

THE DESIGN OF 3D-ANIMATION IN MOBILE TELEPHONE SIMULATORS

Aviation computer integrated complexes department, National Aviation University, Kyiv, Ukraine

E-mails: ¹jcarlos0202@yahoo.com, ²fineart@inbox.ru

Abstract—As animation and digital technology the opportunities for animators are growing in new directions. One area in which demand is growing rapidly is in the development of mobile applications. Applications, usually just called apps, are software programs that serve a single purpose or a few related purposes. Some apps are designed to be tools (maps, translators, newspapers), some are social (chat, social media), some promote businesses (placing orders, offering promotions) and some are purely for entertainment (games, videos). As ownership of smartphones increases, the demand for new apps is exploding.

Index Terms—3D-animation; mobile applications; modeling; rendering.

I. INTRODUCTION

With the advent of the Internet, and the ability to transmit information instantaneously around the planet, along with local communication and video capable devices – these educational needs for low literate learners has the potential to be partially met through innovative educational approaches. An increasing number of people throughout the world are gaining greater access to relevant information through Internet and mobile-phone technology.

Internet and mobile phones could provide a unique opportunity to address constraints that affect to low literate learners or illiterate in developing countries. However, technology in itself is not the solution – the development of effective educational content that can be deployed through these strategies is what is critical.

The decrease in the cost of mobile phones has contributed to the rapid spread of accessibility of information throughout the poorest countries in the world.

There is evidence that cell-phones are becoming easily available for users in developing nations. “Scientific Animations Without Borders” (SAWBO) creates educational animations that can be watched on cell-phones and other devices and can be transmitted from mobile phone to mobile phone through Bluetooth® technology.

Innovative information deployment strategies have the potential to help usher in a new era of educational tools that can be used to bring life altering concepts into the realm of accessibility to the approximately one billion low literate learners on the planet.

As full worldwide literacy is not likely going to be a reality in the near future, there is instead a need to make knowledge accessible to people regardless of

their ability to read or write; this knowledge needs to be accessible in their own language and potentially even in their own regional accents. With the advent of the Internet, and the ability to transmit information instantaneously around the planet, along with local communication and video capable devices – these educational needs for low literate learners has the potential to be partially met through innovative educational approaches. An increasing number of people throughout the world are gaining greater access to relevant information through Internet and mobile-phone technology.

Internet and mobile phones could provide a unique opportunity to address constraints that affect to low literate learners or illiterate in developing countries. However, technology in itself is not the solution – the development of effective educational content that can be deployed through these strategies is what is critical.

3D-graphics (in contrast to 2D-graphics) are graphics that use a three-dimensional representation of geometric data (often Cartesian) that is stored in the for the purposes of performing calculations and rendering 2D-images. Such images may be stored for viewing later or displayed in real-time [1].

3D-graphics rely on many of the same algorithms as 2D-vector graphics in the wire-frame model and 2D-raster graphics in the final rendered display. In graphics software, the distinction between 2D and 3D is occasionally blurred; 2D-applications may use 3D techniques to achieve effects such as lighting, and 3D may use 2D-rendering techniques [2].

3D-graphics are often referred to as 3D-models. Apart from the rendered graphic, the model is contained within the graphical data file. However, there are differences. A 3D-model is the mathematical representation of any three-dimensional object. A model is not technically a graphic until it is displayed.

Due to 3D-printing, 3D-models are not confined to virtual space. A model can be displayed visually as a two-dimensional image through a process called 3D rendering, or used in non-graphical simulations and calculations[3].

II. TECHNICAL ASPECTS

Skilled digital animators won't have many problems with the technical side of designing for apps. The programs used are familiar: Flash, Anime Studio Pro, After Effects... etc.

The technical aspects of mobile applications include:

- programming;
- technical design & development;
- database systems;
- networking;
- systems analysis & design;
- testing and debugging;
- cross-platform applications.

3D-graphics creation falls into three basic phases:

- 3D-modeling – the process of forming a model of an object's shape;
- layout and animation – the motion and placement of objects within a scene;
- 3D-rendering – the calculations that, based on light placement, surface types, and other qualities, generate the image [4].

III. STATEMENT OF THE PROBLEM

The rules of the applications design and all specifications must be completely laid out before the graphic designers and engineers begin work. Task can be formulated like: how to increase accuracy of calculations and to simplify them due to finite possibilities of phone processor.

VI. FEATURES AND STRUCTURE

Animations could provide a pedagogical platform for information and knowledge that could contribute to positive educational inputs and outputs. Information technology could facilitate skill acquisition for low literate learners.

3D-services are leveraged for interactive application for engineering, training, marketing and sales that drive investments, move products and affect bottom line with a favorable increase in ROI [5].

3D-design & interactive programming services are sought by the following industries:

- Manufacturing;
- healthcare / medical;
- pharmaceutical;
- architectural;
- biotechnology;
- financial;

– scientific.

Interactive models can communicate valuable information for product prototyping, architectural building, mechanism of action (MOA) or complex movements required to show medical, scientific and engineering applications.

Animation or CGI animation is the process used for generating animated images by using graphics. The more general term generated imagery encompasses both static scenes and dynamic images, while animation only refers to moving images.

Modern animation usually uses 3D-graphics, although 2D-graphics are still used for stylistic, low bandwidth, and faster real-time renderings. Sometimes the target of the animation is the itself, but sometimes the target is another medium, such as film.

We explore the potential of creating animations based on techniques or activities scientifically validated that could improve the daily lives of low-literate learners.

Animations have the flexibility, in many cases, to have greater accessibility across cultural

boundaries, as compared to live-action filming, and can be altered through a reiterative process in order change scenes in order to increase their educational potential.

Animation is essentially a digital successor to the stop motion techniques used in traditional animation with 3D models and frame-by-frame animation of 2D illustrations. generated animations are more controllable than other more physically based processes, such as constructing miniatures for effects shots or hiring extras for crowd scenes, and because it allows the creation of images that would not be feasible using any other technology. It can also allow a single graphic artist to produce such content without the use of actors, expensive set pieces, or props.

To create the illusion of movement, an image is displayed on the monitor and repeatedly replaced by a new image that is similar to it, but advanced slightly in time (usually at a rate of 24 or 30 frames/second). This technique is identical to how the illusion of movement is achieved with television and motion pictures.

For 3D-animations, objects (models) are built on the monitor (modeled) and 3D-figures are rigged with a virtual skeleton. For 2D-figure animations, separate objects (illustrations) and separate transparent layers are used, with or without a virtual skeleton. Then the limbs, eyes, mouth, clothes, etc. of the figure are moved by the animator on key frames. The differences in appearance between key frames are automatically calculated by the in a process known as tweening or morphing. Finally, the animation is rendered [6].

For 3D-animations, all frames must be rendered after modeling is complete. For 2D-vector animations, the rendering process is the key frame illustration process, while tweened frames are rendered as needed. For pre-recorded presentations, the rendered frames are transferred to a different format or medium such as film or digital video. The frames may also be rendered in real time as they are presented to the end-user audience. Low bandwidth animations transmitted via the internet (e.g. 2D-Flash, X3D) often use software on the end-users to render in real time as an alternative to streaming or pre-loaded high bandwidth animations.

V. CONCLUSION

Mobile phones have the capacity to facilitate entrepreneurship opportunities in the informal sector. Thus, entrepreneurs could start business around mobile phones, selling, repairing, and recharging batteries, renting mobile phones in rural areas. The rapid insertion and adoption of mobile phone technology could transform the lives of people living in these countries. 3D-models and animation simplifies a complex product by allowing users to visualize in an interactive virtual space. Engaging users to build a product by selecting color, style and options makes a powerful marketing tool. In addition providing the ability to share their experience in their social space expands brand awareness. Interactive 3D-models and animation services are ideal for following business application:

- sales force training;
- educational and medical media;
- product design & development;
- product marketing.

Some examples of interactive 3D-solutions:

Educational Training

Allows students to become immersed in the learning process. Transforming them from passive observers of linear material, to active hands-on operators of interactive content.

Training simulations

Create accurate simulations which replicate much of the realism of the real world environment, while eliminating many of the associated risks and costs.

Product configurations

Component details such as price, part number and availability are fetched in real-time from your existing database and collated for output at the end of the configuration process.

Product marketing

As an integrated marketing and sales tool, we can easily export all user choices and even track user interactions within the presentation.

REFERENCES

- [1] Ding, H.; Hong, Y. (2003), NURBS curve controlled modeling for facial animations, *and Graphics*, 27(3). pp. 373–385..
- [2] “ERIS Project Starts”. *ESO Announcement*. Retrieved 14 June 2013.
- [3] “3D Scanning Advancements in Medical Science”. Konica Minolta. Retrieved 24 October 2011. pp. 214–220.
- [4] Jon Radoff, Anatomy of an MMORPG, August 22, 2008. pp. 115–126.
- [5] “3D Marketplace 3D Model Licensing Documentation”. Retrieved 30 October 2011. pp. 10–24.
- [6] “Lands' End First With New 'My Virtual Model' Technology: Takes Guesswork Out of Web Shopping for Clothes That Fit”. *PRNewswire*. Lands' End. February 12, 2004. Retrieved 2013. 11. 24. pp. 116–122.

Received 23 May 2014.

Huan Carlos Martin Rodrigez. Senior lecturer.

Aviation computer integrated complexes department, National Aviation University, Kyiv, Ukraine.

Education: National Aviation University, Kyiv, Ukraine (1989).

Research area: maintenance, data processing, radio engineering.

Publications: 11.

E-mail: jcarlos0202@yahoo.com

Khriptulova Olesia. Assistant.

Aviation computer integrated complexes department, National Aviation University, Kyiv, Ukraine.

Education: National Aviation University, Kyiv, Ukraine (1987).

Research area: alternative sources of energy.

Publications: 8.

E-mail: fineart@inbox.ru

Х. К. М. Родрігес, О. В. Хрїтулова. Використання 3D-анімації в додатках для мобільних телефонів

Як в анімації, так і в цифровій техніці можливості для аніматорів збільшуються в нових напрямках. Однією з областей, в яких попит швидко зростає є розробка мобільних додатків. Додатки – це програми, які служать одній меті або декільком пов'язаних з ними цілями. Деякі програми призначені для інструментів (карти, перекладачі, газети), деякі з них соціальні (спілкування, соціальні медіа), деякі для просування бізнесу (розміщення замовлень, пропозиція акцій) і деякі з них чисто для розваги (ігри, відео). Так як попит на смартфони збільшується, попит на нові додатки сильно зростає.

Ключові слова: 3D-анімація; мобільні додатки; моделювання; візуалізація.

Хуан Карлос Мартін Родрігес. Старший викладач.

Кафедра авіаційних комп'ютерно-інтегрованих комплексів, Національний авіаційний університет, Київ, Україна.

Освіта: Національний авіаційний університет, Київ, Україна (1998).

Напрямок наукової діяльності: системи експлуатації, обробка даних, радіоелектронне обладнання.

Кількість публікацій: 11.

E-mail: jcarlos0202@yahoo.com

Хрїтулова Олеся Василівна. Асистент.

Кафедра авіаційних комп'ютерно-інтегрованих комплексів, Національний авіаційний університет, Київ, Україна.

Освіта: Національний авіаційний університет, Київ, Україна (1989).

Напрямок наукової діяльності: мобільні технології.

Кількість публікацій: 8.

E-mail: finart@inbox.ru

Х. К. М. Родрігес, О. В. Хрїтулова. Использование 3D-анимации в приложениях для мобильных телефонов

Как в анимации, так и в цифровой технике возможности для аниматоров растут в новых направлениях. Одной из областей, в которых спрос быстро растет является разработка мобильных приложений. Приложения – это программы, которые служат одной цели или нескольким связанным с ними целями. Некоторые приложения предназначены для инструментов (карты, переводчики, газеты), некоторые из них социальные (общение, социальные медиа), некоторые для продвижения бизнеса (размещение заказов, предложение акций) и некоторые из них чисто для развлечения (игры, видео). Так как спрос на смартфоны увеличивается, спрос на новые приложения сильно растет.

Ключевые слова: 3D-анимация; мобильные приложения; моделирование; визуализация.

Хуан Карлос Мартин Родригес. Старший преподаватель.

Кафедра авиационных компьютерно-интегрированных комплексов, Национальный авиационный университет, Киев, Украина.

Образование: Национальный авиационный университет, Киев, Украина (1989).

Направление научной деятельности: системы эксплуатации, обработка данных, радиоэлектронное оборудование.

Количество публикаций: 11.

E-mail: jcarlos0202@yahoo.com

Хрїтулова Олеся Васильевна. Асистент.

Кафедра авиационных компьютерно-интегрированных комплексов, Национальный авиационный университет, Киев, Украина

Образование: Национальный авиационный университет, Киев, Украина (1987).

Направление научной деятельности: мобильные технологии.

Количество публикаций: 8.

E-mail: finart@inbox.ru