

# **Remote Monitoring Assessments Through Pan-Tilt-Zoom Automated Camera Control**

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Visual monitoring inspections plays a crucial role in assessing challenging-to-access areas, such as buildings and complex construction sites, offering a straightforward, non-invasive, and reliable method for experts. In situations where physical access is impractical, this approach proves indispensable. High-powered visual equipment like cameras with pan-tilt-zoom (PTZ) capabilities can be used in such scenarios, but manual aiming becomes complex as increased magnification reduces the field of view (FoV), making scene localization challenging since small angle adjustments can completely change the scenery. To improve the precision of visual assessments, we propose implementing an autonomous PTZ camera control system through a feedback system where when given a 3D world information, the camera calibrates the input according to the output coordinate data. The control of the PT system will be tested by implementing ROS and visualized through Gazebo to validate the pan and tilt motion. The computation of the angles is done by utilizing a pre-generated 3D point-cloud model and its P Matrix to match the selected point with the reference system of the camera. By accurately controlling the motion of the camera, the area of interest will be easily located. The control of the Pan-Tilt unit will be tested to ensure the correct functionality in the real world. As a result, the proper implementation of this research could potentially enhance visual assessment capabilities.