g2o: A General Framework for Graph Optimization

Rainer KummerleAuthors, Giorgio Grisetti, Hauke Strasdat, Kurt Konolige, Wolfram Burgard

December 3, 2016

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2 Basic Information

2.1 Authors

R. Kummerle, G. Grisetti, and W. Burgard are with the University of Freiburg. G. Grisetti is also with Sapienza, University of Rome. H. Strasdat is with the Department of Computing, Imperial College London. K. Konolige is with Willow Garage and a Consulting Professor at Stanford University.

2.2 Conference

2011 IEEE International Conference on Robotics and Automation (ICRA 2011, Shanghai)

2.3 Abstract

- Simultaneous Localization And Mapping (SLAM) or Bundle Adjustment (BA) can be phrased as **least squares optimization** of an error function that can be represented by a **graph**.
- g^2o[1] is an open-source C++ framework for optimization graph-based nonlinear error functions.

2.4 Keywords

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3 Introduction

3.1 Problem & Solution

Awide range of problems in robotics as well as in computer-vision involve the minimization of a non-linear error function that can be represented as a graph. The overall goal is to find the configuration of parameters or state variables that maximally explain a set of measurements affected by Gaussian noise.

A naive implementation using standard methods like Gauss-Newton, Levenberg-Marquardt (LM), Gauss-Seidel relaxation, or variants of gradient descent typically provides acceptable results for most applications. However, to achieve the maximum performance substantial efforts and domain knowledge are required.

3.2 Objective

A general framework for performing the optimization of nonlinear least squares problems that can be represented as a graph. This framework is named as g^2 (general graph optimization).

3.3 Formulation

3.4 Contributions

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4 Related Work

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5 Method Description

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6 Experiment Evaluation

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7 Conclusion

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[1] https://github.com/MengwenHe-CMU/g2o

8 Note