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The Role of Single Valued Neutrosophic Sets and Rough Sets in Smart City: Imperfect and Incomplete Information Systems

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ABSTRACT

During the recent years the smart cities knows a great extension as a modern shape of sustainable expansion. It's a urban area that utilize various devices connected with internet and integrates them with ICTs to promote goodness and execution of services for the best interaction among citizens and city's government. The basic for smart cities is distributed and independent information infrastructure. Using information effectively is going to be a main factor for success in the smart cities. The sources of information's (models, experts, and sensors) must be reason, perfect and complete. The generated information from independent and distributed sources can be imprecise, uncertain, and/or incomplete in real life. Any deficiency in gathered information will have a negative effect on the performance of services and decision making process within smart cities. So, we need a general framework to represent all types of imperfect and incomplete information. Since the classical methods fails to deal with vague, inconsistent and incomplete information, the fuzzy set was introduced to solve this drawback. The fuzzy set was not the perfect method for dealing with these drawbacks because it considers only truthiness and fails to deal with indeterminacy. The efficient mathematical tool for dealing with uncertain, vague and inconsistent objects is rough sets theory which introduced by Pawlak. The theory of neutrosophic rough sets is powerful for dealing with incompleteness and neutrosophic set deals with indeterminate and inconsistent data efficiently through considering truthiness, indeterminacy and falsity degrees. So, in this research we will propose a general framework for dealing with imperfect and incomplete information through using single valued neutrosophic and rough set theories. The combination of two sets will deal with all aspects of vagueness, inconsistency and incompleteness of data and information, and then will enhance the quality of introduced services and

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