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Abstract

**A DISTRIBUTED INTELLIGENT MEDICAL
ADVISORY SYSTEM WITH EMBEDDED-LINK
SELF-ADAPTIVE NUMERICAL MEDICAL ADVISORY
AGENTS FOR HOME HEALTHCARE BASED ON
SPHYGMOGRAM**

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Cardiovascular Disease (CVD) is one of the leading causes of death in the world nowadays. Consequently, helpful to learn the health status of cardiovascular system, the corresponding monitoring apparatus, which should be easily operative, cost-effective and suitable for home healthcare, are of the urgent need to depress the intimidation from CVD. Complying with the Chinese medicine and theories of Hemodynamics, sphygmogram owns potential to monitor the health status of cardiovascular system.

However, due to poor intelligence and lack of mobility, the conventional health monitoring apparatus based on sphygmogram for cardiovascular system need to be greatly improved. The existing or ongoing methods to power the apparatus include attaching them to personal computers, contacting to health centers for obtaining the supports from medical professionals, or connecting to central server for intelligent analysis, etc.

In this thesis research, a new type of distributed intelligent medical advisory system (IMAS), which deploys the modules of machine learning, global knowledge base and service manager etc. in central server, and the embedded-link self-adaptive numerical intelligent medical advisory agents (IMAA) with the modules of local numerical knowledge base and numerical inference engine etc. in mobile apparatus, is researched for home healthcare based on sphygmogram.

The innovative numerical IMAA is able to depress the dimension of knowledge base and save the storage space greatly by transforming the string-based or symbol-based medical rule base into numerical one, namely, coding the premises & conclusions of medical rule with prime numbers and then representing the medical rule with their production. Driven by events, the global knowledge base (located in central server) and local numerical knowledge bases (installed in mobile apparatus) can be linked and adjusted/updated dynamically and automatically.

Owing to the numerical knowledge base, the conventional inference engine is completely changed by applying the simple arithmetic calculation, which avoids the iterative procedure of string-based or symbol-based searching & matching. Based on the unique characteristics of product of prime numbers and the corresponding decomposition, the numerical IMAA can implement the medical inference fast while keeping the transparent procedure and understandable results.

Attributing to the coding tables, besides separating from the inference engine, the knowledge base is further independent from the knowledge content. So it is easy to implement the shell machine in the numerical embedded-link IMAA. Once the object has been altered, the mobile apparatus just needs to download the re-customized numerical knowledge base and its accompanied coding tables from central server while the numerical inference engine is left unvaried.

The numerical embedded-link self-adaptive IMAA gains the remarkable advantages including the compact knowledge base in numerical way, better inference performance realized through arithmetic calculation and shell architecture, etc. It well improves the intelligence of mobile apparatus for home healthcare and accomplishes the certainty medical inference.

Key words: Numerical, Embedded-Link, IMAS, Sphygmogram, Home Healthcare