Abstract

SLAM algorithm is very important in the process of building maps for robots, the speed of building maps affects much from algorithms, hardware speed, image resolution. The integration on raspberry pi increases the flexibility of building a robot model, but the speed of raspberry pi is not high, so we propose a method of speeding up by building a vector model for the D435i camera and accelerating process on usb intel modivus.

References

1. Mur-Artal R, Montiel JMM, Tardós JD (2015) ORB-SLAM: a versatile and accurate monocular SLAM system.
2. Klein G, Murray DW (2007) Parallel tracking and mapping for small AR workspaces In: Proceedings of International Symposium on Mixed and Augmented Reality, 225–234.
3. Takafumi Taketomi, Hideaki Uchiyama & Sei Ikeda. Visual SLAM algorithms: a survey from 2010 to 2016
4. C. Mei, G. Sibley, M. Cummins, P. Newman, and I. Reid, “RSLAM: A System for Large-Scale Mapping in Constant-Time Using Stereo,” IJCV, vol. 94, no. 2, pp. 198–214, June 2010.
5. S. Williams, V. Indelman, M. Kaess, R. Roberts, J. J. Leonard, and F. Dellaert, “Concurrent Filtering and Smoothing: A Parallel Architecture for Real-Time Navigation and Full Smoothing,” IJRR, vol. 33, no. 12, pp. 1–47, 2014.
6. A. Ahmad, G. D. Tipaldi, P. Lima, and W. Burgard, “Cooperative Robot Localization and Target Tracking based on Least Squares Minimization,” in ICRA, 2013. [13] R. Reid and T. Braunl, “Large-scale Multi-robot Mapping in MAGIC ´ 2010,” RAM, 2011.
7. T. A. Vidal-Calleja, C. Berger, J. Sola, and S. Lacroix, “Large scale multiple robot visual mapping with heterogeneous landmarks in semistructured terrain,” RAS, vol. 59, no. 9, pp. 654–674, Sept. 2011.
8. R. C. Leishman, T. W. McLain, and R. W. Beard, “Relative Navigation Approach for Vision-Based Aerial GPS-Denied Navigation,” ICUAS, 2013.
9. B. Kim, M. Kaess, L. Fletcher, J. Leonard, A. Bachrach, N. Roy, and S. Teller, “Multiple Relative Pose Graphs for Robust Cooperative Mapping,” in ICRA, 2010.
10. A. Cunningham, V. Indelman, and F. Dellaert, “DDF-SAM 2.0: Consistent Distributed Smoothing and Mapping,” in ICRA, 2013.
11. H. Hirschmuller, P. Innocent, and J. Garibaldi, “Fast, unconstrained camera motion estimation from stereo without tracking and robust statistics,” ICARCV, vol. 2, pp. 1099–1104, 2002.
12. E. Olson, “AprilTag: A robust and flexible visual fiducial system,” in ICRA, 2011.
13. K. Schmid, F. Ruess, M. Suppa, and D. Burschka, “State Estimation for highly dynamic flying Systems using Key Frame Odometry with varying Time Delays,” in IROS, 2012.
14. C. Brand, M. J. Schuster, H. Hirschmuller, and M. Suppa, “Submap Matching for Stereo-Vision Based Indoor/Outdoor SLAM,” in IROS, Hamburg, Germany, 2015.
15. G. Grisetti, R. Kummerle, C. Stachniss, and W. Burgard, “A Tutorial on Graph-Based SLAM,” ITSM, vol. 2, no. 4, pp. 31–43, 2010.
16. G. H. Lee, F. Fraundorfer, and M. Pollefeys, “Robust Pose-Graph Loop-Closures with Expectation-Maximization,” in IROS, 2013. [24] F. Tombari, S. Salti, and L. Di Stefano, “A combined texture-shape descriptor for enhanced 3d feature matching,” in ICIP, 2011.

Index Terms

Computer Science

Algorithms

Keywords
SLAM, Modivus, D435i, LMeds