

**INFORMATION SOCIETY TECHNOLOGIES
(IST)
PROGRAMME**



SmartSketches 

Exploitation Plan – 2nd version


Project acronym: **SmartSketches**

Project full title: **SmartSketches: A Multimodal Approach to Improve Usability in the Early States of Product Design**

Contract no.: **IST-2000-28169**

DELIVERABLE: D23

WORKPACKAGE: WP10



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Technological Implementation Plan - eTIP

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Users:

Projects:

Project_id: 1530
Contract number: IST-2000-28169

Overview of the project

EC program:	IST
Title of project:	SMARTSKETCHES: A multimodal approach to improve usability in the early stages of product design
Acronym:	SMARTSKETCHES
Programme type:	5th FWP (Fifth Framework Programme)
Contract Number:	IST-2000-28169
Website:	http://smartsketches.inesc-id.pt/
Start date:	01 Dec 2001
End date:	31 May 2004

Coordinator Details

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Partners Name

Italdesign - Giugiaro S.P.a., Barone Mirko
Elasis S.C.p.a., MONACELLI Gennaro
Centro Tecnológico da Industria de Moldes, Ferramentas Especiais (CENTIMFE), ARAÚJO Billy
Faculdade de Engenharia da Universidade do Porto, Fernando Nunes Ferreira
Fraunhofer Gesellschaft zur Foerderung der Angewandten Forschung E.V., Stork André
Mind - Software Multimedia e Industrial, Mendes Bruno
ICEM Technologies GmbH, Peter Salzmann
INESC-ID, Bruno Rodrigues de Araújo
INESC, Manuel João Fonseca
Barski Design, Olaf Barski

Commission Officer Name: Konstantinos Papanikolaou

Original research objectives

SmartSketches is a user-centred approach to introducing computer-based tools in the initial stages of product design and development. CAD systems possessing great functionality now enable us to manufacture very complicated mod. However, computers have yet to become usable at the early stages of product design, where pencil and paper still reign. We look to improve usability of product design systems in several important areas, through a User-Centred Design Approach, from Personal Design Assistants to Virtual and Augmented Environments. This project aims at developing the state of the art in User Interface Design and Multimodal interfaces for extended and ubiquitous design Environments. We will provide ready-to-use encapsulations of interaction techniques that can be adapted to other systems through a well-defined API, available to others as open-source. Objectives: Alternative input modalities and emerging interface technologies form the basis for a new generation of sketching applications: Calligraphic Interface. These remove artificial dialogue constraints, allowing designers to work with the computer much as they would with more traditional media, to capture rough shapes and ideas. We look to improve the usability of product design systems.

in several important directions, through a User-Centred Design Approach, from Personal Design Assistants (PdAs) to Virtual and Augmented Environments. One direction will focus on handheld PdAs for mobile input, combining pen and speech with retrieval of remote product and geometric data using sketches. Another direction will use sketches to create technical designs through novel input techniques in 2D and 3D, exploring multiple modalities. To create geometric information we combine the flexibility of sketches with constraints and pattern recognition techniques to achieve a powerful control mechanism. Work description: SmartSketches is a user-centred approach to introducing novel tools in the initial stages of product design and development. Computers have yet to become usable at the early stages of product design, where pencil and paper still reign. This is because current interfaces require designers to fill large conceptual gaps from their mental model to geometric shapes, dissociating the early design phase from detail product definition. The result: longer product cycles and inflexible separation between design and engineering, raising manufacturing costs and time-to-market. Creating complex models and drawings is a painful task using current systems. These are hard to learn and the final product is difficult to visualise, which explains users' preference for pencil and paper. Pervasive interfaces will enable a seamless transition from interacting with PdAs to manipulating the same information in an interactive design desk, or an immersive environment, creating what we call Extended Design Environments. Creative designers often re-use data from previous projects, publications and libraries. We will develop new techniques, taking advantage of their natural ability at sketching and drawing to retrieve data from project and component libraries. The research to carry out combines novel interface modalities such as pen input, sketches, gestures, speech with mobile and virtual environments to replace cumbersome and unnatural input methods typical of present-day interfaces. Briefly, we intend to work on: 1. Cognitive Task Analysis and Specification of Multimodal Interfaces; 2. Visual languages to parse sketch and Multimodal input; 3. Walk-up interfaces for virtual and augmented environments; 4. Efficient search algorithms to match sketches against multimedia databases; 5. Intelligent user interfaces; 6. Interactively building 3D models from sketches; 7. Usability studies and empirical evaluation of Multimodal interfaces. Milestones: All dates in Months (M) after start of project: User Requirements and Task Analysis @6M, Workshop on Calligraphic Interfaces @6M API Specification @6M, First Prototype: Sketch editor for modelling @12M Field and User tests - Tech Report @26M 3D Sketching in Immersive Environments @28M, Constraint-based Scene Modeller @28M, Sketch-based Retrieval, MCAD Drawings @28M Integration and final prototype @31M, API Available @31M User Evaluation Tests @35M, Wrap-up workshop @36M.

Expected Deliverables

The expected project result will be a set of products from input devices and software device drivers up to software plugins that can be embedded into professional software packages. Some expected concrete results are:

- Input device working in immersive environments like 3D pen allowing designers to work in a virtual 3D space on a CAD model
- Immersive modeling techniques to move design work into virtual environments which come as close as possible to non-virtual "real" working techniques, but with all the advantages of the computer
- Software plugins allowing CAD packages to extract usable geometry representations from ambiguous strokes on tablets, Powerwalls and normal desktop computer screens. Also an API specification and a set of modules that encapsulate functionality and interact with software components will be developed by consortium members as a result of research and development activities carried out during the project.

Project's actual outcome

The actual outcome of the project can easily be extracted by the results of the different tasks defined in this eTIP documents. As overview here the following concrete results which have been reached:

- A prototype product called "SketchAR" has been developed containing the integration of different software results developed during the SmartSketches project (containing new sketching functionality, gesture recognition methods, support of immersive environments and devices)
- An API has been specified allowing the integration of the different project components
- Prototypes of physical devices allowing the interactive work in immersive virtual environments have been developed
- A prototype of the integration of SmartSketches software components into a commercial CAD package has been developed

Broad dissemination and use intentions for the expected outputs

There are a number of exploitation possibilities, which can be carried out by the consortium, taking into account the profile of each partner.

- Disseminate the API by a single member of the consortium, a group of consortium members or even the full consortium. A consortium agreement will be set up to address Intellectual Property Rights.
- Making the API available for free and licensing source-code to software companies such as MIND or ICEM in exchange for royalties.
- Making specialized subsets of the API available for all related CAD packages interested in the project results.
- Establish advanced training services to help disseminate the results of the project
- Setting up a consultant network focused on the deployment of calligraphic interfaces.
- Explore e-marketplaces focused on the deployment of advanced interfaces
- Evaluate possibilities to bring some of the physical device prototypes developed in the project into production

In addition potential customers for the usage of project results or project components will be addressed to ensure that project results are developing into real marketable solutions.

Quantified Data on the dissemination and use of the project results

	Currently achieved quantity	Estimated future quantity
Product innovations	5	
Process innovations	5	
New services (commercial)		
New services (public)		
New methods	3	
Scientific breakthroughs	2	
Technical standards to which this project has contributed	1	
EU regulations/directives to which this project has contributed		
International regulations to which this project has contributed		
PhDs generated by the project	2	
Grantees/trainees including transnational exchange of personnel	5	

Comment on European Interest

European dimension of the problem (The extent to which the project has contributed to solve problems European level)

Product Design is an integral part of most European industries. Using CAD systems to help in all phases of the product conception has strong roots in industries as diverse as automotive, aerospace, mould, appliances, etc. which are responsible for a significant share of wealth generation across Europe. In the automotive and mould design sectors, production crosses national borders and communications span the whole European space, justifying the European dimension of the SmartSketches consortium which joins partners from three different nations with the ideal combination of skills to contribute to improve designer's productivity across Europe.

Contribution to developing S&T co-operation at international level. European added value (Development critical mass in human and financial terms; combination of complementary expertise and resources available Europe-wide)

The technology developed in SmartSketches will improve the interaction between humans and computers, in general and aims at improving user performance in the early stages of product design, in particular. It will add value to software systems for design, through the inclusion of more natural and intuitive ways of describing technical drawings creating 3D surfaces and expediting queries to retrieve related past projects. It may enable designers to be more creative and productive and indirectly promote the quality of designed products by allowing more design alternatives to be tried out before manufacturing.

Contribution to policy design or implementation (Contribution to one or more EU policies; RTD connected with standardisation and regulation at Community and/or national levels)

Both the automotive and mould-making industries are being forced to shorten their product cycles in response to increasing competition on a global scale. SmartSketches effort is directed towards improving productivity at the initial stages of product design where significant productivity gains are still possible. On the other hand, greater flexibility exploring product alternative designs makes it possible to correct critical manufacturability problems and issues at an early stage where these can be easily corrected. These changes have the potential to improve profitability and promote competitiveness of European industries on a global scale, also indirectly promoting employment and enhancing the welfare of EU citizens.

Improving the quality of life in the Community

Designers usually spend too much time in early phases of product design, because current software systems are hard to use and inhibit their creativity. The demonstrators of SmartSketches have the potential to increase designers' quality of life through the use of metaphors that explore skills developed by humans from a tender age, such as sketching with pencil and paper, using speech and gestures to communicate. Through a user centered design approach, such as the one used in this project, it is possible to enhance designers' work and productivity. The introduction of the technology developed within the project is of special relevance to workers in the design area and will help to remove stress caused by operating current systems in constrained environments and within tight schedules.

Provision of appropriate incentives for monitoring and creating jobs in the Community (including use and development of skills)

A number of partners within the proposal will be employing additional individuals to carry out the work involved in the SmartSketches project. This represents a direct contribution to improving employment. The commercialization of the final product and its operation by end-users will require training courses to teach designers how to use SmartSketches and consultancy in advanced user interfaces. Therefore, through training the project may also contribute to improve employment. The wider use of SmartSketches' results could also have an impact on employability. The design industries, who could use the results of this project, through for example enhanced design environments, can increase demand a number of Computer industries such as equipment, novel input and output devices and software applications. In this way, the project has the potential to contribute to increase employment both within the target industries as well as in ICT.

Supporting sustainable development, preserving and/or enhancing the environment (including use/conservation of resources)

The SmartSketches project will contribute directly to preserving the environment by employing a waste minimization strategy. Communication, exchange of information and documentation will be done largely through email, world-wide web or other electronic form, reducing the need for paper. Moreover, waste materials will be recycled wherever possible. The use of SmartSketches enables designers to use digital representations during the initial phase of design where creativity currently requires using pencil and paper. By reducing the use of paper in this phase, the project contributes to preserving/enhancing the environment and natural resources.

Result(s) for this project

----- Number of result: 10044 -----

Title of the result	Demo system integrating ICEM products and Immersives
Category	B: results usable exclusively within the consortium
Partner owning the result	Peter Salzmann Stork André

Contact person for the result

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Organisation	ICEM Technologies GmbH

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specific url	

Summary

The expected project result will be a set of products from input devices and software device drivers up to software plugins that can be embedded into professional software packages. Some expected concrete results are input device working in immersive environments like 3D pen allowing designers to work in a virtual 3D space on a CAD model, immersive modeling techniques to move design work into virtual environments which come as close as possible to a non-virtual "real" working techniques, but with all the advantages of the computer and software plugins allowing CA packages to extract usable geometry representations from ambiguous strokes on tablets, Powerwalls and normal desktop computer screens. One special result is a communication protocol, which allows it to combine standard CAD applications with immersive visualisation and editing techniques. The protocol is open and can easily be implemented by software vendors as well as by vendors of immersive hardware components. During the project IGD and ICEM are developing together a feasibility study inside the project, a demonstration toolkit to the potential end users inside the project and based on this a demonstration toolkit for potential end users of the software outside the project.

Subject descriptors

121 COMMUNICATION SCIENCES/HUMAN COMPUTER INTERACTIONS
129 COMPUTER SCIENCE/ENGINEERING, NUMERICAL ANALYSIS, SYSTEMS, CONTROL
155 DESIGN, DESIGN ENGINEERING

Documents

Documentation type :	Presentation Paper
Details	Amicis, R., Santos, P., Stork, A., et al "SketchAR – Sketching in Mixed Realities", 1st. Paderborn Workshop on Augmented and Virtual Reality, 104, 145-155, Paderborn (Germany), 2002, ISBN 935433-16-6
Status:	Public
Documentation type :	Presentation Paper
Details	Santos, P., Graf, H., Fleisch, T., Stork, A., "3D Interactive Augmented Reality in Early Stages of Product Design", HCI International 2003, 10th Conference on Human - Computer Interaction, Vo IV, 1203-1207, Crete (Greece), 2003, ISBN 0-8058-4933-5
Status:	Public
Documentation type :	Presentation Paper
Details	Amicis, R., Bruno, F., Stork, A., et al "The Eraser Pen: A New Interaction Paradigm for Curve sketching in 3D", Marjanovic, Dorian (Hrsg.); University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture u.a.: Proceedings of the 7th International Design Conference. Zagreb: Faculty of Mechanical Engineering and Naval Architecture, University of Zagreb, 2002, pp. 465-470
Status:	Public
Documentation type :	Presentation Paper
Details	Fiorentino, M., Amicis, R.; Monno, G., et al, "Spacedesign: A Mixed Reality Workspace for Aesthet Industrial Design", Müller, Stefan (Ed.) u.a.; Institute of Electrical and Electronics Engineers (IEEE) u.a.: IEEE and ACM International Symposium on Mixed and Augmented Reality 2002. Proceedings: Los Alamitos, Calif.: IEEE Computer Society 2002, pp. 86-94
Status:	Public
Documentation type :	Presentation Paper
Details	Fiorentino, M., Amicis, R., Stork, A., et al, "Surface Design in Virtual Reality as Industrial Application.", Marjanovic, Dorian (Hrsg.); University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture u.a.: Proceedings of the 7th International Design Conference. Zagreb: Faculty of Mechanical Engineering and Naval Architecture, University of Zagreb, 2002, pp. 477-482
Status:	Public
Documentation type :	Publication
Details	Stork, A., Bimber, O., Amicis, R., "Projection-based Augmented Reality in Engineering Application Stelzer, Ralph (Hrsg.) u.a.; Gesellschaft für Informatik (GI), Group 4.2.1 Computer Aided Design

(CAD) u.a.: CAD 2002. Proceedings: Corporate Engineering Research. Bonn : GI, 2002, S. 241-2. 2002

Status: Public

Documentation type : Tech Report

Details: Stork A., Santos P., Fleisch T., Araujo B., "Base Software and System Requirements", WP1, D5 Dec 20th 2002 <http://smartsketches.inesc-id.pt>

Status: Public

Intellectual Property Rights

Type of IPR	Knowledge: tick a box and give the corresponding details (reference numbers, etc) if appropriate					Pre-existing know-how Tick a box and give the corresponding details (reference number, etc) if appropriate	
	Current					Foreseen	
	Tick	NoP	NoI	Details	Tick	Tick	Details
Patent applied for							
Patent granted							
Patent search carried out	<input checked="" type="checkbox"/>			Web Services, Colaborative Technologies			
Registered design							
Trademark applications							
Copyrights							
Secret know-how							
Other - specify:							

Application sectors

45 Construction
 72 Computer and related activities
 73 Research and development

Current stage of development

Experimental development stage (laboratory prototype)

Quantified data about the result

	Actual current quantity	Estimated future quantity
Time to application / market (in months from the end of the research project)		6
Number of (public or private) entities potentially involved in the implementation of the result :		3
of which : number of SMEs :		
of which : number of entities in third countries (outside EU) :		
Targeted user audience: # of reachable people		
# of S&T publications (referenced publications only)		8
# of publications addressing general public (e.g. CD-ROMs, WEB sites)		5
# of publications addressing decision takers / public authorities / etc.		
Visibility for the general public	YES	

Further collaboration, dissemination and use of the result

(please tick the boxes corresponding to what form of contact you are seeking and what future steps you envisage in order to use your research results.)

LIC	License agreement	<input checked="" type="checkbox"/>
MKT	Marketing agreement	<input checked="" type="checkbox"/>
MAN	Manufacturing agreement	

JV	Establish a joint enterprise or partnership	
PPP	Private-public partnership	
FIN	Development financing	
VC	Venture capital/spin-off funding	
CONS	Available for consultancy	v
INFO	Information exchange/Training	
R&D	Further research or development	v
Other	(please specify below)	

Details: Please describe in more detail what you are looking for - your intension, and/or your offer to others.

Potential offered for further dissemination and use

The result is interesting for any producers of immersive devices to be used in 3D graphics based computer program and for software vendors delivering such programs.

Profile of additional partner(s) for further dissemination and use

The implemented result is of interest for any customers using 3D graphics based computer programs in immersive environments as powerwalls, on stereo screens etc.

----- Number of result: 10489 -----

Title of the result	Immersive Input Devices
Category	A: results usable outside the consortium
Partner owning the result	Stork André Olaf Barski

Contact person for the result

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Fax	+49-69-94 41 90 80
e_mail	olaf.barski@barskidesign.com
URL	http://www.barskidesign.com
specific url	

Summary

In the SmartSketches project modeling techniques are developed suitable for creating and modifying free-form surfaces in 3D space using commercially-available virtual environment systems together with innovative use of calligraphic/immersive devices to meet designers' requirements. Barskidesign is responsible for the product design development of the 3 D tools. This includes the 3 D Pen called "Cyberstilo", a 3 D Mouse called "CyberStone", a PIP (personal interactive panel) and a Tapefinger. In the 1st stage we developed a system of different 3 D tools, easy to understand and easy to handle, with a family character and from technical side with less different parts for various applications and easy production. The creative work starts with analysis, sketches and foam model making in scale 1:1. Various user tests at Fraunhofer IGD were the requirement for the detailing design stage, construction and the rapid prototyping of the tools. The cyberstilo was the first working prototype with all functionalities, presented at th EUROMOLD in Frankfurt, December 2003 and at the CEBIT March 2004 in Hanover.

Subject descriptors

411 MULTIMEDIA
155 DESIGN, DESIGN ENGINEERING
53 AUDIOVISUAL COMMUNICATION
400 MODELLING/MODELLING TOOLS, 3-D MODELLING

Documents

Documentation type :	Publication 01
Details	Barski O., "Skizzierem im virtuellen Raum", FORM, The European Design Magazine, No. 190, p. 12, Birkhäuser Verlag AG, 2003

Status:	Public
Documentation type :	Publication 02
Details	Barski O., "Werkzeuge für Virtual Reality", designreport Nr. 7+8, Blue C. Verlag, Frankfurt, 2003
Status:	Public
Documentation type :	Publication 03
Details	Barski O., "Werkzeuge für Virtual Reality", designreport Nr. 1/04, Blue C. Verlag, Frankfurt, 2004
Status:	Public
Documentation type :	Publication 04
Details	design+engineeringforum, VR Forum, Euromold, dot -Verlag, Frankfurt/Main, 2003
Status:	Public
Documentation type :	Publication 05
Details	Mediendienst, Fraunhofer Gesellschaft, München, Nr. 11 - 2003
Status:	Public
Documentation type :	Publication 06
Details	Chr. Babel, "Eintauchen in ´s System/Diving into the system", FORM, The European Design Magazine, No. 192, page 62-65, Birkhäuser Verlag AG, 2003
Status:	Public
Documentation type :	Publication 07
Details	IT, Moderne Informationstechnik, Nr. 1, "Freihändig im Cyberspace", S. 38, Jan./Febr. 2004
Status:	Public
Documentation type :	Tech Report
Details	Olaf Barski, "Cyberstilo report", Feb. 17th, 2004 http://smartsketches.inesc-id.pt
Status:	Public
Documentation type :	Tech Report
Details	Barski, O., "Foam models of calligraphic 3D input devices", WP4, D9, Apr. 30th 2003 http://smartsketches.inesc-id.pt
Status:	Public

Intellectual Property Rights

Type of IPR	Knowledge: tick a box and give the corresponding details (reference numbers, etc) if appropriate					Pre-existing know-how Tick a box and give the corresponding details (reference number, etc) if appropriate	
	Current					Foreseen	
	Tick	NoP	NoI	Details		Tick	Details
Patent applied for							
Patent granted							
Patent search carried out							
Registered design							
Trademark applications	v			303 58 019.4/42			
Copyrights							
Secret know-how							
Other - specify:							

Application sectors

45 Construction
 72 Computer and related activities
 73 Research and development

Current stage of development

Quantified data about the result

	Actual current quantity	Estimated future quantity
Time to application / market (in months from the end of the research project)		6
Number of (public or private) entities potentially involved in the implementation of the result :		3
of which : number of SMEs :		
of which : number of entities in third countries (outside EU) :		
Targeted user audience: # of reachable people		1
# of S&T publications (referenced publications only)		
# of publications addressing general public (e.g. CD-ROMs, WEB sites)		7
# of publications addressing decision takers / public authorities / etc.		3
Visibility for the general public	YES	

Further collaboration, dissemination and use of the result

(please tick the boxes corresponding to what form of contact you are seeking and what future steps you envisage in order to use your research results.)

LIC	License agreement	
MKT	Marketing agreement	
MAN	Manufacturing agreement	<input checked="" type="checkbox"/>
JV	Establish a joint enterprise or partnership	
PPP	Private-public partnership	
FIN	Development financing	
VC	Venture capital/spin-off funding	
CONS	Available for consultancy	
INFO	Information exchange/Training	
R&D	Further research or development	<input checked="" type="checkbox"/>
Other	(please specify below)	

Details: Please describe in more detail what you are looking for - your intension, and/or your offer to others.

Potential offered for further dissemination and use

Manufacturer of 3D input devices.

Profile of additional partner(s) for further dissemination and use

Any producer of 3D input devices for computers. Every user of a 3D application dealing with creation or modification 3D models in space.

----- Number of result: 10491 -----

Title of the result	2D Sketch Editor/Gesture Recognizer
Category	A: results usable outside the consortium
Partner owning the result	Fernando Nunes Ferreira

Contact person for the result

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specific url

Summary

CAD systems have yet to become usable at the early stages of product ideation, where precise shape definitions are sometimes even design intentions are not fully developed. To overcome these limitations, new approaches, which we called Calligraphic Interfaces, use sketching as the main organizing paradigm. Such applications rely on continuous input modalities rather than on discrete interactions characteristic of WIMP interfaces. However, replacing direct manipulation by sketching alone poses very interesting challenges. While the temptation to follow the paper-and-pencil metaphor is great, free-hand sketch recognition remains an elusive goal. Further, using gestures to enter command and sketches to draw shapes requires users to learn a command set – sketches do not enjoy the self-disclosing characteristics of menus. Moreover, the imprecise nature of interactions presents additional problems that are difficult to address using present-day techniques. We approach the three problems outlined above through a combination of different paradigms: First, a calligraphic sketching metaphor provides for a paper-like interaction. Second, dynamic menus – expectation lists – handle ambiguity and try to expose the state of the application without interfering with task. Third, an incremental drawing paradigm allows precise drawings to be progressively constructed from sketches through simple constraint satisfaction. Finally, reducing instruction set and command usage allow for a simple and learnable approach in contrast with the complexity of present-day interactive systems. Our prototype - GIDeS - embodies these approaches and usability testing carried so far yielded very encouraging results.

Subject descriptors

121 COMMUNICATION SCIENCES/HUMAN COMPUTER INTERACTIONS
129 COMPUTER SCIENCE/ENGINEERING, NUMERICAL ANALYSIS, SYSTEMS, CONTROL
400 MODELLING/MODELLING TOOLS, 3-D MODELLING

Documents

Documentation type :	Presentation Paper
Details	Caetano, A., Goulart N., Fonseca M., et al, "JavaSketchIt: Issues in Sketching the Look of User Interfaces.", Proceedings of the 2002 AAAI Spring Symposium - Sketch Understanding, pages 9-10, Palo Alto, USA, Mar 2002
Status:	Public
Documentation type :	Presentation Paper
Details	Fonseca, M., Pimentel C., Jorge J.; "CALI: An Online Scribble Recognizer for Calligraphic Interfaces", Proceedings of the 2002 AAAI Spring Symposium - Sketch Understanding, pages 51-58, Palo Alto, USA, Mar 2002
Status:	Public
Documentation type :	Presentation Paper
Details	Naya, F., Contero M., Gomis, J.M., et al, "Direct Modeling: from Sketches to 3D Models", Proceedings of the 1st Ibero-American Symposium in Computer Graphics, pages 109-117, Guimaraes, Portugal, Jul 2002
Status:	Public
Documentation type :	Presentation Paper
Details	Caetano, A., Goulart, N., Fonseca M., et al, "Sketching User Interfaces with Visual Patterns", Proceedings of the 1st Ibero-American Symposium in Computer Graphics, pages 271-279, Guimaraes, Portugal, Jul 2002
Status:	Public
Documentation type :	Tech Paper
Details	Pereira J., Ferreira N., "2D Sketch Editor Usability Tests", WP7, D10, Apr 25th 2003 http://smartsketches.inesc-id.pt
Status:	Public

Intellectual Property Rights

Type of IPR	Knowledge: tick a box and give the corresponding details (reference numbers, etc) if appropriate	Pre-existing know-how: tick a box and give the corresponding details (reference number, etc) if appropriate
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	Current			Details	Foreseen Tick	appropriate	
	Tick	NoP	NoI			Tick	Details
Patent applied for							
Patent granted							
Patent search carried out							
Registered design							
Trademark applications							
Copyrights							
Secret know-how							
Other - specify:							

Application sectors

- 45 Construction
- 72 Computer and related activities
- 73 Research and development

Current stage of development

Prototype/demonstrator available for testing

Quantified data about the result

	Actual current quantity	Estimated future quantity
Time to application / market (in months from the end of the research project)		
Number of (public or private) entities potentially involved in the implementation of the result :		
of which : number of SMEs :		
of which : number of entities in third countries (outside EU) :		
Targeted user audience: # of reachable people		
# of S&T publications (referenced publications only)		7
# of publications addressing general public (e.g. CD-ROMs, WEB sites)		
# of publications addressing decision takers / public authorities / etc.		
Visibility for the general public	YES	

Further collaboration, dissemination and use of the result

(please tick the boxes corresponding to what form of contact you are seeking and what future steps you envisage in order to use your research results.)

LIC	License agreement	<input checked="" type="checkbox"/>
MKT	Marketing agreement	<input checked="" type="checkbox"/>
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PPP	Private-public partnership	
FIN	Development financing	<input checked="" type="checkbox"/>
VC	Venture capital/spin-off funding	
CONS	Available for consultancy	
INFO	Information exchange/Training	
R&D	Further research or development	<input checked="" type="checkbox"/>
Other	(please specify below)	

Details: Please describe in more detail what you are looking for - your intension, and/or your offer to others.

Potential offered for further dissemination and use

Profile of additional partner(s) for further dissemination and use

Software providers can embed the algorithms created in this result into any 3D application used to create or modify 3D geometry.

----- Number of result: 10493 -----

Title of the result	Sketch Based Retrieval Plugin
Category	A: results usable outside the consortium
Partner owning the result	Joaquim Jorge Manuel João Fonseca

Contact person for the result

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URL	http://immi.inesc-id.pt/ specific url

Summary

Retrieving drawings using sketches comprises three main tasks: The first is automatic indexation of technical drawing databases. To achieve this we have developed techniques to simplify drawings based on their geometric features. The second task, which constitutes the central component of the information retrieval system, yields methods to match hand-drawn sketches to technical drawings present in the database and associate a measure of similarity to retrieve objects, based on a common symbolic description. The third task has developed a user interface to query drawing databases and CAD libraries, using hand-drawn sketches.

Subject descriptors

121 COMMUNICATION SCIENCES/HUMAN COMPUTER INTERACTIONS
150 DATABASES, DATABASE MANAGEMENT, DATA MINING
155 DESIGN, DESIGN ENGINEERING

Documents

Documentation type :	Presentation Paper
Details	Fonseca, M., Jorge, J., "Towards Content-Based Retrieval of Technical Drawings through High-Dimensional Indexing", Proceedings of the 1st Ibero-American Symposium in Computer Graphics pages 263-270, Guimaraes, Portugal, Jul 2002
Status:	Public
Documentation type :	Publication
Details	Fonseca, M., Jorge, J., "Towards Content-Based Retrieval of Technical Drawings through High-Dimensional Indexing", Computers and Graphics, pages 61-69, Elsevier, January 2003
Status:	Public
Documentation type :	Presentation Paper
Details	Fonseca, M., Jorge, J., "Indexing High-Dimensional Data for Content Based Retrieval in Large Databases", Proceedings of the 8th International Conference on Database Systems for Advanced Applications (DASFAA 2003), pages 267-274, Kyoto, Japan, IEEE Computer Society Press Mar 2003
Status:	Public
Documentation type :	Publication
Details	Manuel J. Fonseca, Bruno Barroso, Pedro Ribeiro, Joaquim A. Jorge, "Sketch-Based Retrieval of ClipArt Drawings", to appear in Proceedings of the Advanced Visual Interfaces (AVI'04) Gallipoli, Italy, May 2004
Status:	Public

Documentation type :	Presentation Paper
Details	Manuel J. Fonseca, Bruno Barroso, Pedro Ribeiro, Joaquim A. Jorge: "Retrieving ClipArt Images b Content", to appear in Proceedings of International Conference on Image and Video Retrieval (CIVR'04), Lecture Notes in Computer Science. Springer-Verlag, Dublin, Ireland, July 2004
Status:	Public
Documentation type :	Publication
Details	Manuel J. Fonseca, Alfredo Ferreira Jr., Joaquim A. Jorge: "Content-Based Retrieval of Technical Drawings", to appear in the Special Issue of International Journal of Computer Applications in Technology (IJCAT), "Models and methods for representing and processing shape semantics".
Status:	Public
Documentation type :	Tech Report
Details	Fonseca M., Ferreira A., "Technical Drawing Retrieval by Sketches Usability Tests at CENTIMFE" WP6, D13, Nov 21st, 2003, www.smartsketches.inesc-id.pt
Status:	Public

Intellectual Property Rights

Type of IPR	Knowledge: tick a box and give the corresponding details (reference numbers, etc) if appropriate					Pre-existing know-how: tick a box and give the corresponding details (reference number, etc) if appropriate		
	Current					Foreseen		
	Tick	NoP	NoI	Details		Tick	Details	
Patent applied for								
Patent granted								
Patent search carried out								
Registered design								
Trademark applications								
Copyrights								
Secret know-how								
Other - specify:								

Application sectors

34 Manufacture of motor vehicles, trailers and semi-trailers
 45 Construction
 72 Computer and related activities

Current stage of development

Prototype/demonstrator available for testing
 other: Alfa version of the prototype, already evaluated by users during a usability test at CENTIMFE.

Quantified data about the result

	Actual current quantity	Estimated future quantity
Time to application / market (in months from the end of the research project)		
Number of (public or private) entities potentially involved in the implementation of the result :		
of which : number of SMEs :		
of which : number of entities in third countries (outside EU) :		
Targeted user audience: # of reachable people		
# of S&T publications (referenced publications only)		9
# of publications addressing general public (e.g. CD-ROMs, WEB sites)		2
# of publications addressing decision takers / public authorities / etc.		
Visibility for the general public	YES	

Further collaboration, dissemination and use of the result

(please tick the boxes corresponding to what form of contact you are seeking and what future steps you envisage in order to use your research results.)

LIC	License agreement	<input checked="" type="checkbox"/>
MKT	Marketing agreement	<input checked="" type="checkbox"/>
MAN	Manufacturing agreement	
JV	Establish a joint enterprise or partnership	
PPP	Private-public partnership	
FIN	Development financing	
VC	Venture capital/spin-off funding	
CONS	Available for consultancy	<input checked="" type="checkbox"/>
INFO	Information exchange/Training	
R&D	Further research or development	<input checked="" type="checkbox"/>
Other	(please specify below)	

Details: Please describe in more detail what you are looking for - your intension, and/or your offer to others.

Potential offered for further dissemination and use**Profile of additional partner(s) for further dissemination and use**

Producers of software solutions like PLM databases which include search engines for 3D parts, as for example PLM providers as Dassault, Unigraphics, PTC.

----- Number of result: 20362 -----

Title of the result	General Integration Framework
Category	A: results usable outside the consortium
Partner owning the result	Mendes Bruno Stork André

Contact person for the result

Name	Bruno Mendez
Position	Technical Director
Organisation	Mind - Software Multimédia e Industrial, SA
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Fax	+351-21-3712650
e_mail	bruno.mendes@mind.pt
URL	http://www.mind.pt
specific url	

Summary

This result delivers a framework integrating the different components developed in the Smart Sketches project. The framework consists out of - an API specifying the data structures and the functionality - web services allowing differ applications to communicate to each other

Subject descriptors

321 INFORMATION TECHNOLOGY/SCIENCE
342 INTERNET TECHNOLOGIES

Documents**Intellectual Property Rights**

Type of IPR	Knowledge: tick a box and give the corresponding details (reference numbers, etc) if appropriate				Pre-existing know-how Tick a box and give the corresponding details (reference number, etc) if appropriate		
	Current		Foreseen		Pre-existing know-how		Details
	Tick	NoP	NoI	Details	Tick	Details	
Patent applied for							
Patent granted							
Patent search carried out							
Registered design							
Trademark applications							
Copyrights							
Secret know-how							
Other - specify:							

Application sectors

72 Computer and related activities
73 Research and development

Current stage of development

Quantified data about the result

	Actual current quantity	Estimated future quantity
Time to application / market (in months from the end of the research project)		
Number of (public or private) entities potentially involved in the implementation of the result :		
of which : number of SMEs :		
of which : number of entities in third countries (outside EU) :		
Targeted user audience: # of reachable people		
# of S&T publications (referenced publications only)		
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Further collaboration, dissemination and use of the result

(please tick the boxes corresponding to what form of contact you are seeking and what future steps you envisage in order to use your research results.)

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Other	(please specify below)	

Details: Please describe in more detail what you are looking for - your intension, and/or your offer to others.

Potential offered for further dissemination and use

Profile of additional partner(s) for further dissemination and use

3D Styling/CAD application producers who want to - make their User Interface easier (e.g. sketch based) - want to integrate their application into immersive environments - want to connect their application to new 3D input devices

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"Please note that in addition to the electronic document, a printed and signed version of your Technology Implementation Plan needs to be sent to the European Commission by post"

(Project Coordinator) **Name:** Joaquim Jorge **Organisation:** INESC-ID **Address:** Rua Alves Redol, 9 1000-021 Lisboa Portugal

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