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# Implementation of an Integrated Filter Incorporating Hole-Filling and Interpolation in Tandem

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**Abstract:** Conventionally, RGBD images are enhanced by implementing interpolation and hole-filling algorithm independently but it leads to a large amount of time-complexity along with low peak signal to noise ratio ( $PSNR$ ). In this work, an integrated filter is proposed that implements hole-filling and interpolation concurrently. The performance is obtained via evaluation of  $PSNR$  and time-complexity. Moreover, a comparative analysis between the conventional and proposed scheme is propounded. It has been inferred that  $PSNR$  improves on using the proposed filter. Furthermore, the proposed filter reduces the time-complexity noticeably by  $O(n^2)$ .

**Keywords:** Hole-Filling, Interpolation, PSNR

## I. Introduction

In 3-D computer graphics, a depth map is an image or image channel that contains information relating to the distance of the surfaces of scene objects from a viewpoint [1]. It is the next emerging revolution after the high definition video and is the key technology in advanced three dimensional television systems (3-D TV) and free-view television systems [2-3]. Depth image is a 2-D image that gives depth value to a point on an object in real scene according to its image coordinates [4]. Once the original image and depth image is given, 3-D can be synthesized by mapping pixel coordinates one by one according to its depth value. A new member of 3-D sensor family, Kinect has drawn great attention of researchers in the field of 3-D computer vision for its advantage of consumer price and real time nature. Based on a structured light technique, Kinect is able to generate depth and colour images at a speed of about 30 fps [5]. However, limited by depth measuring principle and object surface properties, the depth image captured by the Kinect contains missing data as well as noise. These areas of missing data are known as

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