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A LoCATE based visual place recognition system for mobile robotics and GPGPUs

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Title:	A LoCATE-based visual place recognition system for mobile robotics and GPGPUs
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Abstract:	<p>In this paper, a novel visual Place Recognition approach is evaluated based on a visual vocabulary of the Color and Edge Directivity Descriptor (CEDD) to address the loop closure detection task. Even though CEDD was initially designed so as to globally describe the color and texture information of an input image addressing Image Indexing and Retrieval tasks, its scalability on characterizing single feature points has already been proven. Thus, instead of using CEDD as a global descriptor, we adopt a bottom-up approach and use its localized version, Local Color And Texture dEscriptor, as an input to a state-of-the-art visual Place Recognition technique based on Visual Word Vectors. Also, we use a parallel execution pipeline based on a previous work of ours using the well established General Purpose Graphics Processing Unit (GPGPU) computing. Our experiments show that the usage of CEDD as a local descriptor produces high accuracy visual Place Recognition results, while the parallelization used allows for a real-time implementation even in the case of a low-cost mobile device.</p>