EDITORIAL
Special Issue on Machine Learning and Data Mining for Cyber-Physical Systems
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RECENTLY, machine learning as well as data mining for cyber-physical systems has become the main focus of research in this area. Challenges imposed by the large scale of CPS Data, the uncertainty related to contradictory and incomplete information, and also, by properties and characteristics of Linked Data represent an interesting domain for emerging machine learning and data mining approaches. The challenges in managing and analyzing data can require fundamentally new techniques and technologies in order to handle the size, complexity, or rate of availability of this data. The cyber-physical system (CPS) has been coming into our view and will be applied in our daily life and the business process management. The emerging CPS must be robust and responsive for its implementation in coordinated, distributed, and connected ways. It is expected that future CPS will far exceed today's systems on a variety of characteristics, for example, capability, adaptability, resiliency, safety, security, and usability. With the rapid development of computing and sensing technologies, such as ubiquitous wireless sensor networks, the amount of data from dissimilar sensors and social media has increased tremendously.

A new user authentication protocol using trust model, elliptic curve cryptography and biometrics for WSNs is proposed by Liu and Huang *(A User Authentication Protocol Combined with Trust Model, Biometrics and ECC for Wireless Sensor Networks)*. The result of the trust model analysis indicates that the model can improve the model's ability of withstanding attacks from the malicious nodes. With indoor laboratory test data as the basic parameters, using ABAQUS finite element software simulation, an analysis was carried out by Peng et al. *(The Machine Learning Based Finite Element Analysis on Road Engineering of Built-In Carbon Fiber Heating Wire)* of the degree that the surface temperature of heating wire, the thermal physical parameters of asphalt concrete, and environmental conditions have influence on the melting effect. Zhang et al. *(Delay-Dependent Stability of Recurrent Neural Networks with Time-Varying Delay)* investigated the delay-dependent stability problem of continuous recurrent neural networks with time-varying delay. A new and less conservative stability criterion is derived through constructing a new augmented Lyapunov-Krasovskii functional (LKF) and employing the linear matrix inequality method. A regional dynamic CGE model was constructed by Wang *(A Computable General Equilibrium Model Based Simulation on Water Conservancy Investment)* to simulate and analyze the short-term and long-term influence of water conservancy investment to water conservancy industry itself, other national economy sectors and macro economy, so as to provide scientific proof for policy-making of water conservancy, and coordinated and sustainable development police-making of the whole society. The tire braking model and the dynamic characteristic model of the brake torque with the variable of the controlling air pressure were established by Dong et al. *(Optimal Learning Slip Ratio Control for Tractor-Semitrailer Braking in a Turn Based on Fuzzy Logic)*. A new calibration method is presented by Yu *(Kinematic calibration of parallel manipulator for semi-physical simulation system)* that takes into consideration all geometrical parameter errors and coordinate transformation errors. A virtual prototype model of the articulated tracked vehicle is established by Zhao et al. *(The Virtual prototype model simulation on the steady-state machine performance)* based on the multi-body dynamic software RecurDyn. An Iterative Squared-Root Cubature Kalman Filter (ISR-CKF) algorithm proposed by Chen *(The SLAM Algorithm for Multiple Robots Based on parameter estimation)* is aimed at improving SR-CKF algorithm on simultaneous localization and mapping (SLAM). The AMESim simulation models are established by Chen et al. *(Simulation and data analysis of Energy Recovery sensing on Parallel Hydraulic Hybrid Crane)* and

analyzed by establishing vehicle dynamics model and referencing to the actual data of the crane and physical hydraulic components, the simulation results are verified by road tests on the experimental prototype. In order to effectively evaluate the safety interval and lateral collision risk in training airspace, TSE error performance was modeled by Xu et al. *(The lateral conflict risk Assessment for Low-Altitude Training Airspace Using Weakly Supervised Learning Method)*. An adaptive integrated guidance and control (IGC) scheme for the homing missile is proposed by Zhou and Ge *(Intelligent Control for Integrated Guidance and Control Based on Intelligent Characteristic Model)* based on the novel continuous characteristic model and the dynamic surface control technique. The NARX neural network was used by Wu et al. *(NARX Network Based Driver Behavior Analysis and Prediction Using Time-Series Modeling)* to predict real-time speed with the heart rate regarded as the input variable. The results indicated that familiarity with the experimental route did decrease drivers' mental stress but resulted in higher speed. Three models of the vertical cylindrical oil storage tank in different sizes, which are commonly used by Gao and Wang *(The data Analyses of Vertical Storage Tank USING Finite Element SOFT computing)* in practical engineering are established. The dynamic characteristics, sloshing wave height and hydrodynamic pressure of oil tank considering liquid-structure coupling effect are analyzed by using ADINA finite element software, which are compared with the result of the standard method. Qin and Luo *(Association Link Network based Concept Learning in Patent Corpus)* investigated a challenging problem to automatically construct the patent concept learning model. The model consists of two main processes, which are the acquisition of the initial concept graph and refine process for initial concept graph. A multi-phase oil tank recognition of remote sensing images, namely coarse detection and artificial neural network (ANN) recognition is proposed by Liu et al. *(Multi-phase Oil Tank Recognition for High Resolution Remote Sensing Images)*.

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