Modern mobile phones are equipped with high-resolution cameras, high-quality colour displays and powerful 3D graphics processors, this makes it possible to develop applications for stitching building panoramas, especially as VR equipment is so common in these days

building an image ★

Image stitching software is an exciting technology with many applications such as smart phones and satellites. It is used to create panoramic and high-resolution images.

Image stitching is often performed through the use of computer software and works using overlaps between images with identical exposures. This approach can create seamless images. However some approaches use software that makes use of different exposures at the edge of the overlapping region. *Electronics Letters* spoke to Wuxia Yan, from the Nanjing University of Science and Technology in China and who is the co-author of the featured letter, to find out more.

Stitching things together

'Image processing has a long history, and has significant impact on daily life' explained Yan 'with image processing techniques helping with the manipulation of digital images by computers. Image stitching is one of the fundamental fields of image processing'. It can be applied in situations where object or scene recognition is required, with some of the most important uses being motion tracking, medical imaging and video processing.

The process of image stitching can be broken down into three stages; image registration, calibration and blending. Image registration involves matching the features in a set of images, calibration is the process where the differences between the properties of the overlapping images are calculated and blending is where the findings of the calibration stage is applied. This result in an end image, called the panorama, made up of multiple smaller images.

Line of sight

In their paper she, along with Sheng Wang, Jun Hu, and Chuancai Liu, found that 'most of the stitching methods can only perform well on images with little or no parallax [difference in the apparent position of an object viewed along two different lines of sight], which is a big limitation in practical situations. In order to solve the problem of image stitching with large parallax, we proposed a novel method for fronto-parallel building facades stitching in this Letter. These images are taken by a hand-held cameras and large parallax is inevitable. To obtain convincing panoramas, we intended to transform the views of the image pair to the reference view before stitching them. In this way, the parallax problem in stitching building facade images is solved.'

TOP: In order to solve the problem of image stitching under large parallax, the feasibility of obtaining the panoramas of close-range building images with large parallax was demonstrated in this Letter
BOTTOM: The image stitching of building facades is an active area of research in the fields of photogrammetry, computer vision, image processing, and computer graphics.
Website: https://github.com/rukia007/Panorama/blob/master/all2.pdf

This method of considering the image stitching problem is a completely new way of doing so. 'As the existing algorithms of image stitching uses the global parametric warps or local warps or the combination of the two methods. The assumption of these methods is that they change the whole or only part

reference view of one of the image pair into the coordinate of the other. We chose to change both of the reference views of the two images together into a standard reference view. The rest work is the usual stitching process. It simplifies the entire stitching process.'

Coming up

The findings of this work can be applied to stitching building images at a close distance. Yan says 'I think the first applications of this work might be on mobile devices, such as, mobile phone and virtual reality (VR) equipment. Because modern mobile phones are equipped with high-resolution cameras, high-quality colour displays and powerful 3D graphics processors, this makes it possible to develop applications for stitching building panoramas, especially as VR equipment is so common in these days. Our work can create high-quality 360 degree building panoramic images be applied in the augmented reality for the VR.'

Future work for the research team includes speeding up the blending process and reducing its memory consumption on the mobile devices. Ideally they aim to make the image stitching process completely automatic, optimal and precise, requiring no user information in calculating the panorama.