

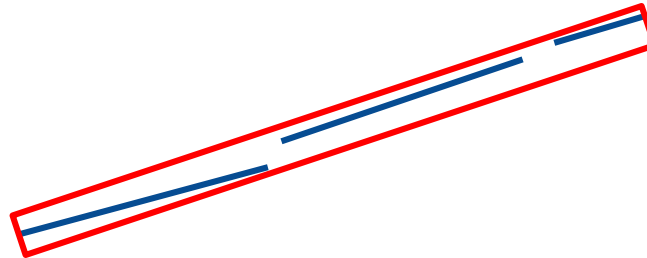
FSG: A statistical approach to line detection via fast segments grouping

Iago Suárez

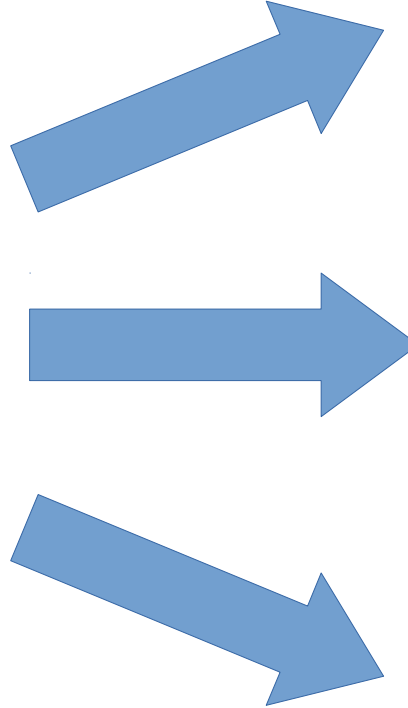
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José M. Buenaposada

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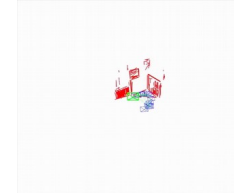
Segment Detection



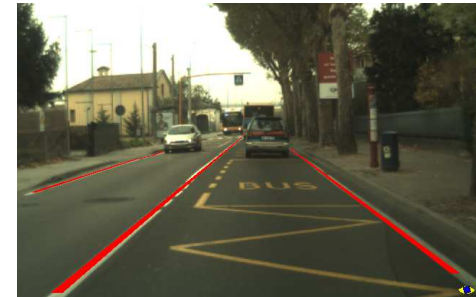
Structure from Motion [Hartley2003]



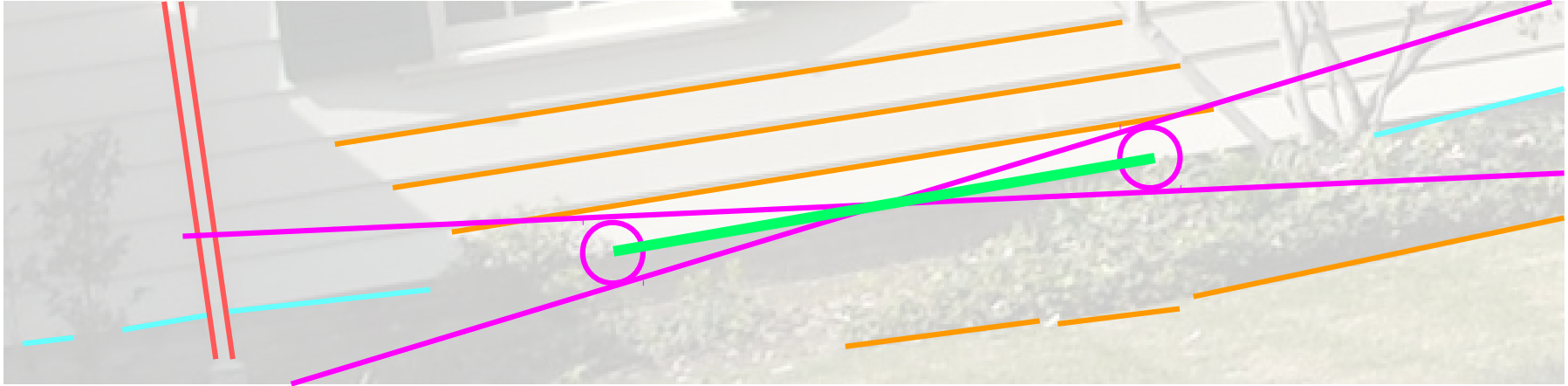
SLAM [Pumarola2017]



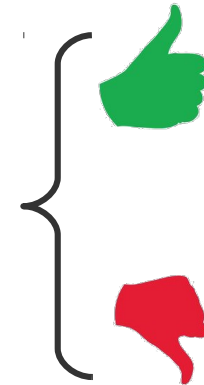
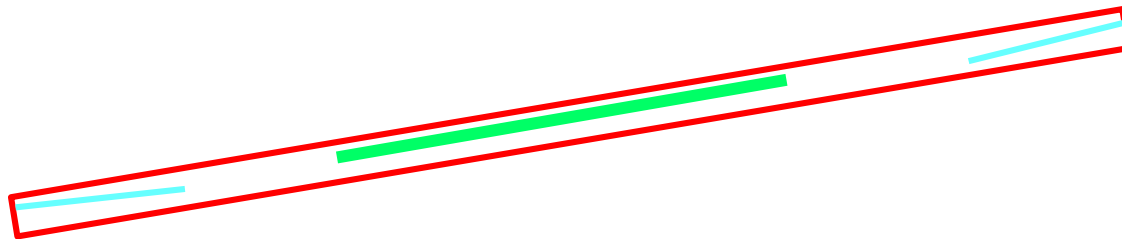
Lane Detection [Felisa2010]



1) Line hypotheses generation



2) Line Validation Criteria



1) Line hypotheses generation



1) Line hypotheses generation



1) Line hypotheses generation



1) Line hypotheses generation / 2) Line Validation Criteria

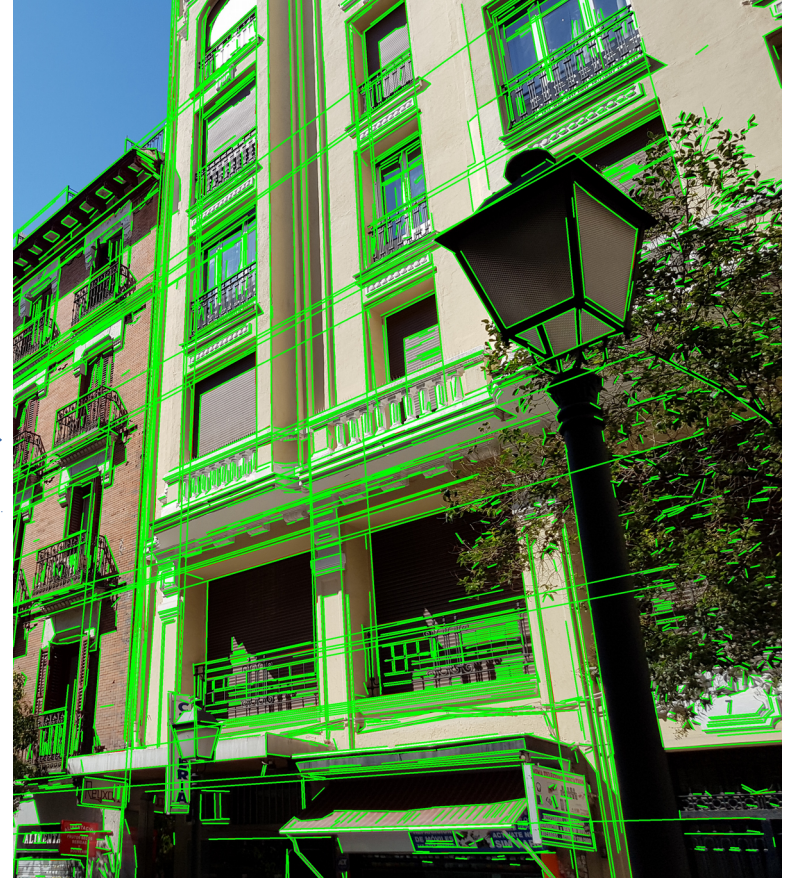


Initial Segments [VonGioi2010] [Akinlar2011]

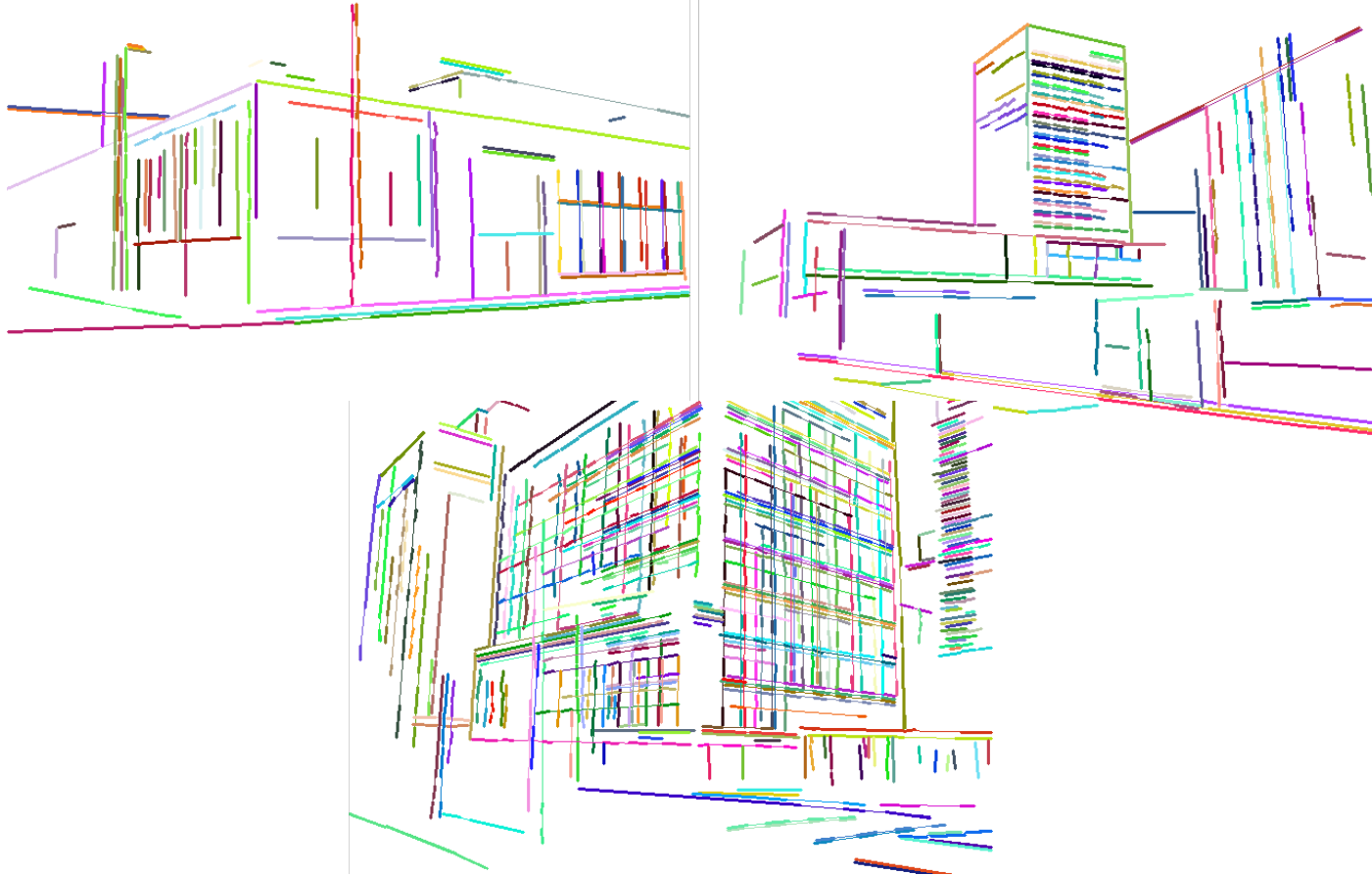


FSG

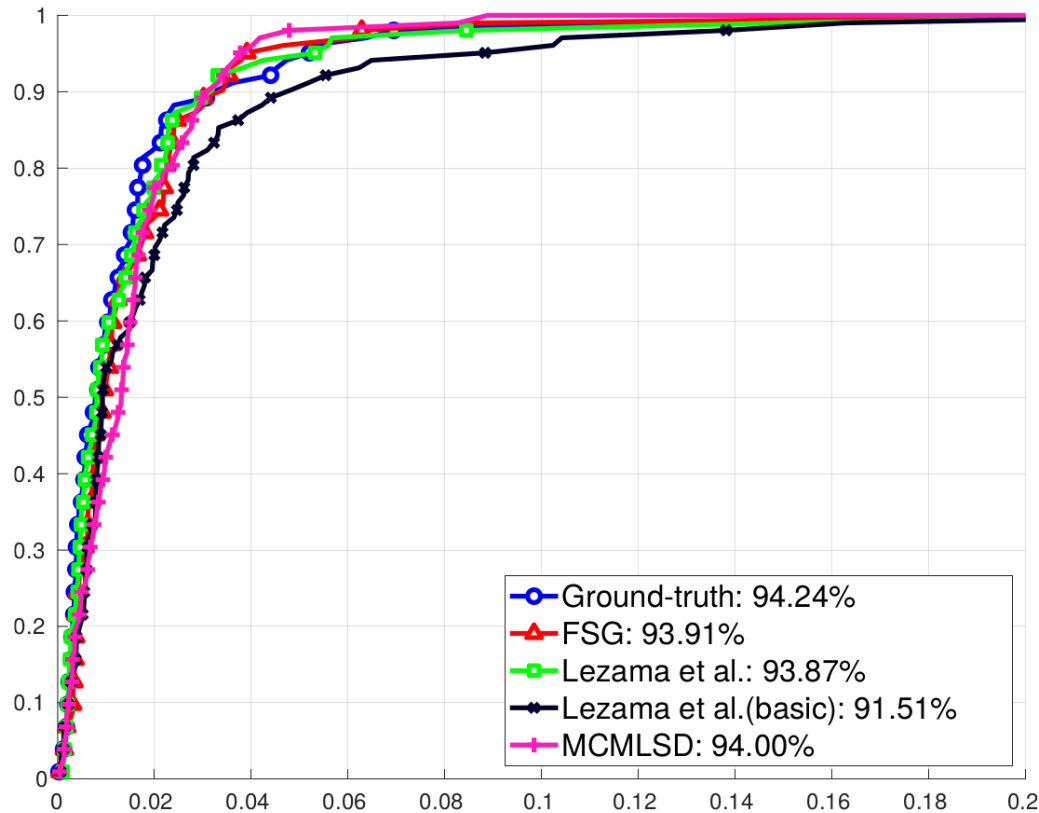
Resulting Lines



- Grafter Hand-Labeled Lines dataset:



- Segments Grouping at **6 ms/frame** on Samsung S8 with State of the Art accuracy in VPs estimation [Lezama2014]

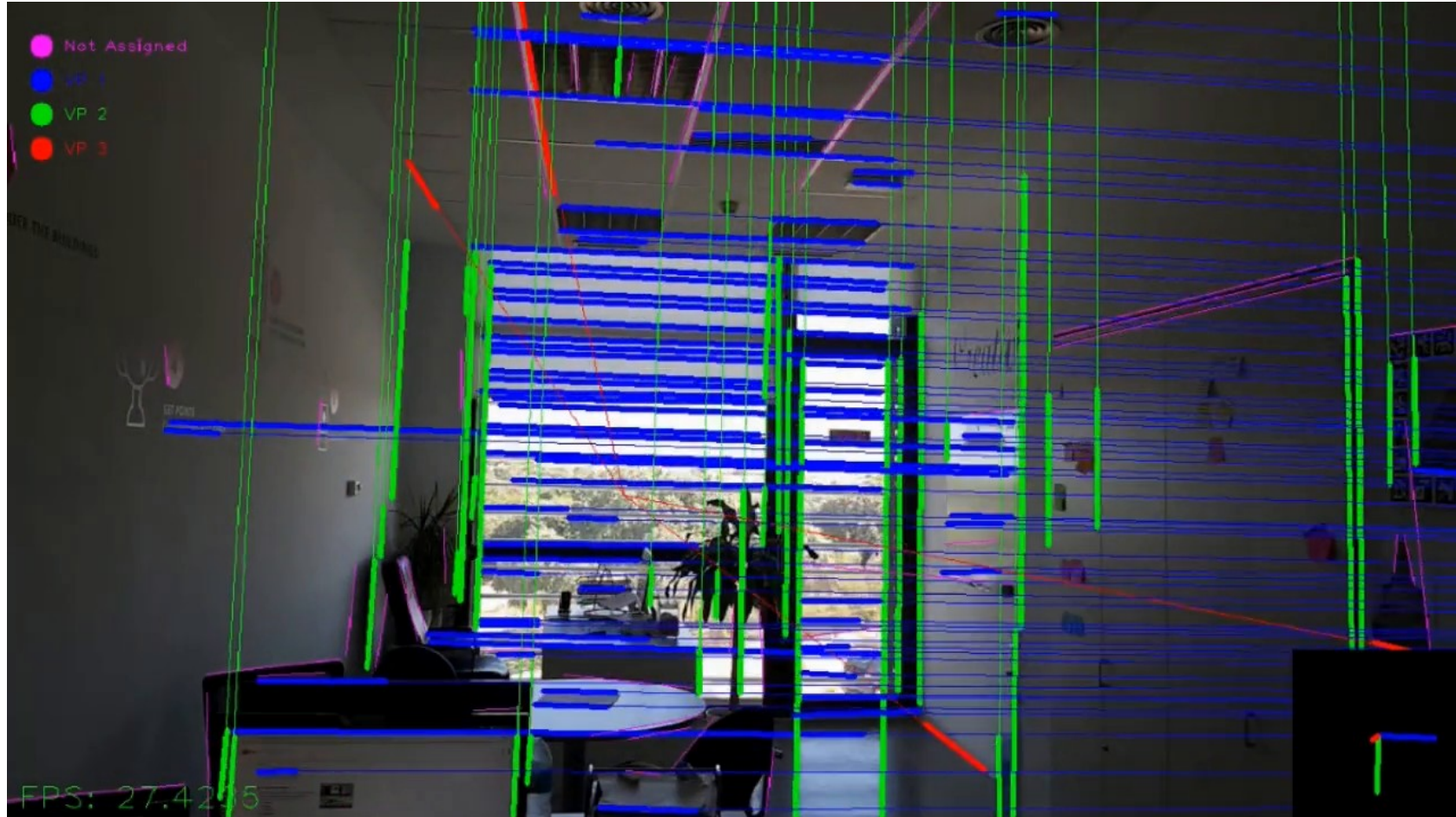


Local Segments Detectors	
LSD	EDLines
32 ms	6 ms

Segments Grouping Algorithms	
FSG	[Lezama2014]
6 ms	14961 ms

Global Segment Detectors	
PPHT	MCMLSD
22 ms	4686 ms

Demo:



References:

- **[Hartley2003]** Hartley, R., & Zisserman, A. (2003). Multiple view geometry in computer vision. Cambridge university press.
- **[Pumarola2017]** Pumarola, A., Vakhitov, A., Agudo, A., Sanfeliu, A., & Moreno-Noguer, F. (2017, May). PL-SLAM: Real-time monocular visual SLAM with points and lines. In Robotics and Automation (ICRA), 2017 IEEE International Conference on (pp. 4503-4508). IEEE.
- **[Felisa2010]** Felisa, M., & Zani, P. (2010, June). Robust monocular lane detection in urban environments. In Intelligent Vehicles Symposium (IV), 2010 IEEE (pp. 591-596). IEEE.
- **[VonGioi2010]** Von Gioi, R. G., Jakubowicz, J., Morel, J. M., & Randall, G. (2010). LSD: A fast line segment detector with a false detection control. IEEE transactions on pattern analysis and machine intelligence, 32(4), 722-732
- **[Akinlar2011]** Akinlar, C., & Topal, C. (2011). EDLines: A real-time line segment detector with a false detection control. Pattern Recognition Letters, 32(13), 1633-1642.
- **[Lezama2014]** Lezama, J., Grompone von Gioi, R., Randall, G., & Morel, J. M. (2014). Finding vanishing points via point alignments in image primal and dual domains. In Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (pp. 509-515).