

Adaptive retina-like 3D imaging based on MEMS mirror



Jie Cao*, Fanghua Zhang, Mingyuan Tang, Huan Cui, Guoliang Li, Qun Hao
Key Laboratory of Biomimetic Robots and Systems, Ministry of Education, Beijing Institute of Technology

INTRODUCTION

Limitation in scanning sensors :

- ☆ Low efficiency and large size of mechanical scanning components.
- ☆ Redundant information exists in image.

Bionic retina-like imaging :

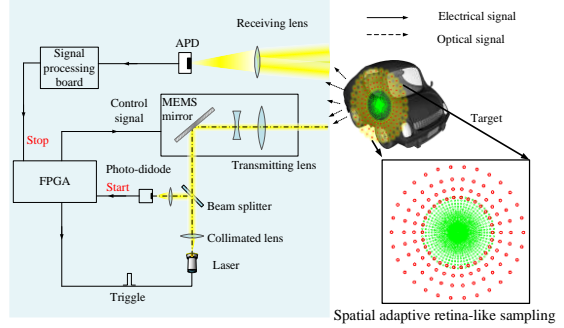
- ★ High resolution in the center of FOV and low resolution in perspective of FOV.
- ★ Fine properties of redundant compress and invariance of scaling and rotation imaging system.

Spatially adaptive retina-like sampling method :

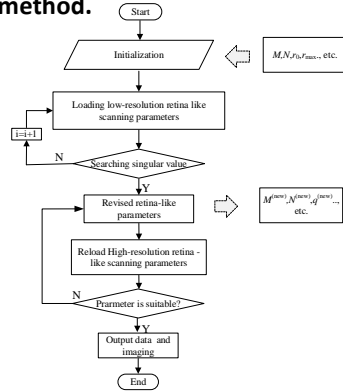
Sampling the data of interest with a small decreasing coefficient and the area of uninterested with a large decreasing coefficient

METHOD

Principle of the Lidar based on spatially adaptive retina-like sampling method.

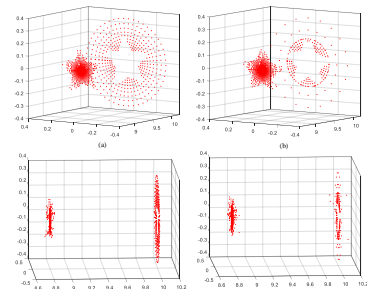
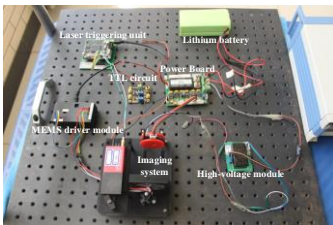


Workflow of the spatially adaptive retina-like sampling method.



EXPERIMENTS AND RESULTS

Laser scanning imaging system based on MEMS galvanometer.



Scatter plots of traditional retina-like scanning imaging and adaptive retina-like scanning imaging.

CONCLUSION

Inspired by the space-variant resolution of retina, we propose a spatially adaptive retina-like sampling method, which has more than one increasing coefficients. This spatially adaptive increasing coefficients can get more detail with less data volume with less sampling points number.