

JOURNAL OF TELECOMMUNICATIONS AND INFORMATION TECHNOLOGY

Preface

This issue of the *Journal of Telecommunication and Information Technology* is devoted mostly to applications of multiple criteria decision making, data mining, knowledge acquisition, and other advanced information technologies to telecommunications and other network services, but includes also a paper on strategies of telecommunication technology migration, one on measuring highly doped optical fibers and one on e-learning.

The first paper by Krzysztof Bareja and Włodzimierz Ogryczak from the Warsaw University of Technology presents an outline of a decision support framework based on the concept of reference distributions. This concept is particularly suitable for decision problems with a large number of criteria that have the same character, such as quality of service perceived by each individual user of a telecommunication network, or any other system which serve many users where quality of service for every individual user defines the criteria; in particular, such problems arise when analyzing facility location problems. Distribution of such criteria for a given design of the system can serve as a kind of criteria trajectory and be compared with a reference trajectory or distribution; diverse techniques of fair multicriteria optimization can be used then to select the best design of the system.

The second paper by Andrzej P. Wierzbicki from the National Institute of Telecommunications in Warsaw, based also on a cooperation with the Japan Advanced Institute of Science and Technology in Nomi, Ishikawa, addresses the issue of objectivity versus subjectivity, stressing that while an absolute objectivity is not attainable for diverse reasons, nevertheless trying to be as objective as possible constitutes a higher value, necessary for hard science and technology. Dangers and errors of the subjectivist reduction of objectivity to power and money attempted by the postmodern sociology of science are discussed. On this basis, the problem of subjective versus objective decision analysis and ranking is considered. While all classical decision theory aims at a rational analysis and support of subjective decisions, there are important application cases, particularly in managerial problems, when the decision maker prefers to avoid specifying her/his preferences and needs decision analysis – e.g., ranking of decision options – that is as objective as possible. An approach to decision support that might be easily adapted for such objective ranking is the reference point methodology, such as used in the first paper; its application is shown on real life examples.

The third paper by Janusz Granat and Andrzej P. Wierzbicki from the National Institute of Telecommunications in Warsaw, based also on cooperation with the Warsaw University of Technology, addresses a similar issue to the first paper, but concentrates on the issue of classification of empirical probability distributions (histograms) irrespective of the issue of fairness; generally, classification of histograms is useful both in management situations and in event detection or event mining. While existing approaches to event detection concentrate on the use of selected moments or other characteristics of empirical probability distributions, the paper is based on the postulate that histograms preserve more of needed information than selected moments of this distribution, thus multiple criteria classification of histograms can be most effective in event detection. This paper uses also the concept of objective classification, addressed in the second paper.

The fourth paper by Piotr Rzepakowski from the Warsaw University of Technology uses conjoint analysis for supporting telecommunication product or service sales. Conjoint analysis is widely used as a marketing research technique to study consumers' product preferences and simulate customer choices. The paper addresses the possibility of using conjoint analysis in telecommunication field, to find optimal services which could be recommended to telecommunication customers. A corresponding decision problem is defined. The conjoint analysis method and its connections with ANOVA as well as regression techniques are presented. Diverse utility functions that represent preferences for voice, SMS, MMS and other net services are formulated and compared. Parameters of the proposed conjoint measures are determined by regression methods running on behavioral data, represented by artificially generated call data records. Finally, users are split in homogenous groups by segmentation techniques applied to net service utilities derived from conjoint analysis. Within those groups statistical analyses are performed to create product recommendations.

The fifth paper by Xiaoning Shi and Stefan Voß from the University of Hamburg, based also on a cooperation with Shanghai Jiao Tong University, describes the development of global logistic services in the form of service networks. Shipping companies and liner shipping alliances have moved from pure transportation companies to logistics service providers during the last two decades. Top liner carriers cooperate with their offspring companies that provide local booking service and third party logistics service, combining the business advantages of tight linkages with liners with the negotiation freedom when dealing with demanding customers by providing diverse extensions of service coverage. The paper applies and combines ideas from the Steiner tree problem and game theory to provide a theoretical framework for network design oriented decision support systems of relevant transportation actors and companies. The relation to decision support for telecommunication system network design is also outlined.

The sixth paper by Sylwester Laskowski from the National Institute of Telecommunications in Warsaw addresses the problem of negotiations on regulated markets, such as telecommunication service market, from a game theoretical perspective. It is assumed that two players have to compete with each other on the retail market and cooperate on the wholesale market. The wholesale market is regulated. The role of the regulator is to support players in negotiations, especially by introducing a recommended solutions when the negotiations were broken off. Two cases are considered. First, a situation when one player makes a retail decision before negotiations on wholesale market, and second, a situation when a retail decision follows the negotiations. It is considered how introducing a recommended solutions influence diverse aspects of the negotiation power of the players.

The seventh paper by Szymon Jaroszewicz from the National Institute of Telecommunications in Warsaw addresses cross-selling models for telecommunication services. Cross-selling is a strategy of selling new products to a customer who has made other purchases earlier. This paper presents an analysis of two approaches to cross-selling in a telecommunications setting. The first approach is based on constructing a Bayesian network representing customer's behavior and using this network to predict which customers are most likely to pick each service offered. This gives not only a cross-selling model, but also allows the analyst to gain insight into the behavior of customers. The method starts with a (possibly empty) network representing users background knowledge. At each iteration it finds patterns whose probabilities in customer data diverge most from what the network predicts. An update of

the network by an analyst (thus human-computer interactive) corrects for those discrepancies. The second approach uses a separate classifier model for each service offered. Each model predicts, which customers are most likely to buy a specific product. Each customer is then offered a service the classifier of which gives the highest probability of acceptance. The method does not give any insight into customer behavior but is fully automatic.

The eighth paper by Wojciech Michalski from the National Institute of Telecommunications, Warsaw, addresses a survey of next generation network migration profiles deployed by selected carriers in Europe, North America and Asia. The profiles of selected carriers are used as examples of alternative network migration strategies. The paper describes technical status of carriers' networks when the migration process began, the transformation process and its consequences. Strategies were selected mainly from the point of view of carrier's goals and influence of factors like cost of maintaining the public switched telephone network (PSTN), competition and development of voice over IP (VoIP) and multimedia services market. While each operator develops its own unique network migration path, carrier strategies are categorized in this paper into three main groups.

The ninth paper by Krzysztof Borzycki from the National Institute of Telecommunications, Warsaw, addresses the issue of testing highly doped and photonic crystal optical fibers. The paper discusses optical measurements – related to spectral loss, OTDR and PMD, temperature cycling and mechanical tests such as bending, twist and crush, performed on Yb-doped single mode fibers and small-core photonic crystal fibers (PCF). Several issues related specifically to characterization of such special fibers, like measurement errors and artifacts as well as coupling of test instruments to samples are presented. Of particular importance is reliable and low-loss fusion splicing of special fibers to standard single mode fibers (SMF), since most commercially available fiber test instruments are fitted only with SMF interfaces.

The tenth paper is presented by Alina Stasiecka, Ewa Stemposz, and Andrzej Jodłowski from the Polish-Japanese Institute of Information Technology, Warsaw, Institute of Computer Science, Polish Academy of Sciences, Warsaw, and the Higher School of Entrepreneurship and Social Sciences, Otwock, and concerns e-learning resources versus traditional teaching models. The paper presents a discussion of the structure of e-learning resources and its influence on the resources' quality. The thesis of this paper is that the conformance of e-learning resource structure with structures suggested by traditional teaching model/models has a strong impact on the quality of this e-learning resource. The most popular teaching models are analyzed and a proposal of a metamodel useful for e-learning resource construction is introduced.

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