A METHODOLOGY TO OBTAINED 3D THERMOGRAPH OF A BUILDING FOR A BETTER BUILDING INSPECTION

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Abstract: Building Information Modelling (BIM) is one of the recent development that are able in presenting a complete three-dimension (3D) model of a building. The technology of the BIM is able in providing a detailed information of the building in term of its measurement, health and its current condition. With the availability of the thermal data and Terrestrial Laser Scanner (TLS), the integration of the two-dimension (2D) thermal image with 3D model of building can be executed to obtained a complete 3D thermograph. Nowadays, majority of the tall and big building are rarely maintained as it takes too much time and hard to go through a detailed checking. By providing a 3D thermograph of the building, it may help the engineer or architect in defining any potential problem or failure in the building with fast and accurate inspection. Hence, this paper aim to present a methodology to obtained a 3D thermograph of a building. TLS instrument of Topcon GLS2000 and Infrared camera of Fluke Ti32 are used to scan over the selected residential building in Universiti Teknologi Malaysia (UTM). Control point are nicely distributed around the building area to get the best perspective view of the building for each instrument. Traversing method are used for the TLS data acquisition to register the point cloud for each control point. The processing of the TLS data included the generation of mesh model of the building to form a solid 3D model. For infrared camera, several image are taken from the control point and each of the image must have the same scene that contain any outstanding features such as edges so that the registration of each image are easily done. Texture mapping technique are used to map the thermal image onto the 3D mesh model. The result of this study shows a complete 3D thermograph of the building which also contain the correct geometry of the building. This study may help the engineer or architect to plan, design, simulate and finding any potential problem or failure in the building with less time consuming and low costing.

Keywords: Building Inspection, 3D thermograph, Infrared Thermography (IRT), Terrestrial Laser Scanner (TLS).