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Towards an automated detection of changes in the urban chameleon skin

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ABSTRACT:

Colourful and ever-changing: Graffiti can be considered the urban chameleon skin. At the *Donaukanal* (Eng. Danube Channel), Vienna's central waterway and one of the largest and most active graffiti-scapes worldwide, this metaphor applies like hardly anywhere else. Every day a multitude of graffiti is destroyed by the creation of new works. Recently, efforts have been made to mitigate this constant loss of cultural heritage along the *Donaukanal* by systematically documenting the graffiti, mainly using photography and photogrammetry. However, keeping track of the newly added works is very time-consuming and often like finding needles in a haystack, considering the large extent and high volatility of the monitored area. Thus, an automated graffiti change detection would significantly reduce the effort and avoid overlooking graffiti.

In this presentation, the main challenges in image-based change detection for an extensive graffiti-scape are outlined. Furthermore, we will showcase a camera-based monitoring framework that provides a robust foundation of data, which serves as input for a novel hybrid method of image-based change detection. The investigated method exploits and combines an established pixel-based change detection algorithm, the Iteratively Multivariate Alteration Detection, with a descriptor-based method. The latter relies on image features rather than pixels as an analysis unit and can robustly filter false alarms from the high-performing but noise-prone pixel-based approach. Overall, the results indicate that the proposed method can largely automate image-based change detection of graffiti-scapes. It can uncover graffiti-related changes and robustly distinguish them from other image differences such as shadows but tends to overlook small-scale graffiti, indicating the need for further finetuning.