

ADDENDUM

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Fulfillment of the total objectives of the thesis and Future Scope

(i) Fulfillment of the total objectives of the thesis

To reach the objective of the study we have set a number of goals and conducted our research accordingly. All specific goals of the study listed in section 1.4 have been reached. In this thesis, we planned to do these in steps for which we have tried to explore the status of the domain for understanding the needs of the sphere of persuade. To meet up the needs of the domain and to achieve our goals, we have developed and tested two knowledge-based systems intended for child health care management. The first advisory system has been selected to demonstrate the usability and acceptability of medical knowledge available elsewhere to medical help seekers including health professionals. This system might be useful for teaching/training purposes. The later is a consultation system focuses on the significant features of input medical knowledge in a complicated real-life decision-making problem, helps in estimating the number of retained cases for a problem domain. This estimate should be useful for the development of a case-based knowledge system for the domain of interest. Conclusions towards the fulfillment of the total objectives of the thesis drawn from our work are as follows:

It is required to judge carefully the quality of the medical information and its characteristics before implementing as it is a question of life and death. Thus we have studied different sources of knowledge acquisition - their merits and demerits including their statistical importance. A comprehensive study on characteristics of Medical Knowledge, use of Expert Systems, issues of selection ES tool, Medical Informatics and Cyber Health Care, the usefulness of Artificial Intelligence in Medicine (AIM), significance and necessity of ICT-enabled medical services like Telemedicine have been included in this thesis chapters 1 through 6. The contributions of these studies touch on a wide area and inevitable for development of medical applications. We, therefore, fulfilled our first goal of acceptability of medical knowledge, particularly for children, available from various sources.

Our second specific goal was to provide, as much as possible, remedies for problems related with content and structure, in particular, to make conscious to the parents/relatives of child patient and advices to consult their physician before apply/administer the same. We have studied and identified the sources and nature

of inexactness of medical knowledge and discussed with examples. A suitability analysis of different methods of handling inexactness which seems to be most sympathetic to the present problem domain has been discussed in chapter 7. A comprehensive study of the web-sources on the basis of published guidelines to parents for managing fever at home has been provided in chapter 8; in which we have judged the accuracy, quality, completeness, and consistency of some medical sites and suggest parents/medical help seeker to be careful before applying the same in actual practice. In this way, we have fulfilled our second specific goal.

We have thoroughly discussed the requirements, implementation details and the performance evaluation of our prototype advisory system 'Web-accessible consultation systems of Child Fever Management' in chapter 9. The validation of the system has been carried out exclusively with experts' opinion and finds satisfactory results. We think this kind of system implementation will certainly help parents/caregivers to manage febrile child at home and reduce the unnecessary harassment including painstaking traffic in the community hospital/health centers. This fulfilled our third specific goal.

We proposed our fourth specific goal of management and development of consultation system by selecting of features and their relevance related to the context of child resuscitation management. We have modeled and implemented a novel knowledge-based consultation system for better handling of complex, voluminous and varying requirements by finding the subset of features and their corresponding relevance (weight) and applying these prior trained data as input to a simple neural network based classifier to detect a particular type of illness based on the set of observations. Performance evaluation has been presented taking cases from practitioner's floor discussed in chapter 10 of the thesis. The results of our case study indicate that such estimation method and test data sources can provide more definite outcome than from the conventional method. This work thus strongly fulfilled our fourth specific goal.

(ii) Future scopes towards further works

As the performances of our proto-type medical knowledge-based systems are significant, hence the transformations to other domains by adding relevant domain knowledge are important issues. Moreover, the tools and techniques deployed in

the present study could suitably be extended to other suitable domains of interest of social applicability.

At present, we are able to model the static aspects of the Advisory System comprising only knowledge and operational rules. The rules customized as per the design and restricted to address only the home management. This could be extended to broader class of decision-making by involving all aspect of clinical setting encountered in reality, would be a major task in future work.

In our system, we allow the user to interactively input their knowledge. It would be very difficult to enumerate all the features at design phase in expanded system. Therefore, the development of an autonomous knowledge acquisition system of the domain is a future challenge for us. The system tools should be developed in close cooperation with Knowledge Engineer.

Currently, all applications uses graphical software to accomplish the design, which combines textual reasoning procedures with graphical reasoning procedures, is an important area to explore as well.

The work could further be extended using hybrid techniques - AI and Expert Systems, Soft Computing and Data Mining techniques - for developing more powerful decision support systems. Our efforts are in line to develop such powerful systems in future.

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