

# Real-Time Loop Closure in Dense RGB-D SLAM

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In this talk I will present a system for capturing large scale dense maps in an online setting with a low cost RGB-D sensor. Central to this work is the use of an "as-rigid-as-possible" space deformation for efficient dense map correction in a pose graph optimisation framework. By combining pose graph optimisation with non-rigid deformation of a dense map we are able to obtain highly accurate dense maps over large scale trajectories that are both locally and globally consistent. With low latency in mind we derive an incremental method for deformation graph construction, allowing multi-million point maps to be captured over hundreds of metres in real-time. We provide benchmark results on a well established RGB-D SLAM dataset demonstrating the accuracy of the system and also provide a number of our own datasets which cover a wide range of environments, both indoors, outdoors and across multiple floors.