

Multimedia in the perspective of Mathematical Modelling: Past, Present and Future

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Abstract

This paper discusses the role of Mathematical Modelling in the past, present and future, in shaping the so-called world of Multimedia as it is known today. In this paper, the term "Mathematical Modelling" does not have a precise definition. The term is used to imply problem description in mathematical terms, algorithms and the use of mathematical tools to investigate the given problem. One of such model is the use of differential equations to describe a vast variety of different phenomena in the areas of physics, biology, sociology, etc. The model can be solved analytically; others require numerical methods and the use of a computer that is a necessity to today's mathematical modeller.

This paper looks into the historical timeline on the evolution of multimedia. Stemming from the area of computer graphics, the field of multimedia has been changed drastically from the invention of Cathode Ray Tube in 1885, and then in 1950, Ben Laposky uses oscilloscope to display waveforms that were photographed as artwork. By 1951 "Computer Graphics" was displayed on vector scope on a Whirlwind computer. In 1974, before the invention of pixels, almost all displays were calligraphic, which means the beam needs to be steered around on the screen to trace out lines using some algorithm and a mathematical model. Today raster graphic is being used but the role of mathematical modelling continues in a new form and algorithms.

The evolution of hardware and the increase of computing power with the decline in cost per MIPS has made computer graphic more accessible to a lot more people. Mathematical modelling tools are now widely available and less complex to use but the tools and the models used are becoming more complex than ever. The platforms used have moved from mainframes or mini to workstations and then to desktop machines and now even hand held machines are capable to do graphics display which was only possible by mini computers before.

Due to the limitation of computing power the algorithms and mathematical models used before were more clever and precise the one which skips few iterations wherever possible. Nowadays, computers are fast enough which leads to a more crude and brute force type of algorithms being used. The more profound change is not in the actual modelling but in the use of mathematical modelling and computer graphics. It used to be used for computer-aided design and data analysis, which was the original intention. Now, most of the applications are in special effects, image processing, graphic arts, telemedicine, etc. Above all mathematical modelling is the fundamental reason to the existence of the world of multimedia from the past, present and in the future.