

D.Y. KIM, H. SUN, C-W. PARK. **Height estimation of gondola-typed facade robot.** *Gerontechnology 2012;11(2):379*; doi:10.4017/gt.2012.11.02.392.00 **Purpose** We researched an automated and robotic facade maintenance robot. This robot can protect people against safety hazards, and save labour cost for building facade maintenance. Our platform is gondola type. Accurate and robust height estimation is necessary for automation. We propose a methodology for height estimation.

**Method** Even though there are many sensor systems for height estimation, a new design for a gondola-typed robot was needed. Our goal was to make this sensor for the gondola accurate, robust, and cheap. We used a dome camera mechanism with tilt sensors. A range sensor always points vertically to the ground. An estimation algorithm then simulated various situations. **Results & Discussion** We will present our results in a graph and/or table (Figure 1) and describe and discuss them briefly. We used a Kalman-filter frame to estimate the height of gondola. The concept of monoSLAM was then applied<sup>1</sup>. There is a control update phase and measurement update phase. For control update, the velocity of the gondola cage was also estimated. During the measurement update, there are branches for any obstacles under the sensor. For example, a worker can go under the gondola, construction materials can be laid, and the terrain under the gondola fluctuates.

**References**

1. Davision AJ, Reid ID, Molton ND, Stasse O. MonoSLAM: Real-Time Single Camera SLAM. *IEEE Trans. Pattern Analysis and Machine Intelligence 2007;29(6):1052-1067*; doi:10.1109/TPAMI.2007.1049

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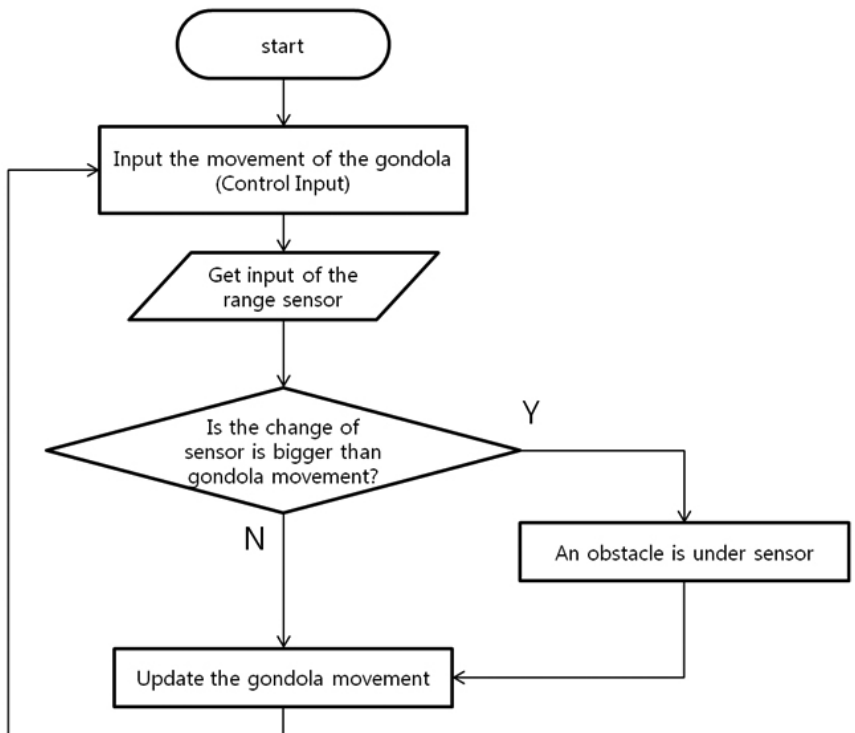


Figure 1. The flowchart for the height estimation