturing enterprises, based on semantic gateway, the concept of semantic entity is defined, and the semantic entity-based integration method is studied. Semantic entity sets up conceptual structure by aggregating semantic concept from semantic gateway, and builds dynamic conceptual structure through adding or removing its general concept. By means of key business data, semantic entity identifies business object and obtains business data from its application system, and then instantiates concept structure. Based on instantiation, semantic service can obtain parameters data from business object instant, and satisfies the interface contract. Semantic entity captures data changes of business object, and then establishes status-based integration rules, defines algorithm logic of rules. By instantiating concept structure aimed to specific application system and invoking semantic service, the integration activities among information systems come true. This work has been verified by prototype system, and attained expected integration effect.

Paper “Incremental Auto Regressive Prediction Models with External Variables of Greenhouse Air Temperature for Control Purposes” states that The impact of actuators should be considered in the prediction modeling of greenhouse air temperature. In this paper, the operating state of a greenhouse was divided into five sub-states based on the on-off characteristic of actuators. A group of novel incremental auto regressive models with external variables (IARX models) suitable for the five operating sub-states were deduced from the mechanistic modeling of greenhouse air temperature. The new IARX models have fewer coefficients than other known ARX models. In order to validate the IARX prediction models, the related environmental factors of a glass greenhouse were measured. The prediction results of the IARX models were compared with two typical ARX models. The maximum prediction errors and the mean square errors of the IARX models, under the three operating sub-states of passive state (all actuators are not working), mechanical ventilation and fan-pad cooling, are 0.1°C, 0.14°C, 0.7°C, and 0°C, 0.3°C, 0.4°C, respectively. The prediction results are much better than those of one compared model, while similar with the other.

The “Research on Model of Vehicle Logistics Transportation Plan” paper used the E problem dates of the National Mathematical Modeling Contest for Postgraduates in 2014 to study the mathematical model is established to solve the problem of loading method of vehicles and transportation plan. Firstly, 2207 vehicles can be divided into four categories, they used MATLAB to calculation the loading method of vehicles for 10 types of vehicle transporters, then they take vehicle transporter minimum number as optimization objective, with vehicle demand and the proportion of vehicle transporters as the constraint conditions, to establish the integer programming model, and finally they used LINGO programming to calculate the optimal transport plan is: vehicle transporter minimum number is 127.

The study “Evacuative Path Design due to the Optimal Cost-Function Arithmetic at Compartment Fire” proposes an optimal fire escape algorithm based on the A\* pathfinding algorithm in building fire situations. This algorithm uses building map coordinates to generate the escape path while ignoring diagonal directions. A potential function is calculated by considering situational factors, such as fire location, smoke, and heat information, to estimate the effect on the user’s escapability based on his or her location within the building. The calculated potential function determines the path with the lowest cost and illuminates the escape route with leading lights to aid the user to escape hazardous situations that might cause loss of orientation. The proposed algorithm suggests safer, shorter paths and aims to safely lead people to exits while minimizing the dangers of smoke and poisonous gases inside buildings. The coordinates of a real-life building environment were obtained to prove the effectiveness of the escape-route algorithm. Simulation results provided different lowest-cost paths based on various building fire situations.

“The Community Discovery Algorithm Based on Label Cohesion” Label Propagation Algorithm is a kind of community discovery method. This algorithm contains large numbers of random selections, which made the result uncertain and reduced the stability of the algorithm. In order to solve these problems, this paper proposed Label Cohesion Algorithm (LCA). In LCA algorithm the label propagation process is divided into two steps. The first step is taking pretreatments on the original labels. The second step is label updating. In the first step they change node label though node centripetal. In the second step the paper use label Cohesion as the judgement to choose the new label. Finally, the experimental result shows that the accuracy of the algorithm has been improved.

Paper “Segmentation of the Synthetic Aperture Radar Image Using the Watershed Transformation and Region Merging Technique” presents an efficient algorithm that segments the synthetic aperture radar (SAR) image into several homogeneous regions by combining edge- and region-based information. A multi-direction ratio edge detector is used to capture the locally directional variation information of a SAR image and construct the ratio edge strength map (RESM) of the SAR image. Watershed transformation is performed on the thresholded RESM to obtain an over-segmentation result. An efficient hierarchical region merging procedure based on the region adjacency graph representation of the image regions is proposed. A novel dissimilarity measurement between the two adjacent regions is derived from the multiplicative noise speckle model of the multi-look SAR image.

The paper “Device-Free Multiple People Daily Activity Recognition Using The Channel State Information Of Wi-Fi Signals” demonstrates on the problem of device-free multiple people daily activity recognition, which is very crucial for human computer interaction. The main idea of this paper lies in that they introduce channel state information of Wi-Fi signals to recognize multiple people daily activity. Channel state information is used in the receiver end to analyze features of a communication channel to detect tampering through the transmitter. In order to alleviate the negative influence of radio frequency interference, they define window size to build up vectors of Channel state information. Afterwards, the proposed device-free multiple people daily activity recognition method is implemented by solving the sparse representation classification problem using minimization. To testify the effectiveness of the proposed method, they set the experiment setting with a bedroom and a living room; moreover, two persons and a cat are set in this experiment.

Paper “Hadoop-based Probabilistic Range Queries of Moving Objects on Road Network” states that with the continuous development of wireless communication and mobile positioning technologies, spatio-temporal queries of moving objects attract more and more attention. In practical application, affected by the sampling frequency of the devices, the position information of moving objects restricted to the road network is often with uncertainty. In this paper, on the basis of the distributed computing framework-Hadoop, it firstly constructs the UPBI index mixing certain and uncertain data. Secondly, it proposes the probabilistic range parallel queries algorithm and the probabilistic calculating method of moving objects on road network.

In the study “Expanding Ring Search Energy Analysis and Optimization for Wireless Sensor Networks”, expanding Ring Search (ERS) is an advanced flooding technique exploring for targets progressively. It is widely used to locate destinations or information in wireless sensor networks. In this paper, a fundamental problem concerning the best ERS strategy to minimize energy cost in wireless sensor networks is addressed. They propose a model for estimating the average energy cost of ERS strategies, and a model for comparing the energy cost of an ERS strategy with pure flooding. The second model is then used to prove that incremental ERS strategies are inefficient in large-scale wireless sensor networks. Furthermore, they propose an ERS strategy optimization algorithm SSetOpt, which can be applied to both dense wireless sensor networks and sparse ones. The simulation results show that the strategy obtained by SSetOpt can cost 5% less energy than prior works when the network is sparse, say, the average degree is less than 30.

Authors of the paper “Research on the Urban Landscape Design based on Digital Multimedia Technology and Virtual Simulation” analyze the application of digital multimedia technology and virtual simulation in urban landscape design. On the one hand, the computer digital mapping tools provide a more effective way to deal with three-dimensional space, so it is very popular in the landscape design. On the other hand, the advent of digital technology makes urban landscape design no longer simply rely on real physical space, modern city landscape design always made use of digital multimedia technology, makes the urban landscape design space is more complex. In addition, the digital multimedia technology not only brings the technical support to the urban landscape design, but also reflects its value in the aspect of appearance, color and so on.

In the study “Research on the Correlation between Urban Scale and Congestion Level and Computer Simulation Based on CA Model”, with the constantly expanding of the scale of the city, urban traffic congestion has aroused people's attention. As a result, traffic congestion can lead to excessive energy consumption and the environmental pollution, which restrict the sustainable development of the city. This paper aimed to build a mathematical model and a traffic flow simulation based on CA model to study the intrinsic reasons of the congestion dilemma in the city especially in the big city, and to explore the correlation between urban scale and congestion effect. Research results showed that, if the existing traffic density was constant and the destination was always random, the continuous expansion of the scale of the city would inevitably lead to increased congestion. And finally getting the conclusion that the traffic congestion state was easier to accept in the city within 20km x 20km, and this study would provide reference for the government to formulate reasonable urban and transportation planning.

Paper “Design and Implementation Technique of the Specific Embedded System for an Instantaneous Wireless Image Observation”, for an instantaneous wireless image observation service, the specific embedded system design and implementation technique which has the instantaneous maximum 1 fps (frame per second) rate for a 160x128 size image is proposed by applying the intelligent sensing concept based on the IoT (Internet of Things) technique to the wireless remote observation, and embodied in prototypes, which are consisted of the intelligent remote monitoring node based on the Zigbee embedded modules with a small digital camera, the provisional ad-hoc wireless network channel, and the main node for system control in this work. Through of the real wireless remote observation experiment, the proposed technique is more proper for the instantaneous and provisional observation situation of the fast start and high successes rate since the observation speed enhancement over three times is attained by the proposed methodology than the conventional observation technique.

The paper “Analysis on Slope Stability of Open Pit Coal Mine Based on Grey Support Vector Machine” uses grey model and support vector machine (SVM) to establish slope model, and carries out stress and strain characteristics under the condition of natural, rainfall, earthquake and calculation and analysis of stability. Through the experiment, it analyzes the stability coefficient of downhill under rainfall condition, and obtains the different strength reduction of safety factor list. At the same time, give full consideration to the uncertainty of the earthquake, assume a variety of working conditions of the earthquake, it conducts dynamic analysis of the slope in detail, and gets the dynamic characteristics curves of the monitoring points. Results show that, relative complex terrain conditions, climate conditions and at a high intensity earthquakes area, are the main factors to induce landslides in this region. Therefore, this paper provides a reliable basis for further study of the effects of rainfall and earthquake on slope and disaster prevention and mitigation.

Paper “2C-CTP: A Centralized Clustering Data Collection Protocol based on CTP” states that WSN (wireless sensor network) is widely applied in environmental monitoring, assets tracking, battlefield monitoring and smart building. Since nodes in WSN are constrained by finite battery power and operational capability, it will have the direct effects on the lifetime of whole network. Well-designed routing protocols could make network succinct and efficient. In order to prolong the overall lifetime of WSN, lots of clustering algorithms have been proposed. Most of them are based on LEACH and proved energy-efficient, but few are implemented in real systems. CTP (collection tree protocol) has been extensively used in many systems and provides a reliable protocol for data collection. However, it neither considers energetic balance nor follows clustering feature. In this paper, they propose an efficient routing protocol by improving the CTP, adding clustering and centrally controlled features. Furthermore, they introduce a lightweight method of command distribution and some implementation technologies of clustering based on CTP. The related experiments that carried on TelosB demonstrate that their scheme is outstanding in lifetime and efficiency.

Paper “Speech Recognition Algorithm in Complex Noisy Environments Based on Multi-Space Compensation” states that speech recognition rate drops significantly when interfered by noise in complex environment. In order to improve the accuracy and the robustness of the speech recognition in adverse acoustical environments, this paper reviewed the main problems of noise robust speech recognition, proposed a multi-space compensation algorithm which from signal-space, feature-space and model-space based on wiener filter, histogram equalization and vector Taylor series. Theory analyses and experiment results show that the proposed method can overcome the defect of the sharp descent of speech recognition rate of existing speech recognition algorithm interfered by

environmental noise and improve the accuracy and the robustness in adverse acoustical environments. The algorithm provides the theoretical support for the speech recognition in airport, station, wharf and other complex noise environment.

In the paper “Design of a Flyback Switching Power for Smart Meter”, with switching power supply being widely used in Smart Meter, there exists more restrictions on the performance of it. This paper designs a single-ended flyback switching power supply based on LNK364DN chips which is used in intelligent single-phase table, Compares the advantages and disadvantages of the switching power supply and the traditional linear regulated power supply, and introduces the reaction type switching power supply design principle and working process. In order to satisfy the security requirements, this paper also designs the EMI suppression circuit, surge suppression current, clamp circuit, etc. The design process, including the maximum duty cycle including transformer, the primary inductance calculation, *etc.*, of the flyback type switch power supply transformer is introduced in detail.

In the study “A SMART Building Automation System”, the building energy management systems its control and automation in buildings has significant role. These systems can play an important role in regular energy monitoring and management and therefore to save the possible energy and cost. The key point of the building automation market is focused upon better facilitation to the user in terms of comfort at reduced operation cost. Energy efficiency improvement will also contribute to environmental protection. Therefore, there have been regulations and rating systems made that mandates the requirement of energy monitoring and control in a building. For example, the above mentioned building utilities and equipment control and automation plays an integral role in achieving the green building rating points from certifying authorities such as GRIHA and IGBC. The proposed system is to control the active systems such as lighting including artificial lighting (on/off & dimming control), air conditioners and safety features like fire alarm & gas alarm. In future the existing idea can be implemented for the whole building, i.e. various rooms or areas and then all of them can be integrated on a common platform for monitoring and control of different equipment.

In the paper “The System Design of Children's Medical Treatment and Health Care based on Mobile Internet”, with development of medical technology, more and more population need the mobile medical service. As a vulnerable group, children need more medical treatment and health care than adult. But now there is no mobile medical service only for the children and guardian. In order to solve the phenomena, they design novel children’s medical treatment and health care system based on mobile internet and cloud computing platform. This system includes emerging technologies for the sake of providing convenient and specific for the children population. From a long term, this integrate system will make a great contribution to the medical treatment and health care for the children.

The study entitled “Research on the Informationization Construction Based on E-Commerce in Rural Areas” states that the increasing development of mobile electronic commerce has produced a great impression on the informatization construction in rural areas of their country. Electronic commerce might be developing rapidly only by means of both the hardware basis of internet and data center and the software basis of the complication of rural logistics network, therefore the both parts may restrict mutually. The article herein will analyze the mobile electronic commerce's importance on the information construction from the perspective of its current situation and then find a realistic way to improve the mobile electronic commerce in rural areas on the basis of research of its details and status quo.

Paper “Design and Simulation Research on Energy Consumption of Electric Vehicle Charging Stations” states that development of automobile industry has made a significant contribution to the liquidity needs of people's lives, but it also brings some major issue such as global warming, air pollution, depletion of oil resources and so on. Electric vehicles are able to replace conventional cars, they are clean vehicle, which is important to solve the current problem. Centralized and efficient safe and reliable charging station become one of the key aspects for the promotion of electric vehicles, which is the energy indispensable service infrastructure after the large-scale industrialization of electric vehicles. To design high degree of automation, reliable, efficient energy-saving, easy to use maintenance management system plays an important role in the construction of the charging station. Modern computer technology, communication technology, control technology and information management technology just provides us an effective way to solve this problem. In this letter, the overall energy efficiency of the charging station is designed.

Authors of the paper “The Research of Slots Allocation on Bridge Mode” analyzed differences of the slots allocation between in the bridge mode and in the traditional mode, and studied the slots allocation algorithm considering the minimum total delay rate. This paper approved the slots allocation algorithm could reduce the total delay and increase the flights volume, and showed a practical significance.

The paper “Research on the Innovative Design of Multi-functional Shoe Cabinet” is mainly based on ergonomics principle and humanized design concept, designing and researching from the aspects of function, material, color and institutions of shoe cabinet, to design multi-functional shoe that sets disinfection and storage as a whole and give a new design concept for shoe cabinet which makes users to enjoy the multi-functional shoe cabinet with hygiene and soft at the same time feeling the beauty and enjoy what design brings to their life.

The paper “A Platform of Service Registry to Discover Service Resources in Ubiquitous Network” presents a new service registry platform named UBI-REGI, which is used to support efficient and dynamic discovery of service resources in a ubiquitous network. To define the scope of operation within the real world and IT world, UBI-REGI divides every service operation into three categories: source service, transformation service and sink service. Furthermore, UBI-REGI specifies meta-data like physical location or device owner to manage physical devices, in addition to the conventional meta-data like service name, purpose and description. In order to enable UBI-REGI to be easily used by external program, this paper designs and implements UBI-REGI API by using Web service technologies. With this API, external applications can find service resources by queries of service category, location, purpose keywords, and so on. As a case study, this paper demonstrates an environment continue service in a home network system to prove the feasibility of this proposal.

The study “Prediction Methods and Precise Electricity Energy Prediction of School Facility” states that there are many obvious evidences supporting a correlation between school facility and student behavior and performance. With the increasing awareness of sustainable school facility, incorporation of various operation cost impact into the consideration of school facility management is attracting a lot of attention. So the Green-School Project in South Korea aims to transform existing deteriorated elementary, middle, and high school facilities into eco-friendly energy saving schools through environmentally friendly materials and techniques and full-scale renovation and repair work. However, the total number of educational facilities in South Korea as of 2015 is 11,590 (5,978

elementary schools, 3,219 middle schools, and 2,393 high schools). Overall reconstruction of these deteriorated educational facilities is realistically difficult. Expenditure by school systems must stay within the limit of their available funding. So in order to plan exact operating cost, this paper presents a prediction improving method of the amount of electricity consumption of elementary school in South Korea by using two regressions, i.e., SVR (Support Vector Regression) and GPR (Gaussian Process Regression) and outlier detection methods, EE (Elliptic Envelope) and EM (Expectation and Maximization) algorithms. As a result, this study enables school facility managers to straightforwardly predict the electricity consumption of elementary school. This method can also extend to prediction of the amount of electricity usage for middle school and high school as well as elementary school.

Paper “Fiscal Decentralization and High-Polluting Industry Development: City-Level Evidence from Chinese Panel Data” studies the effect of fiscal decentralization with the different pollution levels industry which the local government chosen to develop. A dynamic study based on the panel data of 69 major cities from 2001 to 2011. The results show that the fiscal income decentralization may reduce the pollution level of regional industrial structure, but the sample statistical results is not significant in the eastern region; while fiscal expenditure decentralization could significantly improve the pollution level of regional industrial structure, which is an important index to investigate the continuously rising industrial structure pollution level of sampling cities.

In the article “Research on Optimal Design for Water Supply and Energy Conservation in High-rise Office Buildings”, the energy conservation in high-rise office buildings is a key project of building energy conservation work in China. Based on the actual need of projects and with the water environment intelligent monitoring system of photovoltaic power generation as the core, this paper conducts the intelligent and informatization management to the water supply and drainage of high-rise office buildings. Based on the data specification of water supply and drainage design of sanitary ware in China, square-root method is used to design the traffic system, and the rainwater comprehensive utilization system is introduced by referring the advanced experience in China. With shaft power and efficiency index, the superiority of double-pump parallel frequency conversion in the water tank - pump frequency conversion water supply in high-rise office buildings, which provides reference and data base for the subsequent engineering practice and has certain engineering application value.

The paper “Optimization of Control Block of 3-bit PWM using Adiabatic Dynamic CMOS Logic for OLED Illumination System Based on Internet of Things Service” the environment development for deep sleep has been studied using analysis results of the big data about vital signs and parameters in the bedroom. The organic light emitting diode (OLED) illuminations of the bedroom are dimming using analysis results of the big data. Therefore, a low-power and compact design of dimming part is required for OLED illumination system. In this paper, the optimized control block of the clock cut-off circuit was designed using De Morgan’s laws with adiabatic dynamic CMOS logic (ADCL) digital 3-bit pulse width modulation (PWM). The designed clock cut-off circuit pauses the D-flipflops (D-ffs) after cutting off the clock at both 0 % and 100 % pulse width of PWM output for dimming.

The paper “PDConnect: Low Cost Wearable Device connecting Patient-Doctor via Cloud for Good Health” focuses on connecting the rural villages to quality doctors via cloud computing and wearable technology. The system could help to monitor and manage good health with doctor’s interaction in emergence. It’s a wearable jacket where health measuring sensors will be embedded. It sends all the vital stats in real time to the cloud



where the authorized doctors can access the information after user's request. The records contain the patient's medical history. It's a user-friendly application holding the whole database of the patients securely in the cloud with real time updates. Patients can refer to the available Doctor anytime for treatments and diagnosis. The system alerts to the nearest doctor in risk case. This system if is put in use at the rural areas then there will be much benefit to the rural people in their health concerns. They can lead a healthier and more independent lives.

Paper "Applying a Hybrid Approach Based on Analytic Hierarchy Process and Artificial Neural Network to Upholstered Furniture Design" deals with the upholstered furniture evaluation which is a complex and multi solution problem. Multi objective evaluation research can effectively improve the design efficiency and quality of upholstered furniture. The evaluation of each individual design candidate in terms of its ability to meet the demands of all factors should be taken into consideration and is a crucial step within the conceptual and product design stage. The evaluation indexes are established according to the principle of upholstered furniture design. Consequently, this paper proposes a method which enables upholstered furniture product evaluation by means of analytic hierarchy process (AHP) and back propagation neural network (BP neural network) method of artificial neural network.

In the article "Research on the Low Carbon Evolution Mechanism of the Coal Enterprises based on Genetic Algorithm and Game Analysis", the Authors conduct research on the low carbon evolution mechanism of the coal enterprises based on genetic algorithm and game analysis. Presently, internationally the industrial security development presents colony, fusion and ecology three general trends, the low-carbon development became the global countries mutual recognition. Traditional industry cluster is a complicated network which is gradually formed by a large number of subjects in the repeated game, through constant imitation, learning and choosing the best choice, in search of the strategy of maximum survival probability. The emergence and selection of low-carbon strategy is the main body of the cluster in low-carbon evolution of the game, through continuous imitation, as learning and try to choose the best selection process. Under this basis, this paper proposes the low carbon evolution mechanism to help determine the further development trend of the enterprise. The genetic algorithm and game analysis are jointed to optimize the model.

The paper "Research on the English Teaching and Autonomous Learning Based on Multimedia Platform and Smart Classroom System" states that with the development of technology and the popularization of computer media, information technology is playing a more and more important role in foreign language teaching. In this paper, the author analyzes the English teaching and autonomous learning based on multimedia platform and smart classroom system. Intelligent classroom is a wireless ubiquitous network access environment, students can use wireless terminals for interconnection, and student could carry out group discussions and cooperative learning according to the needs of learning. The multimedia classroom provides a more authentic language environment for English teaching. In the teaching process, it can better stimulate students' interest and participation in learning, make independent learning really possible. Through the analysis of English autonomous learning based on multimedia platform, the author puts forward the related English learning strategies

The paper "Analysis on Mechanism of Vegetation Slope Protection based on Security Perspective" focuses on vegetation slope protection which is a kind of slope protection technology in engineering, but research on its reinforcement mechanism lags behind engineering practice. In this paper, the mechanical model of the interaction between

vegetation root and rock is established, and the mechanical anchoring mechanism is analyzed. The results show that the reinforcement effect of plant roots on rock and soil reinforcement can be regarded as a three-dimensional effect. The reinforcement effect of vertical root can be simplified as axial effect, and the lateral principal root is friction reinforcement effect.

In the article “Data Visualization and Multimedia Application in Value Identification and Integrity Protection of Traditional Villages based on 3D Simulation”, 3d simulation and virtual reality landscape is the main form of digital city street performance, through the virtual system based on computer, the designer can construct design of multiple perspectives to feel personally on the scene. In this paper, the authors analyze the computer aided multimedia application in value identification and integrity protection of traditional villages based on 3D technology. In the protection of traditional villages, multimedia technology has great advantages; it can realize the permanent preservation of traditional village historical memory and landscape.

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