

Web Application Used in Education for a Healthy Diet

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Abstract: www.anchetainfarfurie.ro is a website that intends to help healthy people maintain, increase or decrease their weight. www.anchetainfarfurie.ro logs food and activities during day. The program contains a database of 6396 foods with nutrition data for each food. The program also contains a database of 81 activities with energy expense for each activity. Both, foods and activities, are separated to logical groups for better access while logging. The user can add your own foods to the list of existing ones. After logging, the program shows a summary of energy income and expense for each day. “Ancheta in farfurie” can also log the body measurements.

Keywords: Medical database; Nutrition; Web application.

Material and Method

BMI equation

The BMI equation (BMI = Body Mass Index) was originally framed by Adolphe Quetelet, a Belgium mathematician and scientist- between 1830 and 1850 [1]. He was the first person to think of relating weight to height in a statistical, expressible manner:

Description	Lower BMI	Upper BMI
Anorexic		Below 17.5
Underweight	17.5	18.5
Optimal	18.5	25
Overweight	25	30
Obese	30	40
Morbid Obesity		Over 40

Basal metabolic rate

BMR is the amount of energy expended while at rest in a neutrally temperate environment, in the post-absorptive state (meaning that the digestive system is inactive, which requires about twelve hours of fasting in humans). The release of energy in this state is sufficient only for the functioning of the vital organs, such as the heart, lungs, brain and the rest of the nervous system, liver, kidneys, sex organs, muscles and skin. Illness, previously consumed food and beverages, environmental temperature, and stress levels can affect one's overall energy expenditure as well as one's BMR. The equation is:

- For men: $(13.75 \times w) + (5 \times h) - (6.76 \times a) + 66$

- For women: $(9.56 \times w) + (1.85 \times h) - (4.68 \times a) + 655$

Where:

- w = weight in kg
- h = height in cm
- a = age

As BMR and RMR only represent resting energy expenditure, an adjustment must be made to reflect your activity level. This is done by multiplying your BMR or RMR by an activity factor.[1]

The Methods section should include only information that was available at the time the plan or protocol for the study was written; all information obtained during the conduct of the study belongs in the Results section.

Activity Factor	Category	Definition
1.2	Sedentary	Little or no exercise and desk job
1.375	Lightly Active	Light exercise or sports 1-3 days a week
1.55	Moderately Active	Moderate exercise or sports 3-5 days a week
1.725	Very Active	Hard exercise or sports 6-7 days a week
1.9	Extremely Active	Hard daily exercise or sports and physical job

The Application

This application is based on a RIA technology[2] and it is developed in Adobe Flex 3.0[3]. Rich Internet applications (RIAs) are web applications that have the features and functionality of traditional desktop applications. RIAs typically form a stateful client application with a separate services layer on the backend. RIA architecture breaks the Web page paradigm. Traditional Web applications can be viewed as a series of Web pages, each of which requires a distinct download, initiated by an HTTP GET request. This model has been characterized as the Web page paradigm. RIAs invalidate this model, introducing additional asynchronous server communications to support a more responsive user interface. In RIAs, the time to complete a page download may no longer correspond to something a user perceives as important, because (for example) the client engine may be pre-fetching some of the downloaded content for future use. New measurement techniques must be devised for RIAs, to permit reporting of response time quantities that reflect the user's experience. In the absence of standard tools that do this, RIA developers must instrument their application code to produce the measurement data needed for SLM. The application is using the SOA model [4].

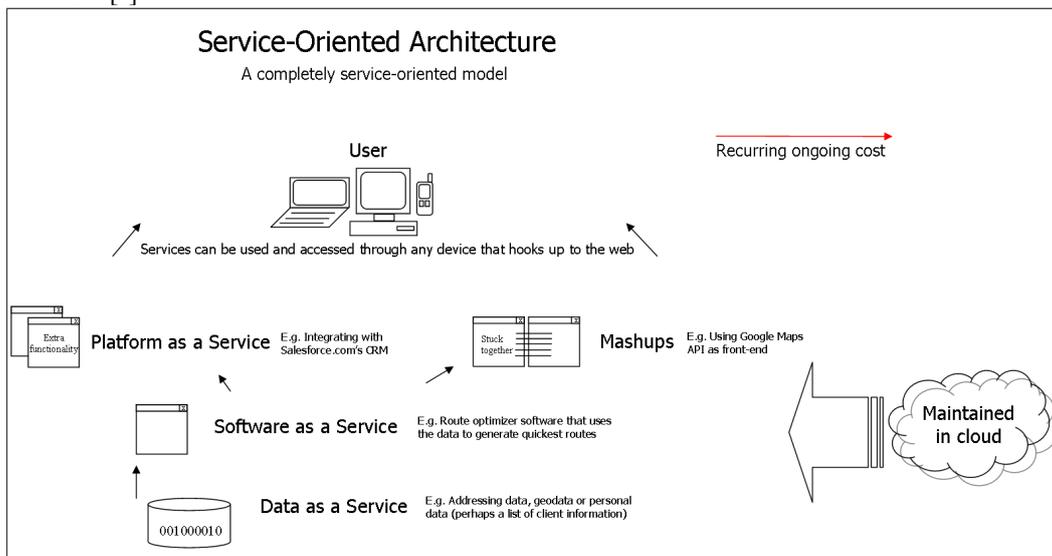


Figure 1. Service oriented Architecture

The application can be view from two sides: server and client.

Server Side

This side is based on Microsoft SQL Server 2008. SQL Server (from 2005) supports native HTTP SOAP via a feature known as HTTP Endpoints. SOAP is short for Simple Object Access Protocol, a lightweight XML-based messaging protocol used to encode the information in Web service request and response messages before sending them over a network. SOAP messages are independent of any operating system or protocol and may be transported using a variety of Internet protocols, including SMTP, MIME, and HTTP.

The endpoints were created with this T-SQL syntax:

```
CREATE ENDPOINT [ancheta]
    AUTHORIZATION [sa]
    STATE=STARTED
    AS HTTP (PATH=N'/sql/ancheta', PORTS = (CLEAR), AUTHENTICATION = (NTLM,
    KERBEROS, INTEGRATED), SITE=N'+', CLEAR_PORT = 80, COMPRESSION=ENABLED)
    FOR SOAP (
    WEBMETHOD 'calculContinut' ( NAME=N'[papa].[dbo].[calculContinut]'),
    ... (more webmethods)...
    WEBMETHOD 'stergSport' ( NAME=N'[papa].[dbo].[stergSport]')
    WSDL=N'[master].[sys].[sp_http_generate_wsdl_defaultcomplexorsimple]',
    SESSIONS=DISABLED, SESSION_TIMEOUT=60, DATABASE=N'master',
    NAMESPACE=N'http://193.231.29.131/', SCHEMA=STANDARD, CHARACTER_SET=XML)
```

Each web method that is described in the SOAP Endpoint has a stored procedure in the back. One of the simplest procedure is the procedures that brings the Sports Catalog into the list (for choosing it)

```
CREATE procedure [dbo].[iaCatSporturi]
as
select id,sport,calorii
from catsporturi order by sport
for xml raw
As we can see the procedures are returning XML data.
<row id="1" sport="Aerobic" calorii="67.50" />
<row id="77" sport="Aerobic in apa" calorii="48.00" />
...
<row id="37" sport="Zugravit" calorii="57.00" />
```

On the server side is stored all of the database for the food, sport, users and user's parameters.

Client Side

The client application is written in Adobe Flex 3.0. The language in with “Ancheta in farfurie” is written is MXML [5] and ActionScript 3.0[6] a scripting language that is very similar to Java. The interface has an accordion menu and a View Stack with Canvases that changes according to accordion index. The change event for the accordion object is {viewstack1.index=accordion1.index}. The transition between canvases is flip3d (to the left or to the right) according to previous index. Inside every canvas we use Panel for grouping the information.

All of the communication between the client and the server is made through asynchronous web service call.

The Application Logic

After you create your own user, you can enter into the application. The first step that you'll need to do is to complete some personal information about your weight, height, activity factor, etc. After you enter this data the application calculates the BMI, BMR and Ideal Body Weight based on New

York Metropolitan Life Insurance formula. All of these results are stored into a server table named “parameters”.

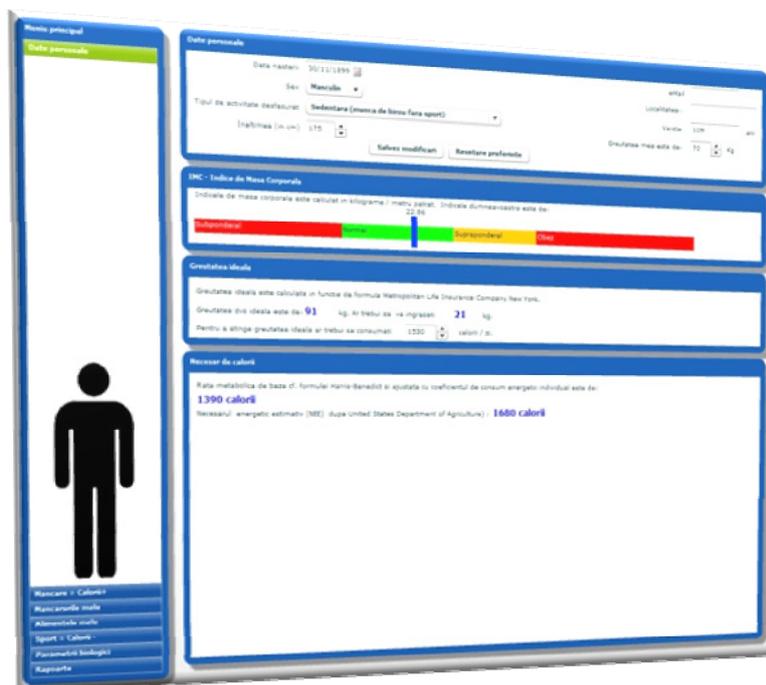


Figure 2. Personal data on www.anchetainfarfurie.ro

After you complete this data you can go to the next step and choose the date for your food log. You can add food to your log with double click or “add” button press. Of course, you can change the quantity and the measure unit. If you drag a column name (to increase or decrease column width), this width is saved locally into configuration file. So if you exit the application and enter again, the configurations that are changed by you are automatically restored from the local configuration file. In the same ViewStack you can view a graph with Macronutrient (Protein, Carbohydrates and Fat).

In the same manner you can enter the sports that you practice, you can define your own recipes or you can enter the biological parameters. In the biological parameters window, you can see any three parameters available from the list: Weight, Height, Abdominal perimeter, blood glucose, blood pressure systolic, blood pressure diastolic, cholesterol, LDL cholesterol, triglycerides and Uric acid.

The site

The web server application that runs on the “ancheta” server is Windows 2003 with IIS 6.0 installed. We installed a PHP version and MySQL Database - both for Windows version and a CMS application for PHP named Joomla [7] - version 1.5.

6. ***, Programming Action Script 3.0. (online) Adobe Systems Inc. 2006 [cited 2008 November]: 20-25. Available from: URL:
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