

**National University of Singapore  
School of Computing**

**CS6240 Multimedia Analysis  
Problem Solving Assignment**

**Presentation date: 30 March 2011**

Your company specialises in city planning and management. In particular, it is developing a system for reconstructing 3D models of a city scene, which includes 3D models of the major buildings in the city. Being the Chief Computer Scientist, your task is to put together a team to develop a convenient way to reconstruct the 3D models of buildings. The algorithm needs to be as automatic and accurate as possible.

You took some pictures of a building and discover the following characteristics:

- A picture or a view shows only the part of the building facing the camera. So, multiple views are needed to reveal different parts of the building.
- You cannot afford to hire a helicopter to fly over a building to take pictures of the top of the building. So, your algorithm has to be intelligent enough to estimate how the top of the building looks like.
- If you take a picture far away, the view may capture the whole building but some other objects may appear in front of the building, thus causing complications to your algorithms.
- If you take a picture near enough such that nothing else appears in front of the building, then you may need to take many overlapping pictures to cover the entire building.
- You cannot use a 3D scanner to just scan the building because it is a limited range. It cannot cover the entire building.



Assignment problems:

- Design a convenient method for reconstructing the 3D model of a large building. The method should require as few views as possible.
- Explain how and why your method works. You need to give sufficient details about your method and the algorithms involved to explain how it works.
- Use images of sample buildings to estimate the number of views needed by your method to reconstruct the buildings.
- You may search the web for relevant materials. You need to understand the materials that you use, and please cite the references.