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ElasticFusion on the Google Tango Tablet

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1 Introduction (1-3 pages)

ElasticFusion on the Google Tango Tablet
The Dyson Robotics Lab has recently purchased a set of Google Tango Tablets that come as an integrated Android-based platform equipped with an Inertial Measurement Unit (IMU) colour camera, a fisheye monochrome camera, as well as a depth camera that uses projection of an infrared pattern.
This makes it an ideal setup for deployment of RGB-D SLAM algorithms, such as ElasticFusion [T. Whelan, S. Leutenegger, et al. RSS15, IJRR'16], which we recently published. This will need, however, some adaptations to the algorithms and software. While this project is very challenging, it is also rewarding, since the aim is to develop a fully self-contained dense mobile 3D scanning solution.

ElasticFusion: Dense SLAM Without A Pose Graph. Whelan, Thomas and Leutenegger, Stefan and Salas-Moreno, Renato F and Glocker, Ben and Davison, Andrew J. In RSS 2015.

R. A. Newcombe, S. Izadi, O. Hilliges, D. Molyneaux, D. Kim, A. J. Davison, P. Kohli, J. Shotton, S. Hodges, and A. Fitzgibbon. KinectFusion: Real-Time Dense Surface Mapping and Tracking. In Proceedings of the International Symposium on Mixed and Augmented Reality (ISMAR), 2011.
Keyframe-Based Visual-Inertial Odometry using Nonlinear Optimization

2 Background (10- 20 pages)

3 Project Plan (1-2 pages)

4 Evaluation plan (1-2 pages)

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References

[1] Thomas Whelan, Stefan Leutenegger, Renato F Salas-Moreno, Ben Glocker, and Andrew J Davison. Elasticfusion: Dense slam without a pose graph. *Proc. Robotics: Science and Systems, Rome, Italy*, 2015. pages 2

[2] Stefan Leutenegger, Simon Lynen, Michael Bosse, Roland Siegwart, and Paul Furgale. Keyframe-based visual–inertial odometry using nonlinear optimization. *The International Journal of Robotics Research*, 34(3):314–334, 2015. pages 2