

M. CHO, C-W. KIM. *Spin-image based 3D plant equipment model reconstruction from CAD database*. *Gerontechnology* 2012;11(2):71; doi:10.4017/gt.2012.11.02.482.00 **Purpose** Three-dimensional (3D) plant equipment models are important in the plant operation phase as they provide geometric information that is needed for repair and replacement of plant equipment, such as tanks, heat exchangers, pumps, etc. The model is reconstructed using point-cloud data expressing the geometric information of plant equipment. This 3D plant equipment model reconstruction still involves complicated work even though with point-cloud data it is possible to extract geometric information of plant equipment. Plant equipment is designed by using a CAD-database<sup>1</sup>. It is possible to reconstruct a 3D-plant equipment model by using the equipment's geometric information from the CAD-database. Currently 3D-plant equipment model reconstruction from point cloud data is mostly manual. This manual method consists of two processes, recognizing plant equipment from the CAD-database on the one hand, and registering plant equipment in original position on the other. However, because manual method relies on human interaction and interpretation it creates undesirable errors of 3D-plant equipment model reconstruction. **Method** To our knowledge, there is no previous research on 3D plant equipment model reconstruction from point-cloud data. In this paper, we propose an automated method of 3D plant equipment model reconstruction by using spin-image<sup>2</sup> which is an automatic recognition and registration of plant equipment from point-cloud data. The proposed automated method of 3D plant equipment model reconstruction is conducted through three sequential processes. The first process is to generate a mesh model from point-cloud data. The second process, model representation, is to control the resolution of surface meshes between those generated from point-cloud data and meshes from the CAD-model. The last step, equipment model recognition, is to recognize and register plant equipment in point-cloud data from CAD-database by using spin-image. **Results & Discussion** The experiment was performed with point-cloud data from an actual operating plant for validation of the proposed method. The result of experiment validates that our proposed method of 3D-plant equipment model reconstruction is more accurate than the manual method. We therefore conclude that automated 3D-plant equipment models reconstructed can be useful for the plant operation phase to provide geometric information on equipment accuracy that is needed for repair and replacement.

**References**

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