Displaying Real 3-D Object Images Using a Computer-Generated Hologram

A thesis presented in partial fulfillment of the requirements

for the degree of

Master of Science in Computer Science at Massey University

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1998

ACKNOWLEDGEMENTS

I am indebted to my supervisor, Dr. John Hudson of the Department of Computer Science, Massey university, for his invaluable advice, assistance throughout this study. His patience and encouragement are greatly appreciated.

I also wish to thank:

Professor R. C. O'Driscoll of the Department of Physics, Massey University, for providing the facilities for my experiments and helping me operate the instruments.

Miss Heather North, who was a PhD student of the Department of Physics, Massey University, for helping me choose the correct recording materials.

I would also like to express my sincere thanks to the staffs of the Department of Computer Science, Massey University for providing the facilities for this study.

Finally, I would like to express thanks to my wife, for her patience, help and encouragement during the course of this study.

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ABSTRACT

The magic of an optical hologram that produced by optical system offer us a never ending sense of wonderment. The images reconstructed from an optical hologram exhibit all of the three dimensional properties with full, rich perspective effects, enabling us to catch sight of an object behind another by mere tilt of the head.

Computer-generated holograms, synthetic holograms and computer holograms are terms used to refer to a class of holograms that are produced as graphical output from a digital computer. It has been reported that a computer-generated hologram can also yield a three dimensional image. The main advantage of the computer-generated hologram is that it can used to generate a three dimensional image of an object that may not physically exist. But can a computer-generated hologram be used as a three dimensional display device?

This thesis examines the ability of a computer-generated hologram as a three dimensional display device. Many techniques have been used to produce computer-generated holograms. Mathematical descriptions of computer-generated holograms are discussed. The quality of the images reconstructed from these computer-generated holograms are examined. The computation time for producing these computer-generated holograms are compared.