Editorial

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Superior Scene Recognition for Mixed Reality.

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INTRODUCTION

Due of its almost endless potential, augmented reality (AR), which blends virtual and real-world aspects, has shown remarkable outcomes in a number of application domains and attracted major academic focus in recent years. Applications for augmented reality mostly depend on the capacity to recognize the user's environment with accuracy and to continuously observe exchanges between the user and their surroundings. Conventional AR relies on the user's precise location, but modern AR expects a deeper scene perception at several levels, from semantic understanding and dense environment reconstruction to hand-object interaction and action detection. Applications for augmented reality (AR) offer a sophisticated, effective comprehension of the environment by facilitating seamless interaction between virtual and real-world components and by monitoring and dependable supporting users in the real world.

Our goal in this Special Issue is to provide new research on scene perception for augmented reality applications, covering subjects like semantic SLAM, object pose estimation and tracking, dynamic scene analysis, and 3D environmental sensing, sensor fusion, illumination, reconstruction, hand tracking, and hand-object interaction. Thorough evaluations of the state of the art on pertinent subjects and creative AR applications that capitalize on current advancements in scene perception are also appreciated.

There are seven accepted, peer-reviewed articles in this special issue that are very important to the scientific community. Three of these publications offer thorough surveys and reviews of AR-related topics, while four of them highlight new research findings. Important Topics covered include interactivity and particular application areas, as well as user experience-related concerns like self-localization and object pose estimation for augmented reality.

Gupta et al. [1] emphasize in one of these innovative research publications the necessity of switching from 2D object detection to 3D object detection for AR application goals. Their method proposes to generate 3D cuboid recommendations for the items found after beginning with 2D detection. Their implementation is intended for mobile devices and expands upon the ARCore framework.

In order to achieve better tracking quality in AR applications, Outahar et al. [2] presented a combination of direct and indirect visual simultaneous localization and mapping (vSLAM) approaches. Their investigation is driven by the reality that both direct and indirect techniques everyone gives outstanding performances in quite distinct kinds of scenes. They employed a direct SLAM system primarily for initialization and relocalization, and an indirect SLAM system as their foundation. Their test findings on many reference datasets demonstrate that the fusion approach can outperform more conventional techniques in terms of accuracy.

Pervasive AR is an extension of classical AR, according to Madeira et al. [3], and refers to experiences that are continuous in space, cognizant of and responsive to the user's context and pose. They present a method for getting 3D images of a space.

These are subsequently employed in an editing environment for augmented reality experiences. In terms of user evaluation, they finally look into the variations between a completely immersive mobile AR experience and a desktop encounter with a 3D model. While the AR interface was widely seen as more user-friendly, the PC platform demonstrated potential in a number of areas, including remote configuration, less effort needed, and overall superior scalability.

Firintepe et al.'s [4] work focuses on the fascinating use of augmented reality in confined spaces, including automobile interiors. They propose that an IR camera with an outside-in tracking approach can be used to accurately predict the pose of the AR glasses. When they approach, a point cloud of the wearer of the glasses is produced from the IR picture, which it then utilizes to calculate the exact stance.

This Special Issue includes three really significant survey papers that were accepted. A survey on 6DoF object detection and posture estimation is presented by Gorschlüter et al. [5]. In recent years, this field has grown significantly in importance for AR and robotic applications. They present an industrial application viewpoint and concentrate their review on the techniques that only make use of artificial data from data.

Marto et al. [6] offer a thorough survey of AR games and presence in another survey report. The PRISMA approach was used to conduct the survey, and all research that reported on visual games with both augmented reality activities and, in some way, presence data or associated dimensions that may be called immersion-related feelings were thoroughly examined analysis or outcomes. They explain that social presence, co-presence, social immersion, engagement, and self-engagement are among the immersion-related emotions mentioned in AR games, in addition to presence.

Lastly, Nikolaidis [7] surveys the subjects that have been the subject of the most AR surveys since 2010 in order to present a meta-review of AR. The findings, which are presented in a taxonomy of the data, mostly highlight the dearth of AR application assessments that address all recommended criteria.

The findings indicate that the majority of current AR reviews focus on healthcare and education, with a significantly lower proportion on industrial themes. This article's primary goal is to identify uncharted territory in augmented reality to spur more investigation by the field's researchers.

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