

AN IMPROVED ACCURACY OF WEB SERVICE
SELECTION BASED ON MULTI-CRITERIA DECISION
MAKING AND WEB SERVICE MODELING ONTOLOGY

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To Mahdi, the promised saviour,
looking forward to his arrival....

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ABSTRACT

The subject of web services has become a popular topic in the area of computer science, as it provides the ability to collect capabilities and components in a unique interface to meet user requirements. One of the significant issues in this area is the development of an accurate service selection approach. In the existing approaches, accuracy refers to the accuracy of the selection method; the accuracy of the input data are neglected. There are many approaches in service selection for managing modelling or algorithmic issues. This research proposes an Accurate approach based on multi-criteria decision making (MCDM) and web service modelling ontology (WSMO), which is called AMW. The accuracy of the selection method is improved compared to existing methods, and the accuracy of the input data are considered. For this purpose, first, a comparative evaluation of state-of-the-art approaches for web service selection approaches has been performed, and the strengths and weaknesses of those approaches have been discussed. Second, the weaknesses of the existing approaches have been identified by applying the analytical hierarchy process (AHP) method to define default criteria weights and enhanced VIšekriterijumsko KOmpromisno Rangiranje (VIKOR) for the selection of services. Moreover, to improve the accuracy of input data, the confidence level of the service provider and the power of the decision maker are considered. Finally, the AMW approach has been validated by applying two case studies with various situations. The results of the experimental validation demonstrate that AMW provides an accurate and feasible solution. The results of this research can assist service consumers in attaining a more accurate decision when selecting the appropriate service.

ABSTRAK

Perkhidmatan web telah menjadi satu topik yang popular dalam bidang sains komputer, kerana ia menyediakan kebolehan untuk mengumpul keupayaan dan komponen dalam antara muka yang unik untuk memenuhi keperluan pengguna. Salah satu isu penting dalam bidang ini adalah pembangunan pendekatan pemilihan perkhidmatan yang tepat. Dalam pendekatan yang sedia ada, ketepatan merujuk kepada ketepatan kaedah pemilihan; ketepatan data input adalah diabaikan. Terdapat banyak pendekatan dalam pemilihan perkhidmatan untuk menguruskan isu-isu model atau algoritma. Kajian ini mencadangkan satu pendekatan yang tepat berdasarkan penghasilan keputusan multi-kriteria (MCDM) dan permodelan ontologi perkhidmatan web (WSMO) yang dipanggil AMW. Ketepatan kaedah pemilihan adalah lebih baik berbanding dengan kaedah yang sedia ada, dan ketepatan data input telah dipertimbangkan. Bagi tujuan ini, penilaian perbandingan terhadap pendekatan terkini dalam pemilihan perkhidmatan web telah dilaksanakan, dan kekuatan dan kelemahan pendekatan tersebut telah dibincangkan. Kemudian, kelemahan pendekatan sedia ada telah dikenal pasti dengan menggunakan kaedah proses hierarki analisis (AHP) untuk menentukan pemberat kriteria lalai dan VIšekriterijumsko KOMPromisno Rangiranje (VIKOR) yang dipertingkatkan untuk pemilihan perkhidmatan. Selain itu, untuk meningkatkan ketepatan data input, tahap keyakinan pembekal perkhidmatan dan kuasa pembuat keputusan akan dipertimbangkan. Akhirnya, pendekatan AMW telah disahkan dengan melaksanakan AMW terhadap dua kajian kes dengan pelbagai situasi berbeza. Keputusan pengesahan melalui eksperimen menunjukkan bahawa AMW menyediakan penyelesaian yang tepat dan boleh dilaksanakan. Hasil kajian ini boleh membantu pengguna perkhidmatan dalam mencapai keputusan yang lebih tepat dalam memilih perkhidmatan yang sesuai.