# ELEC4630/7463 Image Processing and Computer Vision
Assignment 4
(Due date: Friday 31/5/2019 at 5pm)

Assignment report should include **coding**, **results**, **images**, and a **verbal description** of how you approached the problem. Please **demonstrate** your code to tutors during class so they can assess your work more accurately. Most importantly, have fun.

1. Stereo reconstruction is only useful for reconstructing a simple scene from two nearby views. It can be difficult to extend to complicated scenes with occlusion and to a large number of cameras or views. Volumetric reconstruction is one way to handle a large number of cameras with arbitrary viewpoints. In this assignment you will be required to fuse the data from 36 viewpoints of an object into a detailed volumetric model of that object. An example result is given below.
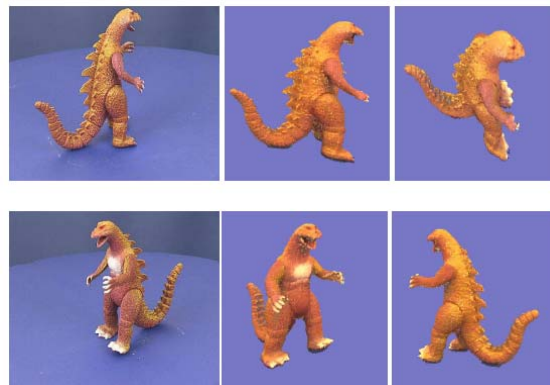
The inputs:
- 36 viewpoints of a toy dinosaur spinning on a turntable (10° per image).
- 36 projection matrices which determine how each spatial point maps onto the image plane.

The output:
- A volumetric model of the dinosaur
- (To be submitted) 4 new viewpoints of the reconstructed dinosaur which do not coincide with any of the original 36 viewpoints. Try to texture map the images.

The method you are required to implement is known as "shape from silhouette". This has been covered in lectures. Images and some hints are available from Blackboard as dino.zip.

(10 Marks)

2. Build a face recognition system based on the eigenface technique to recognize faces from the database on the website. You should be able to obtain about 96% correct recognition. Supply the code listing, explain your method, and performance analysis. Higher marks can be obtained by building a nice gui interface in Matlab. Face images are available from Blackboard. Details of the Eigenface method are in the book chapter "Face Recognition for Data Mining" on Blackboard.

(10 Marks)

(Total 20 Marks)