FOOD, AGRICULTURE AND FISHERIES, AND BIOTECHNOLOGY

FRISBEE

Food Refrigeration Innovations for Safety, Consumers' Benefit, Environmental Impact and Energy Optimisation Along the Cold Chain in Europe.

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Distribution List

- On the project Portal
- On the FRISBEE Intranet (http://www.projects-gateway.com/FRISBEE/)

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1. Objectives

CEMA in collaboration with ITP and SPES together with all FRISBEE partners will develop a food refrigeration technology virtual platform. This will be based on the web site developed in 8.1 and will host tools, models and software in a virtual food refrigeration platform.
After final development, this will allow end users to compare and evaluate their own refrigeration technologies against benchmarked data and to identify how to reduce energy whilst maintaining food quality and safety.
Together with a subcontractor, CNRS will provide the survey database dedicated to consumers to be implemented into the Virtual European Food refrigeration Technologies platform.
The set up and 3 other versions are requested Deliverable.8.5.0, Deliverable.8.5.1, Deliverable.8.5.2, Deliverable.8.5.3.

2. Description

2.1. Industrial virtual platform on cold chain

The industrial part will be developed by SPES with the support of ITP for the layout of the front end.

This part will include the following points:

- Access to the DEMO version cold chain database (limit use: number of request, if more interest then contact us)
- Structure of the database (type excel to be confirmed by Petros, NTUA)
- Kind of interface to link the database and web site (MySQL, for example) read the enquiry, look in the database, and give a result such as figures, tables or graphs.
- Possible limited access: we request mail, address, name
- Possibility to show Actions devoted to be demonstrated
    - Improvements in Currents technologies DEMO (year 3)
    - Advance Control DEMO (year 3)
    - Database field study DEMO (Year 4)
    - QEEAT software and sensor tools case studies DEMO (Year 4)
    - Life assessment DEMO

2.2. Consumer Virtual Platform on cold chain

The consumer part will be developed by ITP with the support of all the partners for providing the content.

This part will be composed of general information of interest for consumers:

- Quizzes, flash animations, etc
- Anthropological and sociological studies on cold chain. How people in Europe (consumers) behave regarding the cold chain (provided by CNRS Year 2)

3. Industrial virtual platform on cold chain

Here we draft some concepts about the industrial part of the virtual platform (VP), to give some preliminary guidelines for the assessment of efforts and the direction for design and implementation.

The industrial part will be devoted to the data mining and treatment basing on databases contributed within the project. It should be a collection of the scientific results obtained in the project, oriented to exploitation from industries at the end of the project.

The industrial part will be a Web site running on an appropriate server, being it a link referenced by the main FRISBEE Web site. So the main technologies involved are taken from the Web context both on server and client sides.

The core and background of the application is the already existent *cold base* application, already available and maintained by NTUA. This application allows users to upload on a Database Management System (DBMS) excel formatted files with data logs from different stages and sites of the various cold chains interested by the project, in particular focus on temperature time series. The current application allows to associate meta information to these data for subsequent classification, retrieval and treatment. The current application should be integrated in the VP.

The VP itself will feature a data model, which will be a central part of the application. The first task will be to augment (or possibly change) the current cold base data model to increase the relational features and to constitute the back-end for the applications and tools foreseen.

We give a draft list of the features desired on the industrial part application of VP:

1. Access to the *cold base* application possibly restyled and reused;
2. Generic interface for database queries on the VP database, for data retrieving, computing, downloading; a set of queries can retrieve and reshape a convenient set of temporary data for elaboration and graphical display. These temporary data should be given the possibility to be stored and classified permanently as intermediate steps in computations and for subsequent fast retrieval;
3. A library of graphic plots and displays, trying to make the library open and upgradable from administrative users;
4. A library of algorithms for statistics and computation on data; reasonably it should be composed by a basic core set of algorithms and possibly the provision of a mechanism to create add-ons on purpose for the progressing of the developments and needs in the project;
5. A mechanism which allows the production of well formatted reports for dissemination activity;
6. A mechanism for connection to remotely hosted software for simulations and elaboration of data. The results of partners in the project should be leveraged and exploited, granted a fee and licensing system being developed within the FRISBEE consortium. The mechanism should be based on the infrastructure specifications delivered in D.4.3.3.1. Essentially, by transfer of data tables, input and output vectors can be transmitted to and from the software modules registered in the FRISBEE cold chain control architecture. In this way we obtain a remote and distributed computation system on data.

7. A *live* connection to the experimental and prototypical FRISBEE infrastructure for cold chain control. Under appropriate access grant policy, both a demonstrative and administrative interface should be available for the inspection of the real plants or configuration of experimental applications. An interesting feature would be an interface oriented to the traceability of products along the cold chain.

Basing on the financial availability and resources within the project, the VP will be scaled correspondingly in its features. But the design should allow and upgrade and reuse of components to reach when possible a full-fledged version featuring all the previously listed ones with a minimum effort.

To match all the design issues we need some technical specifications to be considered to rely on a basic technology toolset for the goals at hand.

The first requirement is a server with Linux operating system. We would like to leverage the open-source community tools both for costs and durability of the application. A typical server side distribution should feature at least the standard LAMP (Linux, Apache, MySQL and PhP) stack. PostgreSQL DBMS could be an alternative to MySQL for better compliance with FRISBEE infrastructure (but optional).

On server side, both for mathematics libraries and for generic business logic, the preferred solution is Python (required at least version 2.5). The Web site layout and development will make use of the Django web applications development framework, to speed up the design and deployment of application.

Having a Matlab library directly on the server would be desirable, but licensing, costs and computational loads issues need a better reckoning. This solution is to be considered for the future and progress of the application in further steps.

On client side, our choices try to follow the directives of W3C consortium. So client side applications will be developed mainly with HTML5, Javascript and CSS. We'll try to avoid Java on server side and Java applets on client side basing on our background experience on industrial automation applications.

A very important feature of the server is the possibility to access an administrative shell for installation of programs (both public and FRISBEE confidential software), configuration of daemons, networking and overall system.

4. Consumer Virtual Platform on cold chain

4.1. Quiz

The consumer quiz will be composed of 10 questions related to day-to day information and history on refrigeration.

The goal is to give a first introduction on refrigeration to consumer with some links to the FRISBEE website where they would have the possibility to read articles related to the questions and answers.

The quiz will be located on the current website (deliverable 8.1). A new element will be displayed on the website home page which will redirect the consumer to a new page containing the interactive quiz.

The consumer will have to answer the different questions (multiple choices) and submit the answer he/she considers to be the correct one. A message will be displayed informing the consumer whether his/her answer is the correct one and providing brief explanation on the correct answer.

At the end of the quiz, the consumer will see the score he/she obtained and he/she will be invited to visit the FRISBEE website for more information on refrigeration and on the FRISBEE project.

The quiz might be updated with new questions and answers through the duration of the project.

4.2. Flash animation

The flash animation will be based on the FRISBEE poster developed by ITP.

The goal is to provide the consumer with more information about product, refrigeration technologies, etc throughout the cold chain.

The animation will be located on the current website (deliverable 8.1). A new element will be displayed on the website home page which will redirect the consumer to a new page.

The idea is to display the 4 sections (factory, distribution, shop and home) on the first page. The consumer will then have the possibility to click on one of these sections and will be redirected to specific location inside this section.
For example, if the consumer clicks on “Home”, a fridge will appear and information will be displayed in a box. The information can be about how to order the products in the fridge to enhance the quality of these products.

The flash animation might be updated with new information through the duration of the project.

4.3. Other

Other items such as anthropological and sociological studies, comic strips (non-animated), etc might also be integrated in the consumer part. They will be provided by the partners of the Frisbee project.

These items will be located on the current website (deliverable 8.1). A new element will be displayed in the fridge (website home page) which will redirect the consumer to a new page containing information related to the item.