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This document explains the distribution of the tasks related with the development of the applications that analyze and convert the source mock-ups to PIVOT language between the different partners of the FRESH project. Additionally, as this activity is connected with the analysis of the mock-ups, the definition of the PIVOT language and the reading tools for working with the PIVOT files, a summary of the whole conversion process has been included.

Summary: relationships between the different work-packages

The conversion process starts with the analysis of the mock-ups. Depending on the format of the files and the dimensions of the mock-ups contained in them we can differentiate two cases:

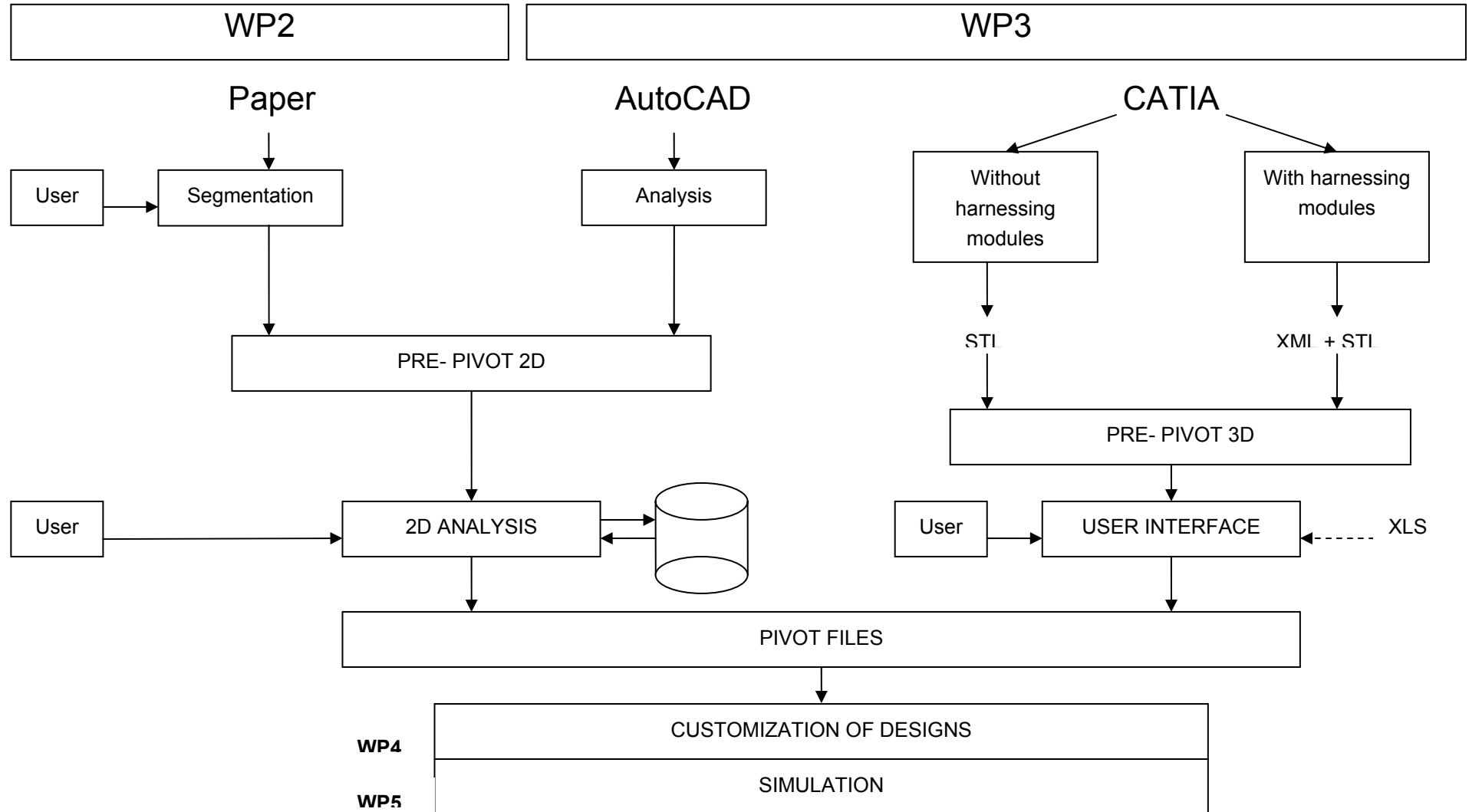
Recognition from paper and AutoCAD files are closely related because they both work with 2D mock-ups. The elements used in each one of them are very similar and, once the symbols of the mock-ups have been recognized, both tasks must face the problem of determining how the elements are connected between them and the routing of the wires. In consequence, the development of methods and algorithms for analyzing the mock-up has been a collaborative task between LORIA (Responsible of analyzing the paper designs studied in WP2) and RECTOR (Responsible of analyzing AutoCAD files of WP3).

Regarding CATIA mock-ups, they are not only different because they have been designed in 3D, but also because the recognition algorithms for detecting connections and extracting the routing of the wires require analysis strategies that have nothing to see with those used for the mock-ups in 2D. Additionally, these mock-ups may have XML and XLS files associated with them that contribute with data and attributes that must be included in the enriched version of the mock-up. In consequence, CEIT, as responsible of studying the CATIA files of WP3, has developed the opportune analysis and enrichment methods separately.

The final objective of the conversion process, however, is to store the description of the mock-up and the associated data in files with a standard format that may be loaded by the software developed by WP4 and WP5. This standard format is the PIVOT language. The first versions of this language were developed by CEIT and RECTOR and, afterwards, its definition has been complemented with the suggestions and ideas of all the other partners, especially Algo'Tech and LORIA.

With the PIVOT structures and the format of the correspondent files defined, the results of the mock-up analysis are saved in the corresponding PIVOT files by the applications developed by WP2 and WP3. Then, they are sent to the software that modifies the designs (WP4) and simulates them (WP5). In this application, the loading of the files is carried out firstly by a parser. Then, the re-designing of the mock-ups is performed, so it is this part of the software the responsible of preparing the structures needed by the simulation. Finally, the simulation pack takes the resulting mock-ups and checks its correct working.

In the following page we have a diagram that explains the different steps of the recognition process for WP2 and WP3, the relations between them and the connections with WP4 and WP5.



Recognition from paper designs and AutoCAD files:

Recognition from paper designs and AutoCAD files are closely related because they both work with 2D mock-ups constituted by elements with a very similar structure. After the pre-processing of the information both tasks must face the same recognition problems.

In consequence, LORIA and RECTOR, responsible respectively of the conversion of the paper designs and the AutoCAD files, have worked together in the development of algorithms for identifying the symbols and devices contained in these mock-ups.

Recognition from CATIA files:

As regards recognition from CATIA files, some differences must be considered. Firstly, the mock-ups are designed in 3D, not in 2D. Secondly, the files may contain structures with additional properties that should be extracted and saved. Thirdly, this information may be complemented by XLS files that are associated to the studied mock-up. Finally, but not less significant, the content of the CATIA files can not be accessed easily and need specific extraction techniques before processing the information.

As a consequence of all these considerations, the development of the software for analyzing CATIA mock-ups and adding to them the electrical information has been performed separately by CEIT.

Generation of PIVOT structures:

Before generating the PIVOT files, the information obtained with the recognition and enrichment process must be converted to the correspondent PIVOT structures. Taking into account that this information has been obtained with different software and that there is no direct relationship between these data, this translation must be performed individually inside each application.

According to this, RECTOR and LORIA have worked together on the conversion of the results of the analysis of 2D mock-ups and CEIT on the translation from 3D structures.

Writing tools:

The development of a writing tool for storing the PIVOT structures in XML files was a responsibility of the partners of WP3 involved in the conversion process. In order to fulfil this request, a XML module in Delphi programming language that can save the PIVOT structures in XML files has been developed by CEIT. This module was initially part of the application Fresh3D developed for analyzing and enriching the 3D mock-ups, but it is independent enough for including it in any other Delphi project. Moreover, this module was not only able to deal with PIVOT structures in 3D, but also with those ones in 2D. However, as LORIA and RECTOR have developed their recognition tools in different languages (C++ and Java respectively), they have had to develop their own XML modules and include them in their applications.

All these writing tools work with the same version of PIVOT language and use the same DTD, so, independently of the application that generates them, the files will have a standard format compatible with the different software.

Reading tools:

CEIT has included in the XML module of the Fresh3D application a generic parser in Delphi language that contains the necessary methods for opening a file in this format and, in case it is a PIVOT file, converting its content to the correspondent PIVOT structures. This parser has been sent to Algo'Tech so that the software they are developing for WP4 may open these files, too. However, they are responsible for developing the appropriate methods for handling these structures once they have been loaded from the files and using the information they contain for preparing the data that the simulation software requires.

Regarding the applications developed by LORIA and RECTOR, as they have used different programming languages, C++ and java respectively, they have had to develop their own parsers.

Relation of the data with the simulation:

Before they are used in the simulation process, the data from PIVOT files are firstly read and re-organized by the user with the interface developed by the partners of WP4. As it has been said previously, Algo'Tech has been the responsible for taking the PIVOT structures contained in these files and preparing them for the simulation software of WP5.