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Editorial

The five papers comprising the September 2019 (Vol. 27, No. 3) issue of *CIT. Journal of Computing and Information Technology* cover the areas of applied graph theory, time series, data mining, software engineering and applied computing.

The paper *An Algorithm for Finding Two Node-Disjoint Paths in Arbitrary Graphs* by Mehmet Hakan Karaata presents a novel algorithm for solving an important practical problem which is recurrent in diverse areas of computing, *i.e.* ensuring alternate disjoint routes in networks of various kinds, from computer networks to VLSI layout design. Although the above problem has been known and extensively researched in graph theory for some time already, the author presents an efficient algorithm having linear time complexity and relying on a simpler basis than other known ones. Namely, the proposed algorithm avoids using the Maximum-Flow computation, upon which other node disjoint paths algorithms are based requiring only the identification of link paths prior to the construction of disjoint paths. This in turn results in a simpler and more understandable solution. Additionally, the presented sequential algorithm allows for an easier transformation to a distributed implementation, hence supporting the development of distributed and fault-tolerant solutions to the problem of finding node-disjoint paths between two distinct vertices in arbitrary graphs.

Classification of uncertain time-series is the topic of the second paper in this issue. Ruizhe Ma, Liangli Zuo and Li Yan explore this issue in their paper *A Shapelet Transform Classification over Uncertain Time Series* by basing their approach on the concept of shapelets, a significant paradigm that considers local time series features and avoids noise and phase shift errors in the series. Such approach for time series classification has the advantage of interpretability, but usually generates a huge number of candidate shapelets due to the high dimensions of time series, resulting in a large amount of computation. Thus, in order to constrain the computation load, the authors propose both a piecewise linear representation of time-series based on key points, and a shapelet filter pruning algorithm to remove similar shapelets in the candidate shapelet subsequences. This in turn ensures a reduced number of shapelets along with a faster classification. The approach was experimentally validated in a setting of 17 time-series datasets which were artificially made uncertain.

The authors of the next paper, Sihem Oujdi, Hafida Belbachir, Faouzi Boufares, focus on using data mining techniques on spatial data. Being more complex to deal with, spatial data. mining algorithms must both consider data representation as a stack of thematic layers, and take into account neighbors linked through implicit spatial relations in addition to the object of interest itself. Hence, inspired by the SCART and spatial ID3 algorithms and the adoption of the Spatial Join Index, they adapt the C4.5 decision trees algorithm to spatial data, naming the resulting spatial classification algorithm S-C4.5. Consequently, their paper *C4.5 Decision Tree Algorithm for Spatial Data, Alternatives and Performances* sets forth this algorithm to construct a classification model from a spatial dataset that can be organized in multi-thematic layers and may contain both discrete and continuous features. Specific novel things brought by the authors' approach encompass adaptation of information gain at the C4.5 algorithm level and data structure preparation using the Spatial Join Index (SJI) based on current literature. In order to evaluate and compare the performance of the proposed algorithm alternatives, they conducted a number of different classification experimentations on a road safety dataset.

The paper *Towards the Control and Prevention of Waste in IT Service Operation Using Fuzzy Logic: Focus in Incident Management Process* by Wadie Berrahal, Rabia Marghoubi and Zineb El Akkaoui addresses the issue of managing waste, *i.e.* non-value-added activities in a business process, and specifically in IT service management. Waste in IT services appears as the result of unnecessary movement of material and information, excess work-in-process like queues and pending requests, and unnecessary movements of people in service areas. In order to prevent potential waste, the authors thus propose the use of fuzzy analysis in IT incident management. In this respect, the authors developed fuzzy rules for assessing the level of waste within a lean agile approach setting, which are based on incident severity, gravity and urgency levels, and use fuzzy analysis in the incident management process. Elaborating on a dataset consisting of 20 incident reports, they show that the observed output waste is usually consistent and mostly higher than the waste estimated by their methodology. They also discuss the validity of the results thus obtained, and suggest that incident management is more complex than initially estimated.

In their paper titled *Identifying Novel Cancer-Related Genes with Prognostic Role Using Gene Expression and Protein-Protein Interaction Network Data*, Pen Li, Bo Sun and Mao Zu Guo contemplate early cancer diagnosis and prognosis prediction for cancer patients. Treatment of such patients builds on effective identification of cancer-related genes and biomarkers, along with survival prediction, and can also be personalized. The authors thus describe a method for integrating data regarding gene expression and protein-protein interaction networks for identifying cancer-related prognostic genes via random walk with restart algorithm and survival analysis. Upon identifying such candidate genes, gene expression data are screened to identify survival-related ones. Then, candidate genes and survival-related genes are in turn screened to identify cancer-related prognostic genes. This method has been validated on lung carcinoma datasets, through gene function analysis and survival prediction. The validation indicated that the combination of survival analysis with the random-walk algorithm has improved the identification of prognostic cancer-related genes when compared to the usage of the random-walk algorithm alone.

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