

Evaluation of Children's Anthropometric Features Using Wavelet Decomposition

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The assessment of growth data is an important part of the paediatric consultation. The measurements of weight and height can be charted and compared to reference values obtained from normal population. These measurements are useful to evaluate and track the growth of children because they provide an overall impression of the child's health. This data is usually displayed as a series of percentile curves in order to show the distribution of body measurements.

In this paper, an adaptive method to approximate unorganized clouds of points by smooth curve based on wavelets is described. The general fitting algorithm operates on a coarse – to – fine basis and selects on each refinement level in a first step a reduced number of wavelets, which are appropriate to represent the features of the data set. In a second step, the fitting curve is constructed as the linear combination of the wavelets that minimizes the distance to the data in a least squares sense. This is then followed by a thresholding procedure of the resulting wavelet coefficients to discard those, which are too small to contribute much to the curve representation. In order to reduce computational costs, we use only a level of decomposition, which is useful enough for most of the paediatric data.

In order to obtain data-driven graphics in a web-based medical record, we had to analyze other graphic formats that surpass the well known GIF and JPEG. SVG (Scalable Vector Graphics) is a XML-based web development tool and graphic format. It is ultra compact and standard compatible; separating the graphic from its original data allowing low consumption of web resources. Being a XML-based standard, SVG drawings can be interactive and dynamically generated, creating high-quality medical graphics from real-time data in a clear and fast way with excellent structure, with the possibility of displaying them on the web or email them as a small attachment files.

Conclusions: The use of wavelets for curve smoothing and SVG graphic format are a useful way of displaying children's growth curves on a web-based platform.

Creation of a Web-Based DRG Grouper

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The DRG (Disease Related Groups) is an inpatient episodes classification system, designed for prospective payment, but it's also used for medical management and epidemiological description of inpatient services.

A DRG is assigned to each inpatient episode, as the result of the combination of the primary diagnosis, additional diagnosis and complications, and all the procedures that occurred during that episode. All these diagnosis and procedures must be coded with ICD-9-CM, and using a standardized method the correspondent DRG is assigned.

There are a little more than 500 groups in the DRG classification, so it's usefulness resides in the power of summing up from multiple ICD-9-CM codes, picked from a list of more than 14.000 codes to a

much more simple classification. All episodes included in one DRG have similar clinical characteristics, similar estimated length of stay, and similar cost.

As DRG's are the base of inpatient episodes paying system in the United States, many government-certified companies provide a grouping service for a fee. Outside USA, if DRG grouping is needed only for scientific reasons, is not necessary to pay for this service. In our case we group our episodes manually, but we need to develop an application to improve this process.

Objective: To develop a web based DRG grouper.

Materials and Methods: DRG assignment to an inpatient episode is a complex task, with many variables and poorly documented. Our source of Information about this process was the Ingenix books collection about DRG's, "DRG Expert", "DRG Desk Reference" and "ICD-9-CM Expert", all 2004 version. Another source of information and testing was the web-based grouper from IRP, in <http://www.irp.com>, a free demonstration tool from a certified USA company.

Results: We created a data model for the DRG grouping knowledge base. ICD-9-CM codes were assigned to correspondent Major Diagnostic Categories (MDCs) and DRGs.

A set of rules was developed for each DRG, representing the necessary combination of ICD-9-CM to assign a DRG. Additional rules were created for managing the exceptions in DRG assigning, related to age, sex, discharge status, comorbidities and complications.

The general procedure is first to assign DRGs in the pre-MDC categories, next to assign the MDC, and at last to execute the rules of DRG grouping. The software was developed using J2EE, and will be available on the Internet.

Conclusion: When using DRG's for others than billing reasons, the option of developing a grouper software is reliable and cost-effective.

Pediatric Patients Parents' Healthcare Information Seeking Behaviour on the Internet

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Objective: This paper aims to establish if paediatrics patients' parents that attend a primary care office use the Internet to seek for health related information regarding their children's health and if they validate its quality with their paediatrician.

Materials and Methods: 501 parents that attended 8 paediatric offices where surveyed from March 15, 2004 till April 30, 2004. The survey was anonymous, previously validated and the data was analyzed using Statistix 7.

Results: The average was of 2 children per family (range 1–8), the main reason for consultation was health control. The mean age of the children was 6.3 years (range 1 month – 27 years) and the mean age of the parents was 35.8 years (34.6 mothers and 37 fathers). 77% of the parents surveyed access the Internet from their home or work, 86% thought that their paediatrician should recommend healthcare sites, although 5% declared having received some kind of information from their paediatricians. From the population under study we found that 46% looked for health information in the Web, the main topics that were searched were: information on diseases (31%), diagnosis or medical treatment (17%) and alternative treatments (16%). Only 15% discussed the information found with the paediatrician. 34% of the parents surveyed declared that their children surf the web and 15% use some kind of parental control software, raising an interesting issue for future studies.