AIM@SHAPE newsletter
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IST Project Sheet

AIM@SHAPE is a Network of Excellence project within EU's Sixth Framework Programme

Full name: Advanced and Innovative Models And Tools for the development of Semantic-based systems for Handling, Acquiring, and Processing Knowledge Embedded in multidimensional digital objects

Action Line: Semantic-based knowledge systems

Duration: 2004-2007 (48 months)

Coordinator: Bianca Falcidieno

AIM@SHAPE Web Portal: *http://www.aimatshape.net*

AIM@SHAPE Mission

The multimedia world can be classified into one-dimensional media like text and sound, and multi-dimensional media. Among the latter, those which are characterized by a visual appearance in a space of 2, 3, or more dimensions are called shapes. Examples of shapes are pictures, sketches, images, 3D models of solid objects, videos (disregarding the sound track), 4D animations, etc. As information is moving from textual to visual form, digital shapes are gaining more and more importance. They populate virtual environments in advanced scientific simulations as well as in emerging edutainment applications. The mission of AIM@SHAPE is to advance research in the direction of semantic-based shape representations and semantic-oriented tools to acquire, build, transmit, and process shapes with their associated knowledge. We foresee a generation of shapes in which knowledge is explicitly represented and, therefore, can be retrieved, processed, shared,
and exploited to construct new knowledge.

The attainment of a new vision of shape knowledge is achieved by: the formalisation of shape knowledge and the definition of shape ontologies in specific contexts; the definition of shape behaviours which formalise the interoperability between shapes; the delineation of methods for knowledge-based design of shapes and the definition of tools for semantics-dependent mapping of shapes. The consortium of 14 excellent research institutions will pursue integration at the institutional level by founding a European Virtual Institute on Shape Modelling, at the foundational level by initiating a new Theory of Digital Shapes, and at the component level by developing a Digital Shape Workbench as a common platform for shape models and software tools. Integrating activities include the design of a common shape ontology and a program for human capital mobility and training. Spreading of excellence includes an international forum, an industrial users' group and regular conferences.

Topics

Consortium

1 Istituto di Matematica Applicata e Tecnologie Informatiche -Dept of Genova
ITALY
2 Università di Genova -Diparimento di Informatica e Scienze dell'Informazione
ITALY
3 École Polytechnique Federale de Lausanne
SWITZERLAND
4 Fraunhofer Institut für Graphische Datenverarbeitung
GERMANY
5 Institut National Polytechnique de Grenoble
FRANCE
6 Institut National de Recherche en Informatique et Automatique
FRANCE
7 Informatics and Telematics Institut
Center for Research and Technology Hellas
GREECE
8 Université de Genève
SWITZERLAND
9 Max-Planck-Institut für Informatik
GERMANY
10 Stiftelsen for industriell og teknisk forskning ved Norges Tekniske Høgskole
NORWAY
11 Technion –Israel Institute of Technology
ISRAEL
12 Technische Universität Darmstadt
GERMANY
13 Utrecht University
NETHERLANDS
14 Weizmann Institute of Science
ISRAEL

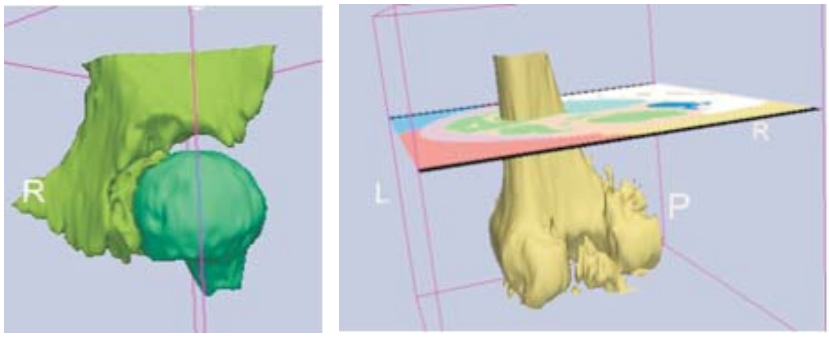
Research Highlights

Optimised Systems for Shape Acquisition and Reconstruction (Task 5.2)

DISI is working on improvements for the IMPACT acquisition system. In particular, research activities have been carried out for updating the image processing library. DISI is also exhaustively testing the system and is starting the acquisition of new shapes.

Shape Reconstruction from Images (Task 5.3)

MRI automatic segmentation remains an important issue within the medical imaging community as no method has proven to be robust, accurate and generic for all tissues. MRI images are noisy and contain a large amount of textural information. Hence direct approaches (thresholding, region growing, and edge detection) generally fail. MIRALab are interested in the segmentation of the musculoskeletal system (muscles, fat, skin and bones) which is a particularly challenging task (muscles are difficult to delineate). They are currently investigating methods using a complex of deformable models with enhanced topological information (i.e. muscle attachments) and high level parameters (shape memory, volume conservation, smoothness constraints). Their methods could benefit from a pre-segmentation that would enhance some constraints from the images. Particularly the fat is well perceptible and could be automatically segmented. Weizmann is recently expanding its multi-scale image segmentation algorithm to deal with 3D MRI Brain data and already has experiences and initial results with medical image segmentation (see figure). The common goal of this joint project is to obtain accurate delineation and segmentation of various types of anatomical components from MRI: bones, cartilage, ligaments, fat, and muscles, for 3D reconstruction of patient's anatomy.



3D Segmentation examples

Human Shape Reconstruction (Task 5.5)

Weizmann has recently joined task 5.5, offering a newly developed model hole filling algorithm. They currently plan to collaborate with MIRALab, intending to use their algorithm in an attempt to correct holes in 3D models of anatomical structures.

Geometry Processing for the Semantics (Task 6.2)

Within SINTEF ICT, Department of Applied Mathematics, 3D graphics has been an important support tool both for the activities within Computer Aided Geometric Design (CAGD) and Partial Differential Equations (PDEs). When Graphical Processing Units (GPUs) with 32bit floating point arithmetic and programmable vertex and fragments shaders were introduced in 2003, SINTEF realized that these GPUs could be an important computational resource both within CAGD and PDE based simulation. Consequently they applied and were awarded for support through a Strategic Research Project "Graphics hardware as a high-end computational resource", for the period 2004-2007 from the Norwegian Research Council. As the origin of the GPU is from computer graphics the terminology related to GPU programming has a strong computer graphics flavor. One of the ambitions of the project is to open GPU-programming to those outside of computer graphics.

The project focuses on algorithms for applications of GPUs within:

- Image processing
- Partial differential equations, see some examples in *http://www.math.sintef.no/gpu/visualwave.html*
- Geometry
- Linear algebra

The project uses standard PCs with commercially available graphics card. Until the middle of 2005 only PCs with AGP bus have been used. However, SINTEF expects soon to start using PCs with PCI-Express bus.
For more details on the project please look at: *www.math.sintef.no/gpu/*, this web page will be moved to *www.sintef.no/gpgpu/* in the time coming.
For more information about GPU-programming please look at the paper: T. Dokken, T.R. Hagen and J. M. Hjelmervik. The GPU as a high performance computational resource, Proceeding from Spring Conference on Computer Graphics 2005, Budmerice Castle, Bratislava, Slovakia, May 12-14 2005.
http://www.math.sintef.no/gpu/pdf/Dokken_SCCG_2005.pdf

Statistical Learning Techniques for Shape Characterization and Feature Detection (Task 6.4)

Silhouettes contain rich information about the shape of objects that can be used for recognition and classification. The vision group at Weizmann has recently developed an approach which allows reliable computation of many useful silhouette properties, and utilization of these properties for shape classification. This approach assigns for every internal point of the silhouette a value reflecting the mean time required for a random walk beginning at the point to hit the boundaries. This function can be computed by solving Poisson's equation, with the silhouette contours providing boundary conditions. The solution can be used to reliably extract various shape properties including part structure and rough skeleton, local orientation and aspect ratio of different parts, and convex and concave sections of the boundaries and can be computed very efficiently using multigrid algorithms. DISI has been investigating image classification methods using SVM classifiers, with the emphasis of using simple features, both global and local, to describe the shapes. The two teams are currently involved in a joint effort directed toward examining a variety of features and different classifiers in order to better understand the various components of the problem and improve classification results.
More specifically, they concentrate their attention on two classification algorithms: Decision Trees with Fisher Linear Discriminant and Support Vector Machines, and compare their performance in classification task applied to a database of natural objects' shapes where each shape is represented by a compact vector of features extracted with the Poisson equation.

Skeletal Structures and Critical Characteristics for Shape Representation (Task 6.5)

DISI has been active in research on morphology of scalar fields, and in particular IT has been working on hierarchical representation of the morphological structure of a 2D scalar field and started a new research activity on algorithms for extracting structural information from 3D scalar fields.

LOD Structural Shape Representation (Task 6.6)

DISI research activities on multi-resolution shape representation have focused on the problem of dealing with large data sets describing shapes, such as free-form surfaces and scalar fields, and it is currently developing a new multi-resolution out-of-core representation for such shapes. Some preliminary results will be presented at the Workshop on Massive Geometric Data Sets (June 9 2005, Pisa (Italy)).

Semantics and Shape for Industrial Design (Task 7.2)

IMATI and INPG are keeping on their activity on the development of semantic tools for early design phases by extending their free form feature deformation tool to include analytical surface constraints. The aim is to provide the possibility of including analytical surface areas, at present only planar, without the need of time consuming trimming and blending operations, thus allowing a faster evaluation of shape alternatives. Complementary, IGD is developing and evaluating interactive free-form creation and deformation techniques for virtual styling, working also on free-form continuity constraints to improve the intuitiveness of the 3D sketching. In addition, INPG and IMATI are also testing the possibility of including haptic evaluation of the deformation results. This is currently under development through the new contacts established with the group of Prof. Antonio Frisoli at PERCRO, Scuola di sant'Anna in Pisa (Italy).
IMATI and GraphiTech (FhG) are working on the ontology definition for car style. IGD and GraphiTech (FhG) are exploring methods for interfacing Content Management systems and Virtual Styling systems, which will merge with the ongoing work towards a common Product Design ontology. Furthermore, GraphiTech (FhG) is working on the development of a system for retrieval of car blueprints using sketching and spatial information. This system is based on a priori knowledge on car-design, sketches, and relations among sketches. Designers will be able to query an expected car by simply drawing some sketches.

Incorporating Semantics and Ontologies in Product Development and Simulation (Task 7.3)

In collaboration with IMATI and INGP, DISI is working on ways of representing and manipulating finite element meshes for CAD/CAM. DISI has developed a new data structure for representing simplicial decompositions of 3D non-manifold and non-regular objects, the Incidence Simplicial data structure (IS), suitable for finite element applications.

Ph.d. Dissertations

- **Giuseppe Patanè** "Analysis and Parameterization of Triangulated Surfaces"
  Ph.D in: "Mathematics and Applications" - Department of Mathematics, University of Genova, Italy.
  SUPERVISORS: B. Falcidieno, M. Spagnuolo
  DATE: April 15, 2005

- **Simone Marini** "3D Shape Similarity through Structural Descriptors"
  Department of Communication, Computer and System Sciences, University of Genova, Italy.
  SUPERVISORS: B. Falcidieno, M. Spagnuolo
  DATE: April 29, 2005

Breaking News

- **Georgle - A 3D Model Retrieval Tool**
  Technion has developed a 3D Web search engine that lets the user provide relevance feedback, in order to refine the search results, as described in Leifman, Meir and Tal, 2004. Relevance feedback lets the user incorporate his or her perceptual feedback in the search, by iterating the following three stages. First, the system retrieves similar models and presents them to the user in descending order of similarity. Next, the user provides feedback regarding the relevance of some of the current retrieval results. Finally, the system uses these examples to learn and improve the performance in the next iteration. The system is released and can be used within Explorer from *http:132.68.60.21/gl.* The search starts with a keyword (e.g. horse), followed by "finding similar objects," and then the user can iterate on "Refining the results".

- **INRIA @ Siggraph 2005**
  Inria will present a new technique for Isotropic Tetrahedral Meshing at SIGGRAPH 2005

AIM@SHAPE Common Workbench

Digital Shape Workbench (DSW)

See *http://www.aimatshape.net/Resources*

The software tools added include:

- **SISL** (SINTEF Spline Library)
  SINTEF has recently licensed the SISL extensive spline library under GPL and they added it to the software repository of the Digital Workbench. SISL has been gradually developed and enhanced for more than two decades by the geometry group at SINTEF in Oslo, and covers functionality for NURBS curve and surface definition, generation, evaluation and processing (intersection computation, data reduction, etc.). With its GPL release, SISL has undergone a brush-up and is supplied with a comprehensive manual, a user guide, a tutorial and a set of sample programs. The goal is to make it easy to learn and use. SISL is written in pure C, and the current release has been verified to compile with GCC 3.3.3 as well as the latest Microsoft Visual Studio .NET compilator. Bundled with SISL is also a free viewer that can be used to visually inspect objects generated with SISL.
  See *http://www.sintef.no/content/page1____5470.aspx*

- **MT Jade** (by DISI)
  JADE provides a method for simplifying triangular models. Given an input model and a user-specified error tolerance, the algorithm generates an output model that attempts to minimize the number of polygons while staying within the specified error tolerance.

- **Segmentation by Weighted Aggregation** (**SWA**) (by the Weizmann institute)
  The SWA software implements a multiscale image segmentation method inspired by Algebraic Multigrid techniques.

The Shape Repository

The shape repository now contains more than 140 models, most of them being polygon surface meshes. It is possible to browse and search the repository. Registered users can leave comments in the forum and, after successful login, upload new shape models. Other links lead to news and information on the repository, and to other online shape repositories. A licence has been elaborated upon in order to open soon the access to the repository.
One example snapshot of a model is available here:
http://www.aimatshape.net:10080/2/files/172_pierrot_final.jpg

BREAKING NEWS:
DSW AT HARVARD AND MIT

The Shape Repository was introduced by Technion staff to graduate students at Harvard University and MIT. Some of the students have started to use data obtained from the DSW.

Ontology Clusters

Ontology for Virtual Humans

Leader Mario Gutierrez (EPFL)
Partners involved: MiraLab, UU, IMATI, DISI, EPFL
The Virtual Humans (VH) ontology aims at organizing the knowledge and data of three main research topics and applications involving virtual representations of humans:

1. Human body modeling and analysis: morphological analysis, model editing.
2. Animation of virtual humans: autonomous or pre-set animation of VH.
3. Interaction of virtual humans with virtual objects: smart objects are virtual entities that contain the information indicating how to grasp them and animate them.

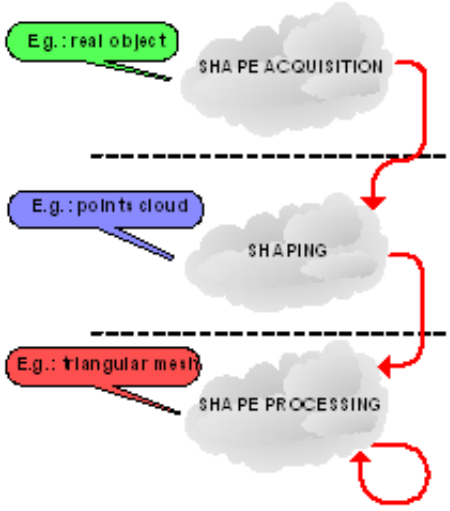
We are currently working on incorporating into the ontology information about garments and accessories. As an outcome of the Ontology Workshop in Thessaloniki (May 2005) we are preparing a new version of the ontology using OWL (Web Ontology Language) which is a stronger language with greater machine interpretability than RDF (the language used in previous versions of the ontology).

COMMUNICATIONS
Welcome to Alejandra Garcia-Rojas (new PhD student at EPFL) who will take over the work of Mario Gutierrez from 1st of August.

Ontology for Acquisition and Reconstruction Processes

DISI, as task leader of Task1.2.2, is working for the design of an ontology for the *Acquisition and Reconstruction of Shapes*.
The domain of this ontology is the development, usage and sharing of hardware tools, software tools and shape data by researchers and experts in the field of acquisition and reconstruction of shapes.
The Ontology is intended to be used in the context of three main macro-steps composing the pipeline:

1. **Shape Acquisition**, Sensors capture measurements. Often, because of the sensor's limited field of view or of the complexity of the object/scene to be scanned, multiple scans are required. Each view gives a set of measures on a certain given coordinates system. In case of multiple scans, the acquired data have to be aligned transforming all the measurements into a common coordinate system. This operation has to be done with the minimal possible error.
2. **Shaping**, all data are merged to construct a single shape. Examples of shapes are pictures, sketches, images, 3D models of solid objects, videos (disregarding the sound track), 4D (=3D+Time) animations.
3. **Shape Processing**, Activities on the shape may be done: smoothing, simplification, texture mapping, remeshing, enhancement, and so on…



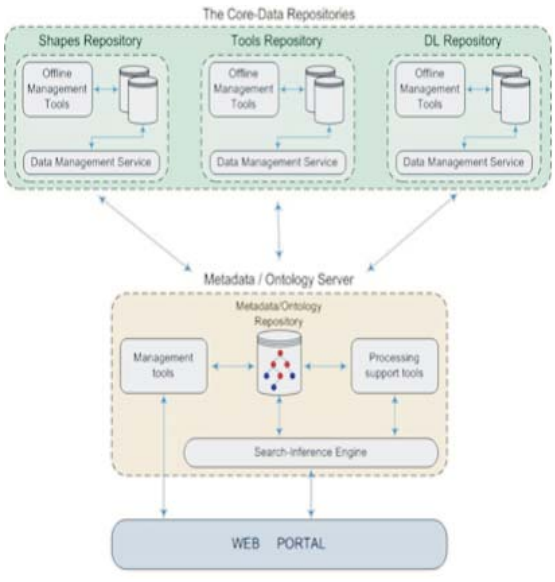
Search Engine

ITI-CERTH's current activities are focused on the requirements, design and initial development of a **knowledge-based search engine**, as well as the development and validation of the domain (cluster) ontologies. Their work also addresses the development of the *Digital Shape Workbench* (DSW) infrastructure, providing a unified architectural model for accessing the digital shapes and processing tools repositories (a first draft of the architecture is shown in figure).

The *Search Engine* will provide advanced retrieval and access to the ontology-driven metadata information stored in the *Ontology & Metadata Repository* and will also provide **reasoning capabilities** on the content of the *Digital Shape Workbench.* The *Search Engine* will use deductive reasoning and inference to find digital shape resources that match the specified semantic criteria. The *Ontology & Metadata Repository* will handle the issues of knowledge organization and management of ontologies and metadata.

All of the above will be based on the definition of requirements and functionalities of the DSW. These include general requirements (e.g. user interface, visualization of results, the degree of reasoning or inference needed etc.) as well as functional requirements (e.g. usage of the search engine, browsing and semantic searching based on end-users constraints/criteria, study and analysis of user behavior in search/browse services etc.)

In addition, browsing approaches based on different techniques such as Information Visualization to enhance the exploitation of the ontology-driven metadata will be investigated.



An initial design of the DSW architecture

Network Industrial Group (NIG) Members & Profiles

AIM@SHAPE is supported by the industrial environment through the NIG members, which provide their expertise to:
- Identify industrial open problems related to shape issues,
- Tune the research activities to address industrial needs,
- Evaluate the research outcomes.

The number of NIG members is constantly growing providing a whole range of expertise:

AD Solutions srl *altair.com*	Development of software components for the suite HyperWorks of the Altair Engineering Inc, an American company leader in CAE software through HyperMesh, HyperView, MotionView e OptiStruct. AD Solutions srl develops the geometric kernel of the software for mesh generation, and is responsible of the R&D of the advanced pre-processing functionalities of their software.
Alessi spa *alessi.com*	Industrial Design company working in all areas of comsumer goods.
BARSKIDESIGN *barskidesign.com*	Product design studio offering services like product design development, studies for concept, material and ergonomics, prototyping, interior design, packaging and working in the areas of medical equipment, comsumer goods, capital goods and communication technology.
DaimlerChrysler AG 059/X803 *daimlerchrysler.com*	Automotive Styling/Design Department of DC.
GeCo Business Consulting *ge.co.it*	IT company providing vertical solutions in the areas of development, security, quality, facility and training.
GIStec GmbH *gistec-online.de*	Geo-Informatics company.
GISIG - Geographical Information Systems International Group *gisig.it*	A sectoral non-profit making Association on Geographical Information Systems (GIS) grouping about 100 organizations from more than 20 European countries.
ICEM Technologies GmbH New Technology *icem.com*	IT software company providing 3D scanning and free-form modelling software for styling and industrial design.
ImpactXoft Europa *impactxoft.com*	IT company providing solutions for industrial design, product engineering, mold & tooling design, and tool manufacturing.
ISPESL DIPIA Centro Ricerche *ispesl.it*	Italian National Institute of Occupational Safety and Prevention.
Megatech Software GmbH *megatech.de*	CAD software developer.
Netherlands Forensic Institute *forensischinstituut.nl*	Digital Technology. Image Analysis and Biometrics.
Philips Research Laboratories Sector Technical Systems *philips.com*	Electronics company developing and producing consumer and communication goods.
Pininfarina S.p.A. Business Unit Design *pininfarina.com*	Styling and industrial design company offering concept and design, product and process engineering and niche vehicle manufacturing as a full-cycle turn-key partner, or a provider of specific services.
STS srl *sts-surface.com*	Company providing design services like 3D CAD/CAS surfacing, NC models milling, preparation of cars' exterior and interior styling models and static or driveable show cars.
think3 GmbH *think3.com*	IT software company providing solutions for industrial design.
TS Tecnospamec S.r.l.	The Company was established in 1981 to perform advanced research, development and operation of new technologies for deep-water engineering projects in support to offshore and maritime industries.

NIG members can contact the **NIG Leader André Stork** (**Fraunhofer IGD**) (*andre.stork@igd.fraunhofer.de*) or the closest national contact point:

- **NIG** representative for **Norway: E. Quak** (*ewald.quak@sintef.no*), **SINTEF**
- **NIG** representative for **France: J.-C. Leon** (*Jean-Claude.Leon@hmg.inpg.fr*), **INPG**
- **NIG** representative for **Greece: M. Vavalis** (*mav@math.uoc.gr*), **ITI-CERTH**
- **NIG** representative for **Israel: R. Basri** (*Ronen.Basri@weizmann.ac.il*), **WEIZMANN**
- **NIG** representative for **Italy: F. Giannini** (*giannini@ge.imati.cnr.it*), **IMATI**
- **NIG** representative for **The Netherlands: R. Veltkamp** (*remco.veltkamp@cs.uu.nl*), **Utrecht University**
- **NIG** representative for **Switzerland: F. Vexo** (*frederic.vexo@epfl.ch*), **EPFL**

NIG Research Directions coming from Past Events

Outcome of the NIG Workshop on "Future of Styling",
March 9, 2005, Fraunhofer Institute for Computer Graphics, Darmstadt, Germany.

In March 2005 AIM@SHAPE organized its first workshop on the 'future of styling' at Fraunhofer-IGD. 30 participants equally balanced between stylists and industrial designers, CAS (Computer-Aided Styling) software developers, and academia contributed to the discussion about the requirements on computer support for the creative styling process. The results of the workshop have been constructive. Common sense has been achieved for what regards the vision of user friendly and intuitive styling environments that take advantage of existing artistic skills rather than bothering stylists and designers with mathematical details of system dependent shape representations. From the users' point of view, research and development should focus on making underlying technology invisible to open space for intuition, fantasy and creativity. CAS tools should also support stylists in reducing the time spend with the technical evaluation of sketches and with the preparation of appealing presentations of ideas, which also includes fast techniques to go from 2D sketches to 3D CAD models. Developers, on the other hand, demand for standardization what regards the convergence of modelling approaches, e.g. free-form features and sketch based interaction techniques, and the I/O devices for styling environments to be able to make progress towards a cost effective fulfillment of user requirements.

Next Event

ProSTEP iViP Science Days 2005: Cross-Domain Engineering, in Cooperation with Fraunhofer Institute for Computer Graphics IGD and Computer Graphics Center ZGDV, September 28 and 29, 2005 at Fraunhofer Institute for Computer Graphics IGD, Darmstadt, Germany.
(See http://www.prostep.org/en/events/sdays2005/)

Workshop "Collaborative European Networks of Excellence"
Moderated by: G. Brunetti (Fraunhofer IGD) and Chr. Kind (Fraunhofer IPK)
A Network of Excellence (NoE) is an instrument within the 6th framework of the European Commission. NoEs are designed to strengthen scientific and technological excellence on a particular research topic through the durable integration of the research capacities of the participants focused on industrial needs. They aim to overcome the fragmentation of European research by gathering the critical mass of resources and integrating the expertise needed to provide European leadership.
The workshop on Collaborative European Networks of Excellence aims at the identification of synergy potentials that will arise from the cooperation of different NoEs by joining their efforts with respect to integrating activities, joint research work and dissemination. This also includes the involvement of industrial companies which are supposed to be the beneficiaries of NoEs. The workshop is initiated by the NoEs "AIM@SHAPE" and "VRL-KCiP" (see description below), but it is open for all other NoEs active in the area of production technology.
The workshop will introduce to the activities and research results of the NoEs to move into a structured discussion in which the following questions will be addressed among others:

- What are the relations to industry?
- How can industry benefit from the NoEs and from their cooperation?
- How can industrial companies participate in the NoEs activities?
- Which are the main points of contact between the NoEs?
- What cooperation potentials exist in order to realise the NoEs objectives?
- What is the best way to specifically realise this cooperation?
- What kind of joint project proposals can be initiated?
- Which problems occur managing the networks and how have they been solved?

VRL-KCiP (Virtual Research Lab for a Knowledge Community in Production) is a new NoE project intended to create a pan-European virtual research lab in the field of production technology. The network bundles the competence of the participating 24 research institutes from 15 different countries who launched their work in the network project on 1 June 2004 and enable them to present a collective and coordinated front to the research market in the future. The project is scheduled to run for four years, during which time the virtual laboratory will be set up. The main focus of the VRL-KCiP lies in the field of production technology and currently comprises topics such as virtual manufacturing and rapid manufacturing, supply chain management and lifecycle management, as well as product models and product development processes. The so-called "Club of Industrialists" exerts considerable influence on the selection and specification of the topics. Accordingly the focus of future research is adapted. As an associated member of the network in this club industrial companies from different branches of industry throughout Europe participate in shaping the network.

Breaking News

Weizmann has secured one company from Israel as an official NIG member. This new member company is El-Op. El-Op, an International company, subsidiary of Elbit Systems, is a complete Electro-Optics system house which maintains all R&D, production, assembly and testing facilities under one roof.

Network Interested Researcher Group (NIRG)

AIM@SHAPE is open to researchers' partnerships through the Network Interested Researcher Group (NIRG) (See http://www.aimatshape.net/get_involved/NIRG/). Advantages in becoming a NIRG member are:

- Opportunities for integration of research activities with 14 prestigious research institutes
- Facilitated access to common resources (Digital Shape Workbench) and the possibility to include your papers in the AIM@SHAPE Digital Library
- Regular update on the new developments in the AIM@SHAPE Network Of Excellence (newsletter)
- Participation to AIM@SHAPE training activities
- Link to your EU project directly from the AIM@SHAPE web portal (if applicable) to increase project's visibility and clustering of research
- Opportunities for organizing joint workshops and official AIM@SHAPE presentations.

Join Us!

To know how to join the AIM@SHAPE research community check out the NIRG web page on the AIM@Shape portal *http://www.aimatshape.net/get_involved/NIRG/*

and contact the following network members:
Bianca Falcidieno *bianca.falcidieno@ge.imati.cnr.it* (Project Coordinator),
Giuliana Ucelli *giuliana.ucelli@graphitech.it* (NIRG Responsible).

AIM@SHAPE Dissemination

Training

- **Summer School on Interactive Shape Modeling, Darmstadt, 8-12 July 2005**
  See http://www.interactiveshapemodeling.net/

  Topics: Computer Graphics continues to battle the challenging question: "How quickly and effectively can a designer transform a mental concept into a digital shape, which is easy to refine and reuse?". Traditional techniques of sculpting and sketching continue to be among the quickest and most expressive ways for designers to visually manifest their ideas. This school traces the evolution of interactive shape design from traditional media to the state of the art in digital modeling techniques, both in commercial software and academic research. The school will cover the gamut of hardware devices and interaction paradigms used in digital modeling and their underlying mathematical representations of shape. The audience will be presented with the properties of various implicit, explicit and hybrid shape representations and the capabilities, limitations and implementation details of current algorithms for interactive shape creation and manipulation. The goal of this school is to impart the audience with both an understanding of the big open questions as well as the skills to engineer recent research in interactive shape modeling applications.

- **Summer School on Open Software for Algebraic and Geometric Computation, Sophia-Antipolis, 5-9 September 2005**
  See http://www-sop.inria.fr/galaad/conf/05Ecole/

  Topics: Our daily research activity involves more and more frequently the use of specialized tools. This leads some members of our community to develop dedicated and efficient software, which are often open to the other members of the domain, but which access and use might seem difficult. The objective of this school is to give the opportunity to present such hight-performance tools, through tutorials and initiation sessions.
  These presentations will take the form of 3-hour courses, on Linux workstation, during which each participant will have the possibility to practice and experiment, under the advices of expert people involved in their development. This school is particularly devoted to Ph.D.Students and researchers, interested in using or developing open software in the Algebra and Geometry. Here is a non-exhaustive list of interests, to be addressed during this school:
  - Shape processing
  - Topology computation
  - Meshing
  - Parameterized and implicit curves and surfaces
  - computation
  - Symbolic and numeric computation
  - Polynomial computation
  - Linear algebra
  - Differential problems in geometry and algebra.
    and more.

Plans to Publish STARS

There have been contacts with a publishing company to publish enhanced versions of the State-Of-the-Art reports for WP6 (Shape Analysis and Structuring) and WP7 (Shape Interpretation and Mapping).

For more information contact: DISI

Future Contribution to Standards? The new Universal 3D Format

According to the white paper submitted by Intel(1), "designers have been creating three-dimensional (3D) objects with computer-aided design (CAD) applications for approximately 25 years, creating a huge library of data with a vast potential for reuse. One estimate suggests for that every 3D CAD user in design, engineering, or manufacturing, there are 30 potential users of the data in marketing, product documentation, sales, support, customer service, and beyond." The objective of the 3D Industry Forum (3DIF) (2) is to develop a standard file format and related libraries to support the reuse of 3D data. The 3DIF is lead by Intel with the involvement of other 3D industry organization such as Adobe, Hewlett-Packard, Nvidia, Solid Works, Boeing, Lego and others. The Universal 3D (U3D) will allow the "transformation of complex 3D data into a format that can be streamed, compressed and viewed on affordable, nonproprietary software/hardware platforms while providing a high quality viewing experience. By removing the voluminous detail needed by manufacturing and retaining the integrity of the original data model, U3D will enable efficient distribution

of 3D data over the Internet and applications requiring lightweight 3D data."
The ECMA (3) General Assembly has recently approved the Universal 3D File Format 1st Edition as an Ecma International standard (ECMA-363) (4). According to the announcement, it "defines the syntax and semantics of the Universal 3D file format, an extensible format for downstream 3D CAD repurposing and visualization, useful for many mainstream business applications. The current features include: execution architecture for run-time modification of geometry, continuous-level-of-detail, domain-specific compression, progressive data streaming and playback, key-frame and bones-based animation.

For more information see:
1. *http://www.3dif.org/modules.php?name=Downloads&d_op=getit&lid=202*
2. *http://www.3dif.org/*
3. *http://www.ecma-international.org/*
4. *http://www.ecma-international.org/publications/standards/Ecma-363.htm*

For more information contact: Laurent Moccozet, MIRALab *(moccozet@miralab.unige.ch*)

Scientific Dissemination Initiatives

Project Presentations

A general-audience presentation on Modelling, Reasoning and Understanding Digital Shapes in Virtual Environments was given on November 8 in Genoa, Italy, within the frame of the "Festival della Scienza", an event being part of the Programme for Genova: European Capital of Culture 2004.

Workshop towards Semantics of Virtual Environments (SVE2005), Villars, Switzerland, 16-18 March 2005 "The AIM@SHAPE network of excellence", (Bianca Falcidieno, invited talk)
Type of audience: academic

Presentation of AIM@SHAPE to Kodak, April 6, 2005 (Bianca Falcidieno)
Type of audience: technical managers

Presentation of AIM@SHAPE to the Association ARIL "Ricerca ed Innovazione In Liguria", March 7, 2005 (Bianca Falcidieno, also a member of Executive Committee)
Type of audience: the members of the Executive Committee of ARIL

Presentation of AIM@SHAPE to SSUP S. Anna, Pisa, May 2, 2005 (Bianca Falcidieno, Vincent Cheutet)

Master Course at DISI, University of Genova, May 2005
Title: "From geometry to shape: methods of analysis and structuring of geometrical information"
Teacher: S: Biasotti

Participation at Conferences

Winter School 2005, organized by the Eurographics Italian Chapter, Pisa, 17-18 February 2005 Lecture title and authors: Skeletal structures for shape representation, (S.Biasotti, M. Mortara)
Type of audience: PhD students and researchers
Number of participants at the whole event (not just at this presentation): 40

5th IAPR-TC-15 Workshop on Graph-based Representation in Patterns Recognition, April 11-13, 2005 "From Exact to Approximate Maximum Common Subgraph" (S. Marini, M. Spagnuolo, B. Falcidieno)
Type of audience: Academic
Number of participants at the whole event (not just at this presentation): ca. 50

Conference "Matematica, Arte e Industria Culturale", Cetraro (Italy), May 19-21 2005 "Computational Topology and Shape Analysis " (S. Biasotti, B. Falcidieno, invited talk)

"Future of Styling" interactive workshop, Darmstadt (Germany), 9th March 2005
"Semantic modelling for styling and design" (Chiara Catalano)
Type of audience: NIG members, industry (mainly car design groups)
Number of participants at the whole event (not just at this presentation): ca 30

Presentations of activities on Geometry Processing for the Semantics (Task 6.2) in the workshop **Industrial Challenges in Geometric Modeling and CAD 2005**
h*ttp://www.mathematik.tudarmstadt.de/ags/ag3/Macsinet/M2005/Programm-05.pdf*
sponsored by AIM@SHAPE (SINTEF and IGD), the Special Interest Group on Geometric Modeling and CAD of the European Consortium for Mathematics in Industry (ECMI), and the Centre of Mathematics for Applications at the University of Oslo. The workshop was organized by SINTEF and the TU Darmstadt (though the Mathematics Department, not as a project partner) and held March 10-11, 2005 in Darmstadt, Germany, at IGD following the IGD NIG Workshop at the same venue.

General Public Dissemination Initiative

• AlphaGalileo (http://www.alphagalileo.org/)

There are plans within Task 8.4.2 to use the AlphaGalileo service, the world's leading resource for European research news, for the dissemination of research results to the general public. AlphaGalileo provides a fast and effective way to get news to journalists around the world. It provides instant access to news, images, background information and a database of experts.

For more information contact: Ewald Quak, SINTEF (*Ewald.Quak@sintef.no*)

Conferences & Journals

SGP 2005: Third Symposium on Geometry Processing

The Eurographics Symposium on Geometry Processing 2005 will take place in Vienna, Austria, from July 4-6, 2005. It is the 3rd event of this series, and follows the highly successful 1st Eurographics Symposium on Geometry Processing, which took place in 2003 in Aachen (Germany), and 2nd Eurographics Symposium on Geometry Processing, which took place in 2004 in Nice (France). The goal of this meeting is to present and discuss new research ideas and results in Geometric Processing. In this emerging area, concepts from applied mathematics, computer science, and engineering are used to design efficient algorithms for the acquisition, manipulation, animation and transmission of complex 3D models. Applications of geometry processing algorithms cover a wide range of areas from multimedia and entertainment, to bio-medical computing, reverse engineering, and to classical computer-aided design. The proceedings of the symposium will be published in the Eurographics Proceedings Series, in cooperation with ACM SIGGRAPH.

For more information visit:
http://www.geometryprocessing.org/

Computer Aided Design journal: Call for Special Issue

Special Issue of Computer Aided Design on Shape Similarity Detection and Search for CAD/CAE Applications.

GUEST EDITORS:
William C. Regli, Drexel University, USA
Michela Spagnuolo, IMATI-CNR, Genova, Italy

IMPORTANT DATES:
1 October 2005 Deadline for Submission of Full Papers
1 February 2006 Deadline for Submission of Revised Papers
Summer 2006 Expected Publication

3D CAD data has become the currency of the modern engineering enterprise. As the industry has matured, CAD models have become ubiquitous artifacts that provide highfidelity descriptions of engineered objects as well as capture vital intellectual property and institutional memory. Researchers have been developing automated tools for model classification, indexing and analysis for over 30 years and this work spans many research areas (CAD/CAM, engineering design, knowledge representation, case-based reasoning, computer vision, pattern recognition, computational geometry, solid modeling, shape modeling, and computer graphics). However, recent developments in shape analysis indicate that it may be a suitable basis to integrate across disciplines and create new technologies for harvesting vast quantities of geometry-centric engineering data into knowledge that can significantly improve product realization.

This special issue of Computer-Aided Design is dedicated to providing a critical evaluation of shape search technology and its applicability to different engineering applications. The Guest Editors are soliciting original manuscripts that highlight recent successes and define major research challenges. We would particularly like to receive papers that contribute to understanding of:

- Multi-level representations for matching and retrieval
- Algorithms for feature extraction, model decomposition and segmentation
- Partial and many-to-many matching
- Matching under uncertainty and noise
- Representation and capture of engineering semantics
- Retrieval using engineering semantics
- Query interfaces and search modalities
- Classification, indexing, mining of engineering data Integration of CAD search with database and PLM systems
- Applications, prototypes, and fielded systems
- Empirical studies, scalability results and benchmarks

For this special issue, Computer Aided Design and the guest editors strongly encourage potential authors to use models and datasets that are publicly available. Additionally, authors may provide online links to models they use in their papers and experiments. Results presented must be independently verifiable or reproducible. Datasets appropriate to this issue include those noted in the CAD "Information for Authors" such as the Drexel Design Repository (*http://www.designrepository.org*), the Princeton Shape Benchmark (*http://shape.cs.princeton.edu/benchmark/*), and the AIM@SHAPE repository (*http://www.aim-at-shape.net:10080/*).

All prospective authors are invited to obtain early feedback on possible submissions by e-mailing an abstract to either of the Guest Editors (*regli@drexel.edu or michela.spagnuolo@ge.imati.cnr.it*).

All papers will be rigorously refereed. Submission of a paper to this special issue of JCAD implies that no strongly similar paper is already accepted or will be submitted to any other conference or journal. Authors should consult the "Instructions for Authors", which are available online and printed at the back of most issues of Computer-Aided Design, for information about preparation of their manuscripts. Papers of an appropriate standard not included in the special issue may be considered for publication in a regular issue of Computer-Aided Design.

For this special issue, manuscripts should be submitted through the Elsevier publication management system for the CAD Journal, *http://ees.elsevier.com/cad/*. If this is your first time using the system you will need to go to the web page and register as a new author by clicking the 'Register' link. Once registered you may then submit your paper by clicking 'Submit New Manuscript' and follow the instructions. All correspondence between the editor and authors will be performed by e-mail and paper copies will not be required at the original submission stage. When submitting a paper for this issue please choose the article type 'Special Issue---Shape Similarity' from the drop down menu.

AIM@SHAPE Papers

- Abaci T., Ciger J., Thalmann D. (2005). **Action semantics in Smart Objects.** SVE05: Workshop towards Semantic Virtual Environments pp. 121-126, March 2005, Villars (**Switzerland**).
- Albertoni R., Bertone A., De Martino M. (2005). **An approach based on visualization and ontology to analyze categorical attributes in geographical metadata.** Accepted for the 2nd International Conference and Exhibition on Geographic Information Estoril Congress Center, May 30 - 2 June 2005, Estoril (**Portugal**).
- Albertoni R., Bertone A., De Martino M. (2005). **Information Search: the Challenge of Integrating Information Visualization and Semantic Web**. Accepted for the 4th International Workshop on Web Semantics (WebS 2005), DEXA Workshop Proceedings, IEEE Press, 22 - 26 August, 2005, Copenhagen (**Denmark**).
- Albertoni R., Bertone A., De Martino M. (2005). **Semantic analysis of categorical metadata to search for geographic information.** Accepted for the 2nd Workshop in Geographic Information Management (GIM05) DEXA Workshop Proceedings, IEEE Press, 22 - 26 August 2005, Copenhagen (**Denmark**).
- Ansaldi S., Monti M. (2005). **Model and methods for representing and processing shape semantics**. Special Issue of International Journal of Computer Applications in Technology vol. 23 n. 2-3-4, pp. 53-56, 2005 (**Italy**).
- Barequet G. (Technion), Sharf Y. (Technion), Dickerson M.T. (2005). **Covering points with a Polygon.** Video Review at the 21st Annual ACM Symposium on Computational Geometry (SoCG), June 2005, Pisa (**Italy**).
- Barequet G., Elber G., Kim M. S. (2005). **Computing the Minimum Enclosing Circle of a Set of Planar Curves.** Accepted for publication in CAD'05, June 2005, Bangkok (**Thailand**).
- Biasotti S., Marini S. (2005). **3D object comparison based on shape descriptors.** Int. J. Computer Applications in Technology (IJCAT) vol. 23 n. 2/3/4, pp. 57-69, 2005, Genoa (**Italy**).
- Comic L., De Floriani L., Papaleo L. (2005). **Morse-Smale Decompositions for Modeling Terrain Knowledge.** Conference On Spatial Information Theory (COSIT), 14-18 Sept 2005, Ellicottville, New York (**USA**).
- Danovaro E., De Floriani L., Magillo P., Puppo E., Sobrero D. (2005). **The Half-Edge Tree: A Compact Data Structure for Level-of-Detail Tetrahedral Meshes.** Proceedings of Shape Modeling 2005 (SMI05), 15-17 June 2005, Boston (**USA**).
- Delponte E., Isgro' F., Odone F., Verri A. (2005). **Large baseline matching of scale invariant features.** Accepted at ICIAP 2005, 6-8 September 2005, Cagliari (**Italy**).
- Delponte E., Isgro' F., Odone F., Verri A. (2005).**SVD-matching using SIFT features.** Accepted at Video, Vision and Graphics 2005, 7 - 8 July 2005, Edinburgh (**UK**).
- Dumitrescu R., Catalano C.E., Giannini F., Falcidieno B., Vergeest J.S.M. (2005). **Curve and skeleton based shape deformations to support product design.** Accepted for CAID, May 29 – 1 June 2005, Delft (**The Netharlands**).
- Elber G. (2005). **Constraints Solving using Multivariate Spline Functions.** To appear in SIAM -GD'05 (abstract only)
- Elber G., Sayegh R., Barequet G., Martin R. R. (2005). **Two-Dimensional Visibility Charts for Continuous Curves.** Accepted for publication in SMI05, MIT, June 2005. Boston (**USA**).
- Frishman Y., Tal A. (2005). **Visualization of Mobile Object Environments.** Accepted for publication in ACM Symposium on Software Visualization, May 2005, St. Louis, MO (**USA**).
- Gutierrez M., Thalmann D., Vexo F. (2004). **Augmented CGI Films, Second International Conference on Intelligent Access of Multimedia Documents.** Medianet'04 25 - 28 November 2004, Tozeur (**Tunisia**).
- Gutierrez M., Thalmann D., Vexo F. (2005). **Semantic Virtual Environments with Adaptive Multimodal Interfaces.** 11th International Conference on Multimedia Modelling, MMM2005, pp. 277-283, 12-14 Jan 2005 Melbourne (**Australia**).
- Hanniel I., Muthuganapathy R., Elber G., Kim M.S. (2005). **Precise Voronoi Cell Extraction of Free-form Rational Planar Closed Curves.** Accepted for publication in ACM Symposium on Solid and Physical Modeling, MIT, June 2005, Boston (**USA**).
- Marini S., Spagnuolo M., Falcidieno B. (2005). **From Exact to Approximate Maximum Common Subgraph**, 5th IAPR-TC-15 Workshop 11-13 April 2005, Poitiers (**France**).
- Patanè G., Spagnuolo M., Falcidieno B. (2004). **Para-Graph: Graph-Based Parameterization of Triangle Meshes with Arbitrary Genus.** Computer Graphics Forum vol.23 n.4, pp.783-797 2004, Genoa (**Italy**).
- Pekerman D., Seong J. K., Elber G., Kim M. S. (2005). **Are Two Curves the Same?** Accepted for publication in CAD'05, June 2005, Bangkok (**Thailand**).
- Seong J.K., Elber G., Kim M. S. (2005). **Contouring 1-and 2-Manifolds in Arbitrary Dimensions.** Accepted for publication in SMI05, June 2005, MIT, Boston (**USA**).
- Tewari G., Gotsman C. (Technion), Gortler S. (2005). **Meshing genus-1 point clouds using discrete one-forms.** Submitted to Symp on Geometry Processing, 9 – 14 December 2005, Vienna (**Austria**).
- Ucelli G., Blanzieri E., De Amicis R., Conti G. (2005) **Behavioural Data, Annotations and Shape Descriptors for Shape Retrieval for Industrial Design.** Submitted for the Special Issue of COMPUTERS & GRAPHICS on Shape Reasoning and Understanding.
- Ucelli G., Conti G., De Amicis R. (2005). **Shape Knowledge embedded in a Collaborative Virtual Design Environment for Architectural Design.** Submitted to education and research in Computer Aided Architectural Design in Europe (eCAADe 2005), 21-24 September 2005, Lisbon (**Portugal**).

Joint AIM@SHAPE Papers

- Abaci T., Mortara M., Patané G., Spagnuolo M., Vexo F., Thalmann D. (2005). **Bridging Geometry and Semantics for Object Manipulation and Grasping.** Workshop towards Semantic Virtual Environments (SVE05), pages 110-119, March 2005, Villars (**Switzerland**).
- Abaci T., Vexo F., Thalmann D., Mortara M., Patané G., Spagnuolo M. (2005). **Bridging geometry and semantics for object manipulation and grasping.** Workshop towards semantics of virtual environments (SVE05), 16-18 March 2005, Villars (**Switzerland**).
- Attene M. (IMATI), Falcidieno B. (IMATI), Rossignac J., Spagnuolo M. (IMATI) (2005). **Sharpen & Bend: Recovering Curved Sharp Edges in Triangle Meshes Produced by Feature-Insenstive Sampling.** In IEEE Transactions on Visualization and Computer Graphics vol.11 n.2, pp.181-192.
- Borgo R.(IMATI-ISTI-CNR), DellePiane M. (IMATI-ISTI-CNR), Cignoni P. (IMATI-ISTI-CNR), Papaleo L. (DISI), Spagnuolo M. (IMATI) (2005). **Extracting Meta-Information From 3-Dimensional Shapes With Protege** - Short Paper, 8th Intl. Protégé Conference - July 18-21, 2005, Madrid (**Spain**).
- Brunetti G. (IGD), Ucelli G. (GraphiTech), Sevilmis N. (IGD), De Amicis R. (GraphiTech), Stork A. (IGD) (2005). **Integrating Virtual Styling with an Ontology-based Content Management System for Industrial Design.** Submitted to the Virtual Concept 2005, 8-10 November 2005, Biarritz (**France**).
- Cheutet V. (INPG), Pernot J. P. (INPG), Léon J.C. (INPG), Falcidieno B. (IMATI) Giannini F. (IMATI) (2004). **Fully Free-form Deformation Features Incorporating Discontinuities.** ASME 2004 International Design Engineering, Technical Conference, Sept. 28 – 2 October 2004, Salt Lake City, Utah (**USA**).
- Cheutet V., Falcidieno B., Giannini F., Pernot J.P., Léon J.C., (2005). **Extension of fully free form deformation features to planar functional areas.** 6th international conference on Computer-Aided Industrial Design & Conceptual Design (CAID&CD 2005) Delft University of Technology, May 29 – 1 June 2005, Delft (**The Netharlands**).
- Cheutet V., Lèon J.C., Pernot J.P., Falcidieno B., Giannini F. (2005). **Insertion of Planar Areas into Free-Form Surfaces in Early Product Design.** DAC 2005, ASME 2005 International Design Engineering Technical Conference & Design Automation Conference, 24-28 September 2005, Long Beach, California (**USA**).
- Falcidieno B. (IMATI), Spagnuolo M. (IMATI), Alliez P. (INRIA), Quak E. (SINTEF), Vavalis E. (ITI), Housits C. (ITI) (2004). **Towards the Semantics of Digital Shapes: the AIM@SHAPE Approach.** EWIMT 2004, London (**UK**).
- Gutierrez M., Thalmann D., Vexo F., Moccozet L., Magnenat-Thalmann N., Mortara M., Spagnuolo M. (2005). **An Ontology of Virtual Humans: incorporating semantics into human shapes.** Workshop towards Semantic Virtual Environments, (SVE05), pages 57-67, 16-18 March 2005, Villars (**Switzerland**).
- Hamri O. (INPG), Léon J.-C. (INPG), Falcidieno B. (IMATI) Giannini F. (IMATI) (2004). **From CAD Models to F.E. Models through a Feature-based Approach.** Conférence int. ASME, 24th Computers and Information in Engineering (CIE) Conference, 28 – 30 September 2004, Salt Lake City, Utah (**USA**).
- Hamri O., Lèon J.C., Giannini F., Falcidieno B. (2005). **Using CAD Models and their semantics to prepare F.E. simulations.** IDETC/CIE 2005, ASME 2005 International Design Engineering Technical Conference & Computers and Information in Engineering Conference, 24-28 September 2005, Long Beach, California (**USA**).
- Hassner T. (Weizmann), Zelnik-Manor L. (Caltech), Leifman G. (Technion), Basri R. (Weizmann) (2005), **Minimal-Cut Shape Composition.** Accepted for publication in SMI05, June 2005, MIT, Boston (**USA**).
- Isgrò F. (DISI), Odone F.(DISI), Saleem W. (MPII), Schall O.(MPII) (2005). **Clustering for Surface Reconstruction, Workshop towards semantics of virtual environments.** (SVE05), 16-18 March 2005, Villars (**Switzerland**).
- Moccozet L. (UNIGE), Dellas F. (UNIGE), Magnenat-Thalmann N. (UNIGE), Biasotti S. (IMATI), Mortara M. (IMATI), Falcidieno B. (IMATI), Min P. (UU), Veltkamp T. (UU) (2004). **Animatable Human Body Model Reconstruction from 3D Scan Data using Templates.** CAPTECH Workshop 2004, 9-11 December 2004, Zermatt (**Switzerland**).
- Papaleo L. (DISI), Albertoni R. (IMATI), Marini S. (IMATI), Robbiano F. (IMATI) (2005). **An ontology-based approach to Acquisition and Reconstruction.** Proceeding of Workshop towards Semantic Virtual Environments' (SVE05), 16-18 March 2005 Villars (**Switzerland**).
- Papaleo L. (DISI), Albertoni R. (IMATI), Marini S. (IMATI), Robbiano F. (IMATI) (2005). **An ontology-based approach to Acquisition and Reconstruction.** Paper presentation to the Collaboration Workshop for the Future Semantic Web at ESWC 2005, 29th-30th May, 2005, Heraklion (**Greece**).
- Pernot J. P. (IMATI, INPG), Falcidieno B. (IMATI), Giannini F. (IMATI), Léon J.-C. (INPG)(2005). **Fully Free Form Deformation Features for Aesthetic Shape Design.** Journal of Engineering Design.
- Polonsky O. (Technion), Gotsman C. (Technion), Patane G. (IMATI). **What's in an Image: Towards the Computation of the "Best" View of an Object.** Submitted to Pacific Graphics, 12-14 October 2005, Macao (**China**).
- Ucelli G. (GraphiTech), De Amicis R. (GraphiTech), Conti G. (GraphiTech), Brunetti G. (IGD), Stork A. (IGD) (2005). **Shape Semantics and Content Management for Industrial Design and Virtual Styling.** In proceedings of the Semantic Virtual Environments Workshop, 16-18 March 2005, pp. 127-137, Villars (**Switzerland**).

For a comprehensive list of AIM@SHAPE publications see:
eRoom>7_Papers_presentations_project-members>AIM@SHAPE papers
or the Digital Library *(http://imati.area.ge.cnr.it/aim%40shape/)*

Conferences _05/06

September 6	HUMAN-ANIMATED CHARACTERS INTERACTION Workshop, Napier University, Edinburgh, (**UK**)
October 12-14	Pacific Graphics 2005, Macao, (**China**) *http://www.fst.umac.mo/pg2005/*
October 17-19	IEEE Visualization, Computer Animation and Social Agents (CASA'05), 18th annual conference on Computer Animation and Social Agents, Hong Kong, (**China**) *http://www4.comp.polyu.edu.hk/~casa2005/index.cgi*
November 7	Second International Workshop on Interaction Design and the Semantic Web. Held in conjunction with the 4th International Semantic Web Conference, Galway, (**Ireland**)
November 8-11	VAST2005 6th International Symposium on Virtual Reality, Archaeology and Cultural Heritage and incorporates the Third Eurographics Symposium on Graphics and Cultural Heritage (EGSGH 2005) Pisa, (**Italy**) *http://vcg.isti.cnr.it/vast05/*
November 14-15	Communicating European Research 2005 International Conference, Brussels, (**Belgium**)
November 23-25	2005 INTERNATIONAL CONFERENCE ON CYBERWORLDS Nanyang Executive Centre, (**Singapore**) *http://www.ntu.edu.sg/sce/cw2005*
Nov 30 - Dec 1	2nd European Workshop on the Integration of Knowledge, Semantic and Digital Media Technologies (EWIMT), London, (**UK**) *http://www.acemedia.org/ewimt2005*
December 1-2	HAPTEX '05 - VR Workshop in Hanover, Germany On Haptic and Tactile Perception of Deformable Objects, Leibniz Haus, Hanover, (**Germany**)

Relevant Projects

Relevant EU Funded Projects

- **ARROV FP5 Growth**, Augmented Reality for Remotely Operated Vehicles based on 3D acoustical and optical sensors for underwater inspection and survey (*http://arrov.disi.unige.it*)
- **ECG FP5 IST FET**, Effective Computational Geometry for Curves and Surfaces (*http://www-sop.inria.fr/prisme/ECG/*) - finished
- **FANTASTIC FP5** Growth, Functional design and optimization of ship hull forms - finished
- **GAIA II FP5 IST FET**, Intersection algorithms for geometry based IT-applications using approximate algebraic methods (*http://www.sintef.no/static/am/gaiatwo/*)
- **HUMAINE FP6 IST NOE**, Human-machine Interaction Network on Emotion
- **KM FORUM FP5 IST**, European Knowledge Management Forum (*http://www.knowledgeboard.com*) - finished
- **LEADING EDGE FP5 Growth**, Prediction of leading edge and tip flow for the design of quiet and efficient screw propellers
- **MINGLE FP5 RTN**, Multiresolution in Geometric modeling (*http://www.cs.technion.ac.il/~vitus/mingle/*) - finished
- **MUVII FP5 IST**, Multi User Virtual Interactive Interface (*http://muvii.hpclab.ceid.upatras.gr/*) - finished
- **SMARTSKETCHES FP5 IST**, A Multimodal Approach to improve usability in the early stages of product design (*http://smartsketches.inesc-id.pt/*)
- **TELLMARIS FP5 IST**, Development of a 3D-map interface for tourist information on mobile computers (*http://www.tellmaris.com*) - finished
- **ViHAP3D**, Virtual Heritage: High-Quality 3D Acquisition and Presentation (*http://www.vihap3d.org*)
- **ViSiCADE FP5 IST**, Virtual Simulation Environment for a Seamless Integration of CAD/CAE into VR (*http://www.visicade.de/*)
- **WIDE FP5 IST**, Semantic Web-Based Information Management and Knowledge Sharing for Innovative Product Design and Engineering (*http://www.ist-wide.info/*)

Compact Representation and Efficient Processing of Very Large Triangle Meshes, funded by the German-Israeli Founda tion for Scientific Research and Development (GIF), (*http://gifres.org.il/*), in progress

Low-cost sensors and geometric techniques for scanning and modeling solid objects, funded by the Ministry of Education, University and Research (MIUR), Italy, (*http://www.ima.ge.cnr.it/*), in progress

- **GPGPU**, Graphics hardware as a high-end computational resource, funded by the Research Council of Norway, Norway, (*www.math.sintef.no/gpu*), in progress
- **InSide**, Intelligent Styling System for Industial Design, funded by the Provincia Autonoma of Trento (PAT), Italy, (*http://www.graphitech.it/projects/index.html*), in progress
- **MACROGeo**, Algorithmic and Computational Methods for Geometric Object Representation, funded by the Ministry of Education, University and Research (MIUR), Italy, (*http://www.isti.cnr.it/ResearchUnits/Labs/vc-lab/research-pro.html and http://www.ima.ge.cnr.it/*), in progress
- **SHAME**, Shape Matching Environment, funded by Technology Foundation (STW), The Netherlands, (*http://www.cs.uu.nl/centers/give/multimedia/matching/shame.html*),in progress
- **SIMI-Pro**, Semantic Information Management system for Innovative Product design, funded by the Provincia Autonoma of Trento (PAT), Italy, (*http://www.graphitech.it/projects/index.html*), in progress
- **WEB-GIS**, Representation and management of spatial data on the WEB, funded by the Ministry of Education, University and Research (MIUR), Italy, (*http://www.ima.ge.cnr.it/*), in progress

Semantic-based Knowledge Systems

1. **ACEMEDIA:** Integrating knowledge, semantics and content for user-centred intelligent media services
2. **AGENTLINK III:** AgentLink III: A Co-ordination Network for Agent-Based Computing
3. **ALVIS:** Superpeer Semantic Search Engine
4. **ASPIC:** Argumentation Service Platform with Integrated Components
5. **DIP:** Data, Information, and Process Integration with Semantic Web Services
6. **DIRECT-INFO:** Media monitoring and multimodal analysis for time critical decisions
7. **KB20:** The European Knowledge Space
8. **KNOWLEDGE WEB:** Realizing the semantic web
9. **METOKIS:** Methodology and tools infrastructure for the creation of knowledge units
10. **MUSCLE:** Multimedia Understanding through Semantics, Computation and Learning
11. **REWERSE:** Reasoning on the Web with Rules and Semantics
12. **SEKT:** Semantically-Enable Knowledge Technologies
13. **SIMAC:** Semantic Interaction with Music Audio Contents

Knowledge Board *(www.knowledgeboard.com)*

The European KM Forum strives to build up a KM community in Europe and through the community to support and identify commonality in KM terminology, application and implementation. This is primarily done by providing infrastructure for networking and pushing KM information to a broad KM community of experts and laymen as well as pulling information and feedback from them. This infrastructure supports face-to-face communication as well as virtual meetings over the Internet. Besides this, there is one main focus on standardising KM application and implementation approaches and to create wide acceptance for these approaches by the community.

Objectives:
The objective of the European KM Forum is to bring together the available critical mass of KM experts in Europe in order to share and exchange the latest developments in the KM domain and to develop visions for the future. European KM Forum aims to establish and maintain a well co-ordinated and effective support infrastructure throughout Europe, enabling KM experts to co-ordinate their research activities and to network, both on formal and informal level. Different application and implementation approaches shall be converged to widely accepted standardised approaches and guidelines. The European KM Forum provides a means for individual organisations to find similarly oriented partners to build special interest groups in order to jointly discuss situations and seek for solutions without losing contact to other greater European view on KM, thus profiting from results achieved and experiences made in other European projects. Further the development and set-up of a WWW-portal has been a central objective of the European KM Forum.

AIM@SHAPE Events

Important Deadlines

June 2005:
- Smart Object Position Paper.
- Technical Reports on the Joint Research Actvities of WP5, WP6 and WP7.

Next Events

- First meeting of the Semantic Rendering activity (Task 7.7) will be organized at EPFL the 23rd of June 2005.
- Managing Board meeting organized at Darmstadt the 7th of July 2005.

Past Events

AIM@SHAPE Passed Very Successfully the 1st Project Review

The first Project Review was held in Genoa on March 14-15, 2005:

PROJECT OFFICER: **Albert Gauthier**
REVIEWERS: **Lindsay Holman, Frans Peters, Georges Ioannidis**
OUTCOME (excerpt from the official Review Report):
The reviewers considered that the work undertaken by the Project in the period under review (first 12 months) was wholly acceptable and it was in general of a high quality. The resources used in the project were commensurate with the output of the project in terms of deliverables. The updated Joint Project Activities extend and elaborate on the existing work programme, and the reviewers believed that the proposed work was acceptable.
Finally, the reviewers confirmed that the proposed research continues to be very relevant, the consortium is performing well, and the resources spent are commensurate with the work done. Therefore, the project should continue as presented in the draft 18-months plan.

The next Review Meeting is holding in March 30-31, 2006.

Semantic Virtual Environments (SVE)

The workshop Semantic Virtual Environments is an international event organized in the framework of the AIM@Shape network of excellence. This workshop, organized by MIRALab from the University of Geneva, Switzerland, was held in Villars sur Ollon, a Swiss ski resort in the Alps, on March 16, 17 and 18, 2005.

Until recently, digital 3D shape representations were mainly limited to the acquisition and the modeling of their geometry and visual properties although shapes are not restricted to geometry but also include knowledge data. New avenues of research are now emerging to include a semantic-aware level into the representations of digital shapes. The objective of this workshop was to contribute in depicting the current state of the art in semantic-based shape representations and semantic-oriented methods to acquire, build, transmit, and process shapes with their associated knowledge in Virtual Environments.

During the workshop, thirty researchers from Europe and Asia have met and attended six different sessions and three invited talks. The topics addressed during the sessions covered a large area of applications, such as virtual heritage, industrial design or virtual humans and the discussions have established the necessity to evolve from a geometric to a semantic level of representation and process of digital shapes.

Two of the invited talks gave the audience the opportunity to hear about research efforts in semantic-based shape representation in Asia.
Professor Masayuki Nakajima from the Tokyo institute of Technology has described a project about virtual human for real/virtual worlds interaction in Japan and Professor Zhigeng Pan from the Zhejiang University in China has presented semantic modeling for ancient architecture of digital heritage.

In order to offer a large access to the results of the SVE workshop, the electronic proceedings have been made available online at the workshop web site from sve2005.miralab.unige.ch. Moreover a selection of the best contributions will appear in a special issue of the Visual Computer journal edited by Springer Verlag.

Mobility & Jobs

Mobility

- Giuseppe Patanè (PhD at IMATI) is visiting MPI-Informatik Saarbrucken-Germany in May and June.
- Olga Symonova (PhD at GraphiTech) is visiting IMATI in June and July.
- Annie Hui, PhD Student University of Maryland : Research Training at DISI.
  Lidija Comic, Researcher from University of Novisad: Research Training at DISI.

Job News

- J.P. Pavone was hired from 15th March as expert engineer, working on WP6, WP2, WP1, on tools for shape processing.
- Alejandra Garcia-Rojas will be a new PhD student at EPFL from 1st of August.

Job Adverts

- Check out for Post Doc openings at GraphiTech (*www.graphitech.it*).
  Please send your applications to Raffaele De Amicis (*raffaele.de.amicis@graphitech.it.).*
- Technion Center for Graphics and Geometric Computing (CGGC) interested in hiring researcher at postdoc level for 1-2 years, to work in the EU-funded AIM@SHAPE project on various aspects of geometry processing. Candidates should have a PhD in discipline close to computer graphics. European nationality not mandatory. Interested candidates should contact Craig Gotsman (*gotsman@cs.technion.ac.il*).

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Please contact Giuliana Ucelli (*giuliana.ucelli@graphitech.it*) if you want to email us your comments, and to be included in our newsletter distribution list.

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