

ABSTRACT

OptiPres: A Distributed Mobile Agent Decision Support System for Optimal Patient Drug Prescription

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Prescribing the right drugs for a patient is a difficult task that takes into consideration several factors. More than 100,000 patients die each year from largely preventable adverse reactions to drugs. To address this problem, we designed and implemented, a distributed intelligent mobile agent-based system (OptiPres) using the the Design Science research methodology approach and the Java Agent DEvelopment framework (JADE). This agent based system will be used by doctors on their smart phones while prescribing medicines. It will assist them in making more informed decisions by either choosing the optimal solution from a repository of past decisions or by presenting a set of possible drugs and using criteria specified by them to subjectively rate the drugs and identify the optimal drug. To achieve this, we uniquely combined Cased-Based Reasoning (CBR) and Analytic Hierarchy Process (AHP) decision strategies and embedded these techniques as functions in the doctors' personal mobile agents on their smart phones. The accuracy of OptiPres was evaluated using double blinded experiments which included comparing the recommended outcome of predefined medical scenarios against the recommendations from a group of doctors and the World Health Organization (WHO) manual entitled: 'Guide to Good Prescribing'. Evaluating OptiPres from the users' perspectives was also done by sampling 32 doctors. These doctors were guided in the use of OptiPres, then at the end of that process, they evaluated OptiPres by completing a questionnaire. Additionally, since the databases were accessed unconventionally, using mobile intelligent agents instead of remote SQL queries, we did performance testing to validate this approach. The results indicate that OptiPres is effective in prescribing optimal drugs and in reducing the cognitive burden on doctors, especially in subjective decision making contexts where they have to consider multiple parameters.

Keywords: Kevin Jahan Miller; Mobile Agents; Decision Support Systems; Analytic Hierarchy Process; Cased-based Reasoning; Design Science.