

**3D RECONSTRUCTION OF OBJECTS
FROM RGB IMAGES AND DEPTH INFORMATION
USING DEEP LEARNING**

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DECLARATION

I, K.N.T.D.Karunanayaka, hereby declare that this is my own work and this report does not incorporate without acknowledgement any material previously submitted for the degree or diploma in any other university or institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

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The above candidate has carried out research for the Master's thesis under my supervision. I confirm that the declaration made above by the student is true and correct.

Name of the supervisor: Dr. Charith Chithraranjan

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Date:

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ABSTRACT

Object reconstruction is the manner of producing a computer model of the 3D appearance of an object from two-dimensional photos. It's the opposite procedure of obtaining 2D photos from 3D scenes. 3D reconstruction of objects from their digital pictures is a time-efficient and convenient manner of analysing the structural features of the item being modelled. Currently there may be an essential need for 3D content for computer graphics, virtual reality and communication, triggering an alternate emphasis for the requirements. Many present methods for constructing 3D objects are built round specialized hardware resulting in a high fee, information scanning barriers due to environment conditions which can't satisfy the requirement of its new programs. The art of three-dimensional reconstruction of objects and scenes has been a broadly researched topic.

In this Master's thesis, I proposed to address the above problems by developing a Deep Learning approach to reconstruct the object. This type of approach does not depend too much on the environment condition and the cost is low. However, the proposed method mostly targets the reconstruction of objects other than reconstruction of scenes. This research attempts to develop a Deep Learning based 3D reconstruction method for objects to avoid the limitations of the current 3D reconstruction approaches.

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LIST OF ABBREVIATIONS

SFM	Structure from Motion
MVS	Multi View Stereo
SLAM	Simultaneous Localization and Mapping
DIP	Dots per Inch
CNN	Convolutional Neural Network
DVR	Differentiable Volumetric Rendering
3D-R2N2	3D recurrent Reconstruction Neural Network
DRC	Differentiable Ray Consistency
PSR	Poisson Surface Reconstruction
MLP	Multilayer Perceptron
NV	Neural Volumes
SRN	Scene Representation Networks
LLFF	Local Light Field Fusion
2D-CNN	2D Convolutional Neural Network
LSTM	Long Short Term Memory
3D-LSTM	3D Convolutional Long Short Term Memory
3D-DCNN	3D De-Convolutional Neural Network
FID	Frechet Inception Distance
AR	Augmented Reality
GAN	Generative Adversarial Network
3D-R2N2	3D Recurrent Reconstruction Neural Network
IoU	Intersection over Union
SDF	Signed Distance Function
FC	Fully Connected
DVR	Differentiable Volumetric Rendering
ED	Euclidean Distance
SPSR	Screened Poisson surface reconstruction