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Automated Menu Planning Algorithm for Children: Food Recommendation by Dietary Management System using ID3 for Indian Food Database

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Abstract

Adequate nutrition is essential in early childhood for the proper body growth and organ formation, to have a strong immune system, cognitive and neurological development. Children in India are mostly suffered from malnutrition. It happens because most of the mothers don't have proper knowledge about nutrition facts, which is to be feed to her child. To give proper diet to children as per their profile, Dietary Management System using ID3 is proposed. In this paper, ID3 is implemented with an example of Beverages using Weka tool and proposed work will be implemented in JAVA.

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Keywords:- BMI; BMR; Entropy; Information Gain; Nutrition; Calories

1. Introduction

Malnutrition in early childhood has long term consequences. Nearly 30% of all new born babies are facing problems like a low-birth weight, and leads to malnutrition, different diseases in their early childhood [1].Vitamins and mineral deficiencies also affect children's survival and development. Anaemia affects 74% of children below the age of three, more than 90% of adolescent girls and 50% of women. Vitamin A deficiency leads to blindness and increases morbidity and mortality among pre-schoolers, also remains a public health problem [1]. It is necessary to

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provide proper diet plan to child according to his necessity. The proposed automated menu planning System for children helps the user to fulfil nutritional needs of children. This paper mainly concentrates on methodology used for balance diet planning and recommendation based on decision tree structure ID3. The implementation of ID3 is validated through Weka tool for food recommendation. This food recommendation is mainly built for North Indian and Maharashtrian food database. There is very less research has been done on nutrition in India [7].

2. Outline of the Work

The proposed system of food recommendation for children is based on the factors such as food preferences, availability of food, medical information, disease information, personal information, activity level of a child, for Indian food database. The important task in implementation is to recommend the particular food item from the food database based on certain constraints such as likeliness of a child, availability of that food, its nutritional contents such as protein, carbohydrates, fats in that food. This recommendation helps to select the food from the database such that the deficiencies will not occur in near future and proper diet plan will be given to the child.

The main objective of presented work is to construct the decision tree until the appropriate classification is reached to select the proper food item based on food availability, Category of user, Likeness Factor, Overall content of Nutrients in that food and then to define the decision rules and constraints on it, for child age group 7 to 9 years.

3. System Framework

The proposed systems framework is shown in the figure 1. The level 0 includes the basic information such as personal information, medical information, disease information, activity level of child is considered. At level 1, user's food preferences, climate information, food availability, specific requirements if any are considered.

The personal information includes child's age, height, weight, gender to calculate BMI [2] and BMR [2]. BMI is used to predict whether child is underweight, normal, or overweight [2]. BMR helps to find daily calorie needs of the child. Medical information includes category of child such as underweight, normal, or overweight. Disease information helps to proposed system such as, if the child is having any disease and child is not allowed to eat some food such as potato, banana, etc by doctor's advice then it will not be assigned in Menu Plan. Activity level of child is used to calculate total number of daily calories required as per child's activity level [2]. The food preference is the likeness factor of a particular user with reference to some food. This factor is taken as an input from the user in ranges from low, medium, high. If the child likes Milk in high portion then likeness factor will be high for Milk. The climate information helps to recommend the foods beneficial in particular seasons are considered. Food Availability helps the recommendation system to select the food depending on its availability. Indian food database contains nutritive value of North Indian food stored in it [3].

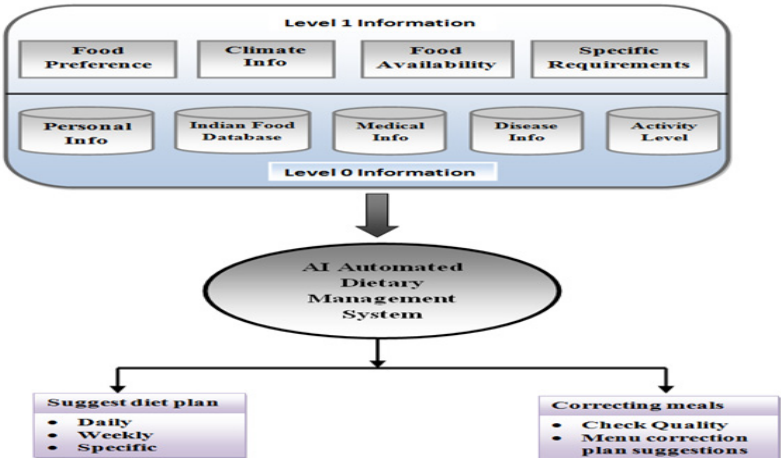

Figure 1: System framework for Menu Planning

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