

Forum: A Knowledge Base for the Computer Graphics Discipline

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Abstract

Computer graphics is a powerful medium used to communicate information and knowledge. It is a discipline whose time has come. Until recently it was a mysterious specialty involving expensive display hardware, considerable computing resources, and specialized software. In the last few years, computer graphics has found its way into the mainstream of society, from entertainment, to engineering design, to the web, and virtually every industry. Much of this has been the result of spectacular improvements in the price and performance of computer graphics hardware and software. Interactive computer graphics is finding its way into nearly every discipline, industry, home, hospital, theatre, football stadium, automobile, appliance, and engineering office. Computer graphics is or will have an impact on nearly everything we do. The discipline of computer graphics is like a wide-open frontier where no matter which direction you move you will find more opportunities and undiscovered applications.

Computer graphics is the pictorial synthesis of real or imagined objects from their computer-based models. A related field is image processing which is the reconstruction of models of 2D and 3D objects from their pictures (Foley, et al, 1996). Traditionally, computer graphics is contained within the well-recognized disciplines of computer science, electrical and computer engineering, and art and design. The discipline of computer graphics has traditionally focused on developing new software algorithms (computer science) and hardware innovations (electrical and computer engineering) with an attempt to force art and design principles into the mix. Those types of developments will continue but the discipline is beginning to mature to a point where it is more than just about hardware and software developments and innovations. More attention must be given to the effective and novel use of the hardware and software developments in the context of graphics communication. This is a much more holistic approach to computer graphics as a discipline. This holistic approach is more focused on the end user and how these tools can be used in much more profound and revolutionary ways.

Obviously there have been many major and profound applications of computer graphics in its short history. However, the recent past of computer graphics is but a prelude of what is to come. Computer graphics can and will touch every human in a number of ways from entertainment to assisting in finding the cure of the most dreaded diseases. Computer graphics can and will have a profound effect on every type of business, industry, government, education, and the home. But it will take a very special type of education to prepare this next generation of computer graphics specialists.

Computer graphics is a powerful medium but only if combined with the principles of information design. The principles of information design are universal, like mathematics, and are not bound to unique features of a particular language or culture. The universal nature of the graphic language makes it a powerful tool in today's society where collecting, analyzing, and communicating all the available information is so important. Information becomes knowledge and knowledge can be commun-

icated more efficiently through computer graphics. Knowledge can become power and is the catalyst for stunning new developments in virtually every field.

The pure computer graphics discipline of the future will not be in computer science, art and design, technology, or electrical and computer engineering. The computer graphics discipline of the future will have its legacy in all these disciplines but will look to merge the software and hardware technology with the human communication process, which will result in novel ways of solving problems and disseminating information. As shown in Figure 1, computer graphics is the overlap between art, science and technology, and psychology.

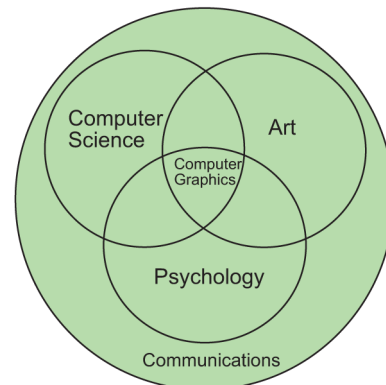


Figure 1 Computer graphics is the overlap between the art, science and technology, and psychology

The ideal student of this emerging discipline is bright, articulate, visual, analytic, and motivated by a passion for computer graphics. This student uses both sides of their brain but is keenly focused on the visual mode to solve problems. They are the modern-day Da Vincis, capable of visualizing what is nonexistent and finding solutions to complex problems. New opportunities are unfolding that require special talents and abilities for people with high visualization abilities who can use computer graphics tools to visualize scientific concepts and for the analysis and manipulation of complex three-dimensional information. As these new opportunities continue to unfold, the skill in manipulating and creating imagery may become more important than skill with words and numbers. Different kinds of tools may require different talents and favor a different type of discipline.

References

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