

Newsletter

Preface

Dear Reader,

We are glad to introduce you the second Newsletter of the INTERACT project. INTERACT is a European Union funded Research & Development Project under the 7th Framework Program (FP7). The project has started on 1st October 2013 and will last until the 30th September 2016. The project engages 8 organizations from various EU countries and the consortium is coordinated by DAIMLER, Germany.

INTERACT aims to bridge the gap between textual and 3D geometrical assembly planning by automatically generating realistic 3D worker simulations from textual descriptions this will let workers and engineers interactively optimize manual processes in joint workshops. INTERACT aims to achieve this vision by a) realizing automatic generation of worker simulations based on textual descriptions of tasks, using a motion synthesis algorithm for the generation of human motions, b) using low cost sensors for real time tracking and storing of human actions and their parameters and c) employing interfaces for intuitive modification of 3D motions.

The research and development activities of INTERACT are driven by the requirements of the European Industry and more specifically from the automotive (Daimler) and professional appliances sectors (Electrolux). The first phase of the project has focused on the definition of a set of industrial pilot cases based. The definition of the pilot cases has provided the basis for the definition and consolidation of a set of generic system requirements so as to broaden the application scope of the INTERACT technology.

The main goal of this newsletter is to provide an overview of the main modules that have been developed within the second phase of the project. Finally, recent project activities and future events are presented.

Sincerely,

The INTERACT project consortium

INTERACT

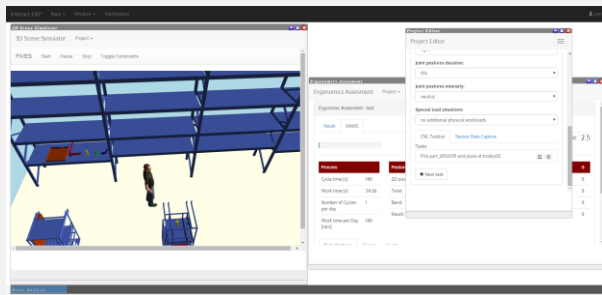


The project

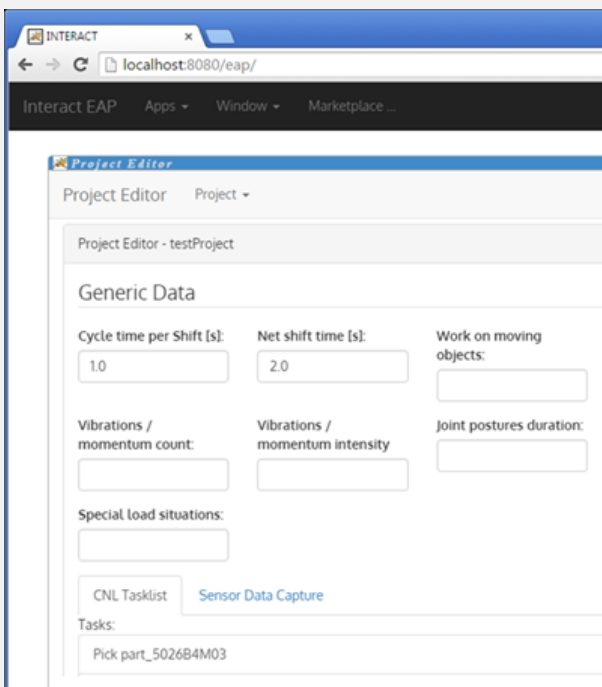
INTERACT – Interactive Manual Assembly Operations for the Human-Centered Workplaces of the Future (FP7-ICT-2013-10, Grant agreement no: 611007) is a European Union funded Research & Development Project.

The project started on **1st October 2013**. The overall work plan is divided into work packages and their subtasks and covers **36 months** of industrial driven requirements, research, development and realization of final demonstrators.

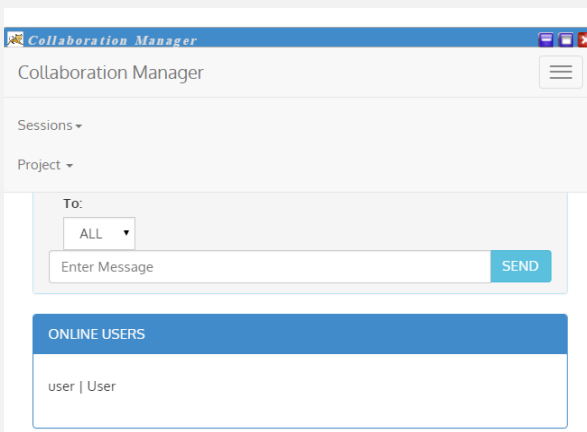
- Phase 1: Generalized end user requirements: Definition & Assessment
- **Phase 2: Modules development**
- Phase 3: Pilot cases setup, execution and assessment



Enterprise Application Platform



Project Editor App



Collaboration Manager App

Main INTERACT components

Some of the most important INTERACT components that have surpassed the prototype stage are the following:

- Sensors system (multi Kinect, wireless sensors and Data Glove) for sensing key human motion parameters during task execution
- Motion Recognition for recognizing key human motion parameters from sensor data
- Simulation of human motions (walk, pick, place and carry)
- High level control of human motion through Controlled Natural Language (CNL)
- Enterprise Application Platform (EAP) and user apps

The **EAP** is a lightweight web based applications and backend container. It provides the following:

- ✓ App Store. An API for registering apps for later installation and a user interface for installing and using the Apps within a user's workspace in the platform.
- ✓ User/Role management & authorization. An API and user interface for user & role management
- ✓ A communication mechanism. An API for inter-apps communication which provides the basis for collaborative sessions and data exchange.
- ✓ A service registry. An API for registering new services (API) supporting the extensibility of the EAP system.

The following apps have been developed and are available through the EAP:

- Project Editor
- Collaboration Manager
- 3D Scene Editor
- 3D Scene Simulator
- Sensor Network Manager
- Ergonomics Assessment
- Basic Analysis

However, utilizing the EAP API third party apps can also be developed and deployed through the EAP. These third party apps can utilize the key INTERACT services such as motion simulation, motion sensing and recognition and provide completely new user experiences.

- ◆ An end-user may create a custom scenario through the **Project Editor** app. This application provides all the required functionalities for creating or editing a use case. It is connected with a number of secondary applications.
- ◆ The creation of a digital workplace where multiple users may join and communicate is enabled through the **Collaboration Manager** app. A moderator may create a session and multiple participants may join the digital workplace that has been created and from their individual applications use the available data.

Main INTERACT components

- ◆ The **3D Scene Editor** enables the construction and manipulation of a scene, matching to a use case scenario. The application provides the user with the capability of adding, changing or deleting assets from the scene.
- ◆ The created scene is along with worker carrying out the created scenario from the project editor, is being simulated in the **3D Scene Simulator** app. The simulation can be displayed at the same in multiple web clients.
- ◆ Sensor data capturing a human motion along with scenario related data and results from the processing operations are provided to the end-user through the **Sensor Network Management** app.
- ◆ The **Ergonomic Assessment** app, as a key aspect of any digital human modelling software, performs the ergonomic evaluation of the simulation that has been generated throughout the previous modules.
- ◆ The **Basic Analysis** app may be used for evaluating the key application features like cycle time, process time, etc.

Next Steps

Following the development of prototype modules, the project now heads towards its third and final phase. During this time period the main actions include collaboration and connection of the developed modules and integration into the main platform. Furthermore, the system will be tested and validated in actual industrial environments. The main target is to create a solution that meets the end-users' expectations. Towards that direction, the two pilot cases provide requirements out of an end-user's perspective along with the proper conditions for testing and validating the final software solution.

The image displays four screenshots of the INTERACT software components, arranged vertically. Each screenshot is labeled with its respective application name below it.

- 3D Scene Editor App:** Shows a 3D environment where a worker is positioned near a set of blue shelving units. A task list is visible on the left side of the interface.
- 3D Scene Simulator App:** Shows a similar 3D environment, but with a worker figure and a cart, simulating the movement and task execution within the scene.
- Sensor Network Management App:** A dashboard interface for managing sensors. It includes sections for 'Optical sensor network' (with a status of 5 stars), 'Necessary sensors' (listing Group, Line, and Screensensors), and 'Sensors available on the network' (a table listing sensor details). It also features a 'Sensors to be used during workday' section.
- Ergonomics Assessment App:** A data analysis window showing task performance metrics. It includes a table for 'Tasks' and 'Single Lifting Tasks' with columns for Task Name, Start Time, End Time, Duration, and Walking Distance. Below the tables, it displays 'Single Task Lifting Index (STLI): 10.0' and 'Frequency Independent Lifting Index (FILI): 10.0'.

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*Interactive Manual Assembly
 Operations for the Human-Centered
 Workplaces of the Future*

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Past Events

From March 2015 to September 2015, the INTERACT project was presented in a number of events (Co-Summit, CeBIT, CIRP CMS, EDM CAE). Event participants had the chance to get more information and insight into INTERACT activities.

- INTERACT participated in Berlin Co-Summit 2015 at the booth hosted by LMS on 10-11 March 2015.
- CeBIT 2015 participants had the unique opportunity to be informed about INTERACT activities and results by visiting DFKI exhibition booth on 16-20 March 2015
- INTERACT research papers were presented in CIRP CMS 2015 – 48th CIRP Conference on Manufacturing Systems on 24-26 June 2015 on Ischia island
- On September 16th and 17th 2015, INTERACT partner IMK presented the objectives of INTERACT project and how it contributes in the future development of IMK's EMA software and Daimler's use in virtual production planning.

Upcoming Events

- INTERACT will participate as an exhibitor in ICT 2015 event in Lisbon 20-22 October 2015.
- The next INTERACT Review meeting will take place on 10-11 November 2015 in ULM, Germany hosted by Daimler AG.
- INTERACT coordinator DAIMLER will present latest project outcomes in the "3. Fachkongress Industrie 4.0: Praxis, Praxis, Praxis" on 1-2 December 2015 in Saarbrücken

Consortium

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Electrolux

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