Interactive viewer of a furniture catalogue

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Many modern technologies, such as digital photography, video, GPS, network communication or 3D modelling, despite being called "modern", were introduced decades ago. However, full potential and possibilities of their use and, especially, of their combining, have still not been depleted until now. Today, rapid advance in the field of miniaturization have enabled a common cell phone to deliver all of the above mentioned technologies and even more. This fact provides software developers with a unique opportunity to build mobile applications subtly combining the whole lot of modern technologies.

Interesting examples of such applications are those that use the, so called, augmented reality. Augmented reality stands for a combination of computer graphics and an actual representation of the real world captured by a video-camera. The augmenting of reality is usually done by adding virtual objects and elements to the projection, which do not exist in the reality. This augmenting process is generally done in real-time and in three dimensions as well. It can be made even more effective by applying data from the other components of a modern cell phone, such as GPS, tilt sensors, built-in-compass, or also from algorithms that recognize certain signs and patterns in a picture.

The goal of this project is building exactly that type of a mobile application in such a way, that its potential will be used to help their users, and not only to look well.

There are many situations in life, when imagining certain things is not quite sufficient, and seeing is needed to achieve the right choice or decision. One of those cases is designing and furnishing an interior of one's house or office. It is vital to see the colours beside one another to tell if they fit. The same is true with the style and size of furniture. These days, various visualisations can be prepared beforehand if it is a bigger project. However, it would be impractical and costly to make them every time we buy a new piece of furniture, for instance.

That is why we come with a solution that allows the user to see selected pieces of furniture added to his environment in chosen colour, in any place and position that he wishes. The visualisation is done automatically, with user's own smart phone, in comforts of home.

At present, many major furniture stores provide comprehensive catalogues of their products for the customer. We decided to develop a software extension to these catalogues to make them interactive and more effective. It should consist of two parts – creating a mobile application to be used by clients and a server add-on that provides connection between the mobile applications and the catalogue.

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We chose to develop the client application for the Android platform, mostly because of its growing perspective and popularity among users and its wide compatibility. The technique of augmented reality we used is based on markers recognized in the pictures of environment, which are taken by the device's camera. Then, three-dimensional models are displayed on these known markers. This technology enables us to develop an application that will visualise requested furniture in a place that the user wants, from any angle, and in life-size. In this aspect our work is similar to *Studierstube ES* framework designed for Windows CE and Symbian platforms [2].

Since models of furniture change, it is necessary to be able to dynamically fetch any model of furniture for the application. Therefore all the models are downloaded via Internet from the server where all 3D models are stored. To save the customer the nuisance of typing any URL links or browsing via phone, access to the models is provided via special QR codes, which should available in the catalogue for each furniture. Every such QR code contains a link to a location, from which 3D model of furniture can be downloaded along with additional product information. QR codes should be also used as markers in a way as was presented in [1].

These downloaded models can be afterwards rendered and viewed by the user in the application using markers. Marker is recognized by our application in camera stream of pictures, and a model is added to the preview that user sees on his display. Whole workflow of application is shown in the Figure 1.

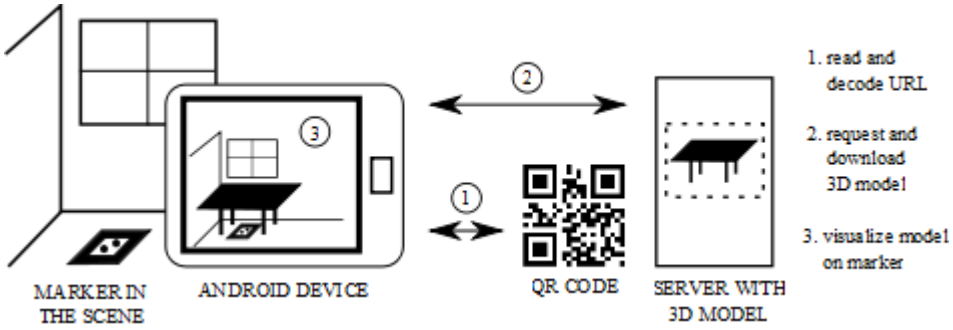

Figure 1. Workflow of the Application.

Server side of our project is represented by add-on to existing catalogue system. This application consists of three parts. Firstly it stands as information connector between client applications and a productive catalogue system based on object-relational database. Secondly, it stores and manages access to 3D model, saved in "mtl" and "obj" files, which are linked to products in catalogue. And thirdly it processes requests from client applications and provides them requested data. Last feature also requires ability to generate and maintain QR codes for the products.

Primary contribution of this project is the better ability of customers to imagine, choose, and fit the right furniture in the right place. That, depending on the specific use of course, might lead to higher sale rates, more attractiveness for the customer, and more satisfied customer. Last but not least, it can help to promote the technology of augmented reality.

References

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