Interactive Environment for Digital Preservation and Preservation of Fashion Objects

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Abstract. This paper presents the overall structure and the functional specification of an interactive environment for digital preservation and preservation of fashion objects, developed to serve the students' learning needs of the National Art Academy.

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1   Introduction

Fashion reflects the global and regional diversity of modern researches, inspirations and last achievements in the new technologies. It opens up horizons and offers an entertaining and informative glimpse of the imaginative world of fashion to creative minds, new ideas and innovations [2].

Each year the number of students entering fashion schools around the world increases. So fashion depends on ideas, individuality and authenticity. In the last years more than ever, designers look to their roots – where they began, who they are, why they do what they are doing.

Computing software developed throughout the twentieth and early twenty-first centuries with a consistent emphasis on speed and efficiency. Many factors have determined the use and eventual integration of computing technology into the creative fields, particularly the fashion and textile industries.

Schools for fashion, their laboratories, their partnerships and collaboration with the industry and the science, their experimental work with new forms, media and materials became the place for generating new ideas, experiments and challenges.

Nowadays it's very important for students and teachers to have the last information about what are the newest researches in the field of fashion and textiles from the new laboratories for future design. The number of the young talented designers with a new conception for fashion and appearance and philosophy is increasing last years. As a result of the aforementioned, the schools became the new media for generating ideas

and it becomes of real importance to have the information what are the last works, researches and results and how they can be organized and published in a specialized system that could be seen and revised from the specialists working in the field of fashion.

It is also important to have a clear structure which will help the analysis, the development and the direction of the research in the field during the years. A well organized interactive environment will help to follow the development, to compare the results, to predict the future for the new fashion designers.

This paper presents the overall structure and the functional specification of an interactive environment for digital preservation and preservation of fashion objects, developed to serve the students' learning needs of the National Art Academy.

2 Specifics of the Fashion Domain and its Objects

Preserving and presenting the fashion domain is a long-term commitment of scholars, creators and researchers. From centuries every generation is aimed at keeping record about the work and life, so that it could be revised and studied by the next generations. For a long time this heritage has been maintained in repositories, museums and libraries, where not everyone was able to access this wealth. The specificity and complexity of fashion objects requires a thorough investigation of the domain so that it can be fully structured and described.

The following parameters must be considered when analysing a type of a garment:

— Year, season and name of the object/collection;
— Size of the garment;
— Material of the garment, parameters of the material: density, elasticity, elongation in X and Y, curves, cutting, etc.; variety of types of materials, fabrics: cotton, linen, silk, wool, ..., leather (natural, imitation), synthetic materials, etc..; patterns, colour, etc.
— Type of the garment /skirt, blouse, trousers, dress..../;
— Intended wearers of the collection: women, men, children….;
— Occasion for which the garment is designed: casual, evening, sport….;

The creation of the fashion object goes through the following stages:

— fashion sketch or drawing of the model;
— cutting out a pattern of a certain size;
— sewing a sample;
— final selection of the materials and accessories which will be used for making the end product (fashion item), depending on other factors—the author's view, special requirements for the collection, etc.;
— creating the final product (the so-called 'fashion object'), which is ready to be part of an individual or co-authored collection, to have an independent significance (possibly as an individual model or part of it) or to be an individually tailored ob-

ject following a theme, genre, materials and accessories used, fashion trends, authorship, school, etc.

Also of significance is the purpose of the fashion objects—uniquely tailored or ready-made clothing, evening/formal wear, casual, sports, scenographic costumes, festive wear, work wear, uniforms, underwear, etc., as well as the methods of production—by hand, by machine, or mixed.

The ultimate vision of the fashion object or model is demonstrated in a variety of ways: through a photo session, a fashion show, live demonstrations, video clips, advertising, etc., shown in specialised publications and media.

Moreover, the interpretations of the fashion knowledge are not considered isolated from the standards and specifications in the field of fashion representation because the goal is to maximise the reusability and portability of its description.

New information and multimedia technologies that have been developed during the past couple of years introduced new methods of creation, preservation, maintenance and distribution of the huge amounts of collected material. For example, the process of creating a model object, model, collection, etc., is greatly facilitated by advanced IT tools such as:

— OptiTex (CAD/CAM system), used for digitalisation and creating cuts, scaling (enlarging and diminishing the details of the fashion object), marker making, automatic nesting, etc.
— Runway 3D – Realistic 3D Design Software for simulated rendering of the image of clothing by presenting it in a three-dimensional computer model, providing cloth simulation, parametric mannequin, graphic capabilities, etc.

3   Functional Specification of an Interactive Environment for Fashion Objects

Following the specifics of the fashion objects a special data model of the Interactive Environment for Fashion Objects (IEFO) is created (see figure 1).

It presents the main data objects, their descriptors, interactions and relations. For example, the central data object is Model related with all other.
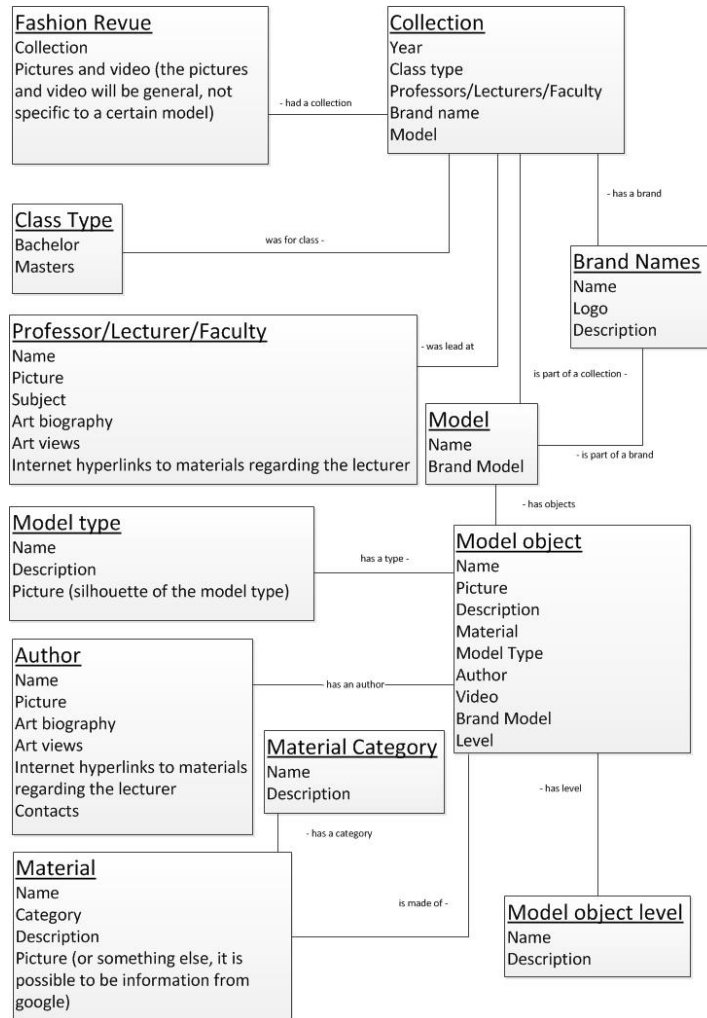
Fig. 1. Data model of the Interactive Environment for Fashion Objects

The following the data model above picture 2 depicts the developed database solution.

The interactive environment for fashion objects includes services for content creation, content presentation, content search, administrative services, and other services, mainly related to better fashion content observation (incl. learning). The environment will serve the following groups of users: Guests, Registered guests, Authors/Students, Professors/Teachers, Administrators. These roles are based on the way of using the environment incl. allowed access, rights, obligations, functionality usage, etc.
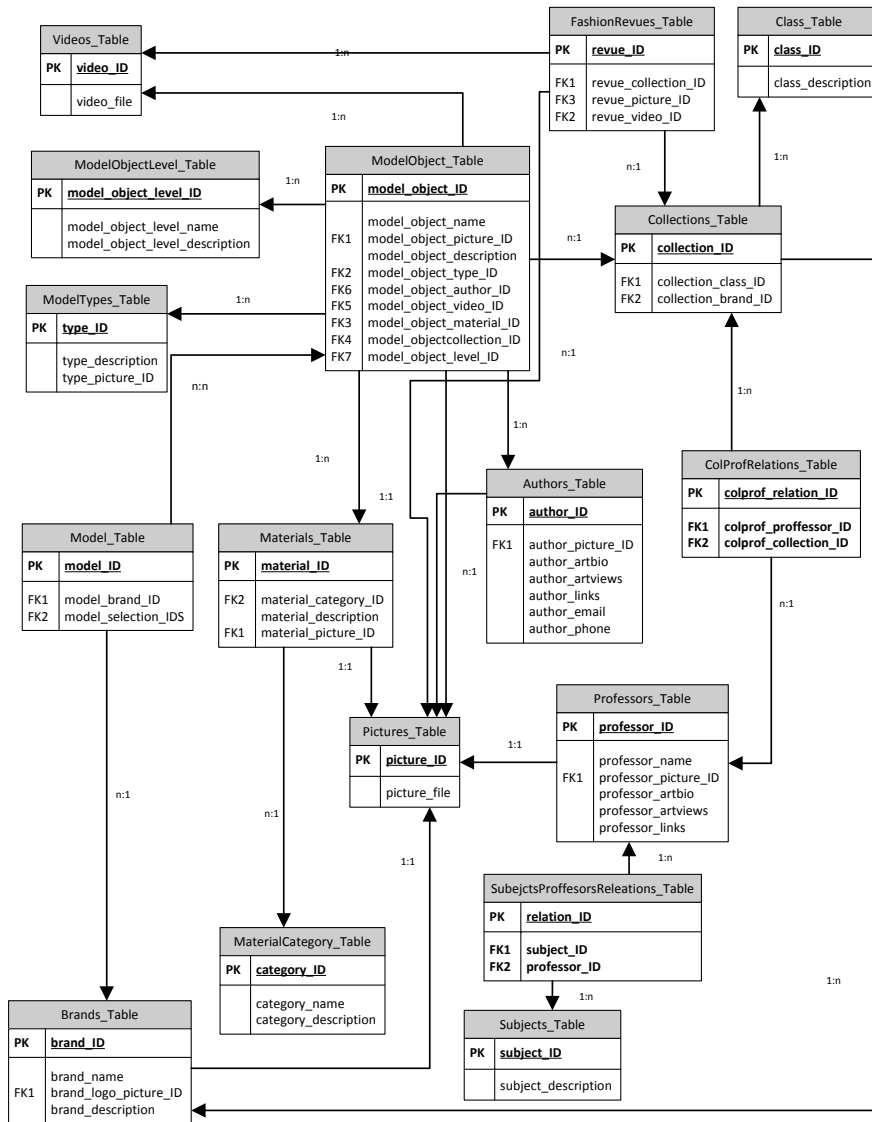
Fig. 2. Database of the Interactive Environment for Fashion Objects

3.1 Content Creation and Presentation

The main part of the content creation process is the annotation and semantic indexing of digital objects [1][3] in order to add them to the IEFO repositories. The metadata entering in the IEFO will be implemented through different automated annotation and indexing services.

An annotation template is developed for the description of fashion objects more completely. The template will provide several options for easy and fast entering of metadata:

- Auto complete services (All used (already entered) field values are available in a special panel for reuse);
- Automated appearance of dependencies coming from the relations of the defined metadata values, describing the fashion objects;
- Possibility for adding more than one media for one metadata description in order to create rich multimedia digital objects;
- Reuse of an already created annotation for new fashion objects: the new media object has to replace the older one, the annotation is kept and the new fashion object appears after saving;
- Possibility for automated resizing of the image objects;
- Automated identification of file formats;
- Automated conversion of the video and text objects in a format suitable for Web-preview;
- Terminology dictionary - As a part of the content creation panel will be included a terminology dictionary. After saving a new fashion object, a special machine traces for the appearance of dictionary terms in the object data. If some terms are available the machine adds links to their explanations. In the case of entering a new dictionary term, its presence in the available objects is discovered automatically and a link is added.

During the development of the content presentation services a profound analysis was made of content selection and preview possibilities in order to satisfy the user's needs. First we had to determine the preview possibilities of a separate fashion object and its components and after that the preview of grouped objects.

The visualization of the rich semantic description of the separate fashion object is determined through hidden parts appearing in a new window after link selection. For example, this possibility is used for long author's biography, dictionary terms, etc. Parts of the descriptive data field are also hidden, but their values are available for searching in special forms.

The content presentation services includes also object grouping services. The main values of IEFO data model are selected as object grouping criteria. Using grouping options the guest users (registered or no):

- can see separately a list of all designers (authors), and selecting one of them he can see additional biographic information and the collections of their work;
- can see separately a list of fashion object type, and selecting one of the type he can see all fashion models of this type, link to collection of every model and brand name
- can see a separately a list of all created brand names, and selecting one of them he can see all models with this brand and all fashion revues of the brand

Every registered guest can create his private collection of selected objects after search activity. Rich search possibilities (see the section 3.2) are available in order to assist collection creation. The registered guest can write the collection's title and short description. He can also select its status: private or shared with other users.

Section 3.4 includes extended presentation of users' activities incl. additional access and object review.

3.2 Content Search

IEFO will provide a wide range of search services, such as keyword search, extended keyword search, complex search (in the metadata descriptors, its values or both) and search with grouping results. Their realization was based on querying action to the IEFO knowledge base using mainly the structural branches of the IEFO data model. Moreover, five types of conditions for the results set are meant:

— "objects having value $= v$ for characteristic c "
— "objects having numeric value $\geq, \leq, <, >, or = v$ for a characteristic c ". In the search templates you could search fashion objects with precise date or period. The period could have concrete values.
— "objects having characteristic c "

The search services support content request and delivery via index-based search and browse of managed content and its description.

3.3 Administrative Services

The administrative services of the environment will provide user data management, tracking and analysis, data export.

The user data management will cover activities related to registration, user data changes, level set, user activities and others.

The tracking and analysis services have two main braches: tracking of objects, tracking of user' activities. The tracking of objects spies on the activities of add, edit, preview, search, delete, selection, export to XML, and group of IEFO objects/collections in order to provide a wide range of statistic data (for frequency of service usage, failed requests, etc.) for internal usage and generation of inferences about the stable work (stability), the flexibility, and the reliability of the environment. The tracking of user' activities spies user logs, personal data changes, access level changes and user behaviour in the IEFO.

The export data provides the transfer of information packages (for example, packages with IEFO objects/collections, user profiles, etc.) compatible with other systems managing data bases. For example, with these services a package with fashion objects could be transported in a XML-based structure for a new external usage.

3.4 IEFO Usage

The five groups of IEFO users could perform the following activities:

Guests - These users will be registered or unregistered. The unregistered will have access to a limited number of functions: they can only view and access the models/reviews in the system. They will also have access to the shared by the students (authors) information. However, the author has decided to share his personal information (eMail, mobile number, etc.) that the guests will be able to contact. The registered guests have access to a wider range of functions in the system such as - creating different users' groups based on their declared interests. While browsing in the system they will be able to share similar fashion objects/models to other users or their group.

Moreover, when the guest makes his registration, he can declare his interest by checking check boxes with all model types and material categories. New objects which are of these model types or material categories appear automatically after entering of this user. The registered guest will receive an email with message for every new information preferred.

Students/Authors - Each student will have their own personal profile which will allow them a wide arrange of functions such as:

- to share the stages of their fashion objects (sketches, patterns, test models and the finished products) with the other Students/Authors and thus they will be able to cooperate easily for the creation of joint new models and collections.
- to browse over the shared model/objects from other authors selecting different criterias such as: type of model, material category, etc., as well as the different stages of creating each object.

Administrators – The administrators of the environment will track and perform the administrative services, described above.

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