WEEK8 Project 2 & 3

Genghang Zhuang[1] Rihui Song[1]

[1]School of Data and Computer Science
Sun Yat-sen University

April 25, 2018

Outline

Project 2 & 3

- Project 2: Path Planning based on 3D LiDAR
- Project 3: Object Detection based on DVS

Future Work

- Every Week Work
- Final Presentation

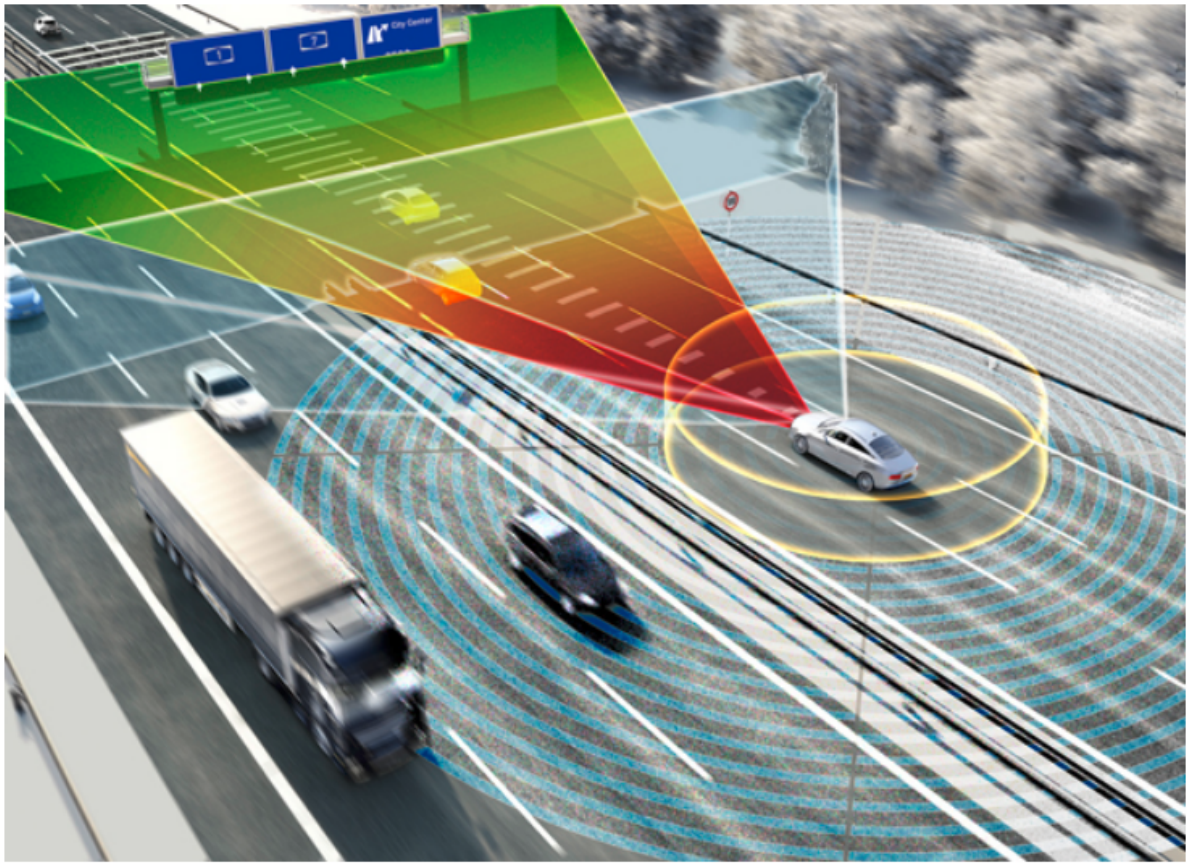
Outline

Background

3D LiDAR: News, 2017

NEWS >>

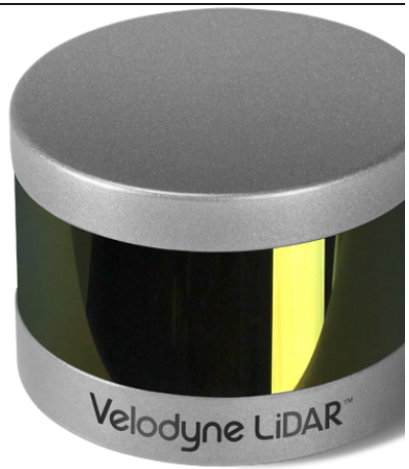
Continental develops next-generation 3D lidar environment model for automated driving



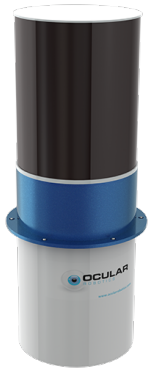
Continental is working on the next generation of an environment model that will deliver a seamless, true-to-life, 360° view of the entire vehicle's surroundings – a basic requirement for sophisticated advanced driver assistance systems (ADAS) and automated driving.

Background

3D LiDAR: Sensor



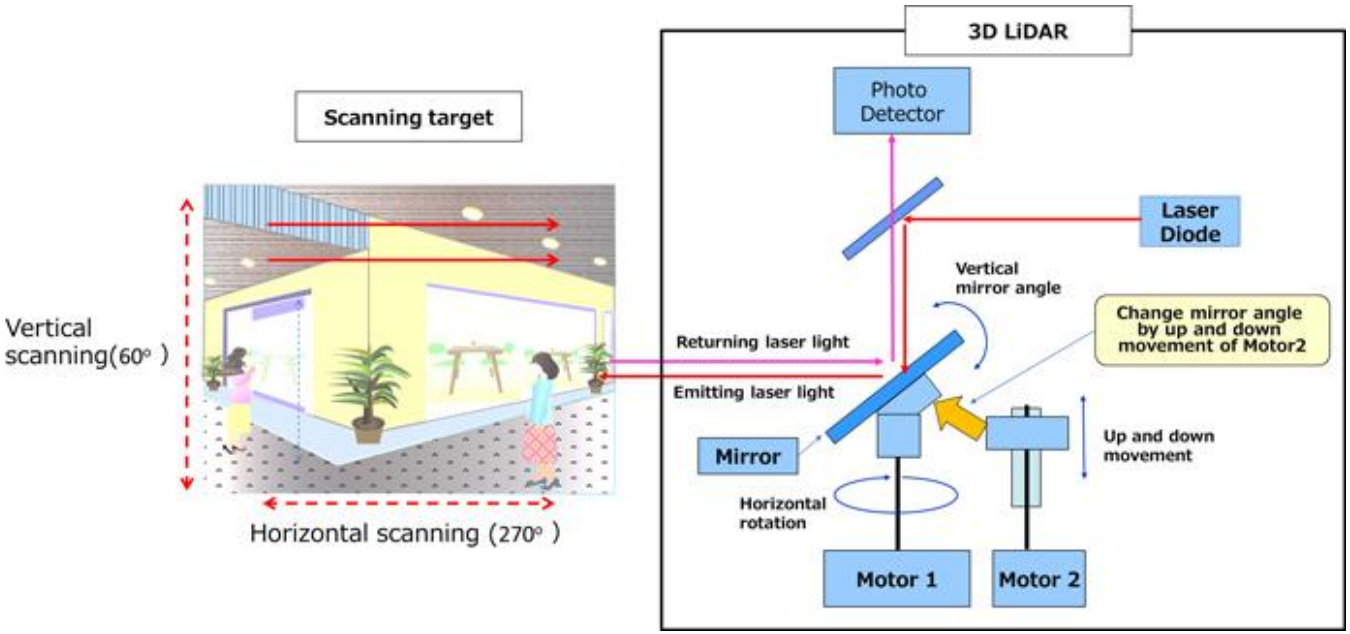
Velodyne LiDAR (Light Detection And Ranging)



RE08
3D LIDAR Scanner

Background

3D LiDAR: Work Principle



Background

3D LiDAR: Data-Point Cloud

Figure: out-door

Figure: in-door

sensor_msgs/PointCloud2 Message

Project 2: Path Planning based on 3D LiDAR

Challenges and Tips

Point Cloud Projection Bird view

Obstacle Detection height map

Path Planning Dijkstra

Outline

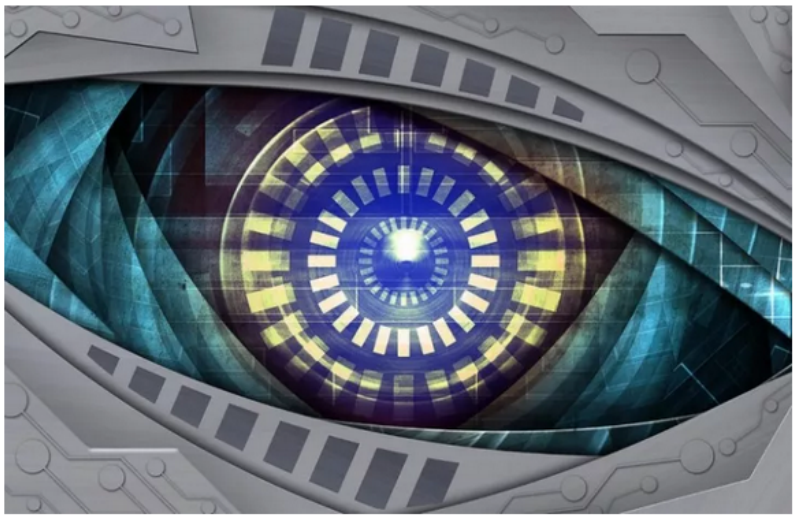
Background

DVS: News, 2018

从源头重塑整个机器视觉行业，这家中国公司要搞事情

李赓 雷锋网　2018-01-25

近日，雷锋网发布了一条公司的介绍，引起良好反响，具体内容如下：



Background

DVS: News, 2018

机器“眼球”的重生

原来体积庞大但有效信息很少的监控视频数据上百倍缩减;在纳秒级的物理极限捕捉影像的变化，甚至可以拍到子弹的轨迹;强光和弱光环境都能很好适应，甚至能够看清明亮霓虹灯中的广告字，在夜间也保持着相当的灵敏度。听起来似乎很玄幻，但已经有公司将它们转变为了现实。

Background

DVS: News, 2018

高效率

这款传感器的体系架构能够实现在焦平面实现像素的并行图像处理以及基于事件驱动的读出方式。

低数据速率

只有动态像素影响。传感器能捕捉超快速运动并且数据量减少了1000倍。

连续性

每一个沿运动轨迹线的像素点都能被捕捉收集，并在纳秒级分辨率记录信息。

快速响应

传感器速度不受传统的相机的概念限制，比如帧率和曝光时间。事实上，CeleX™没有曝光时间。

高动态范围

CeleX™的动态范围超过了120dB。它同样支持从月光到日光的宽光照范围。

兼容性

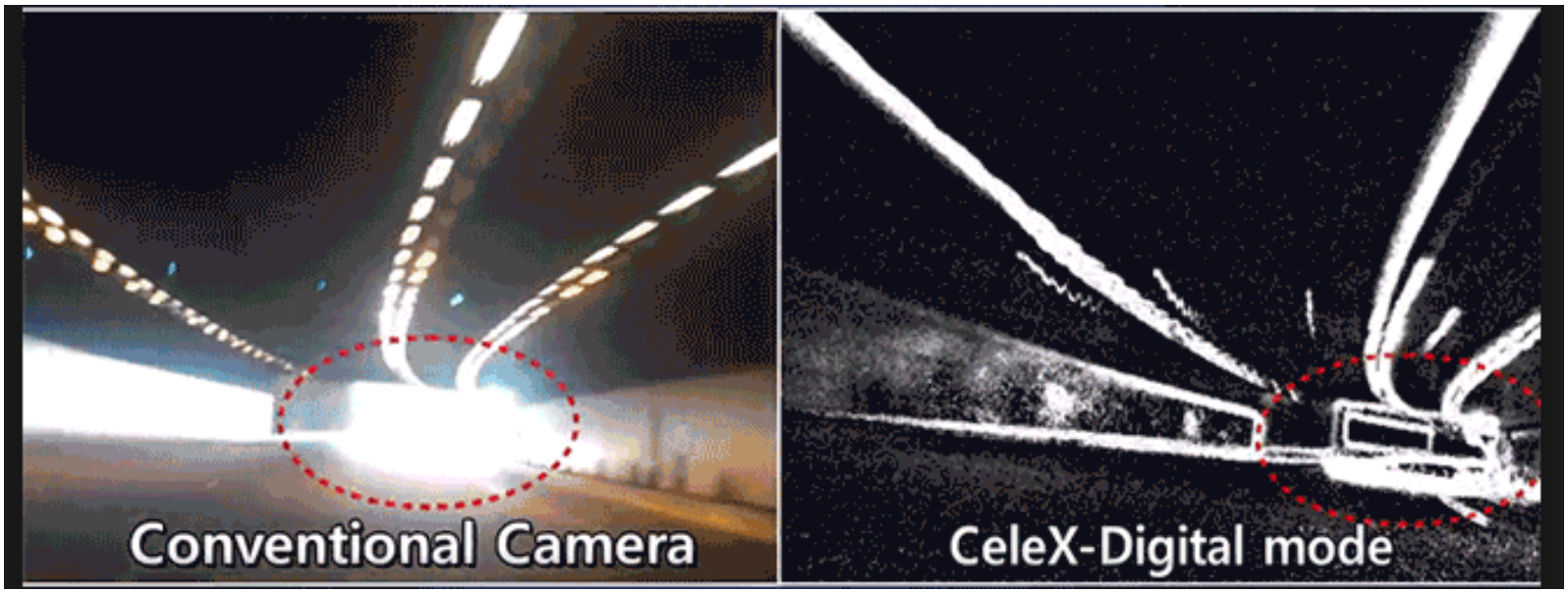
CeleX™与现有的图像传感器兼容，因此它能根据需求很容易生成全帧图片。

Background

DVS: Sensor

Background

DVS Data: Images



Project 3: Object Detection based on DVS

challenges and tips

Noise filtering Median filtering

Edge detection Canny edge detection

Object Detection Region filling

Outline

Every Week Work

- each group: 10 mins presentation
- TAs give some comments

Outline

Final Presentation

TBD...