

An Image-based Distance Estimation Method

Distance estimation method using images

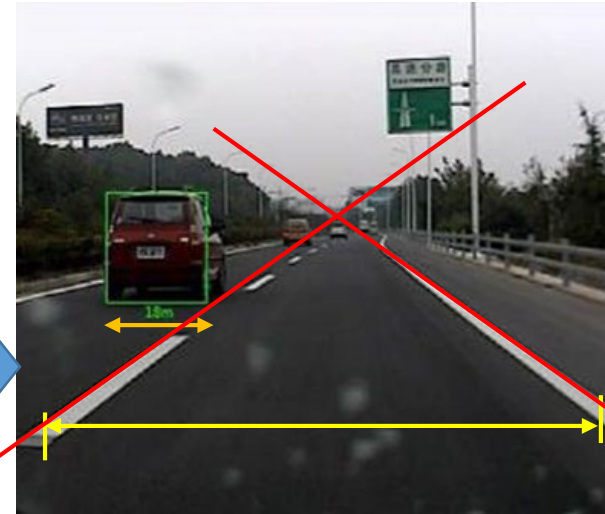
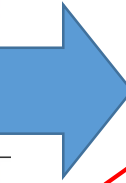
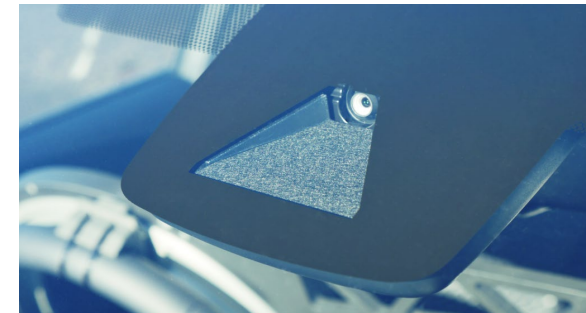
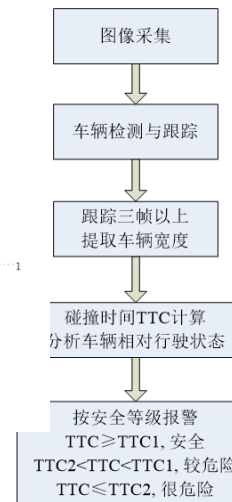
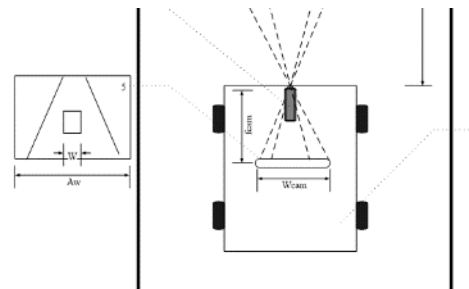
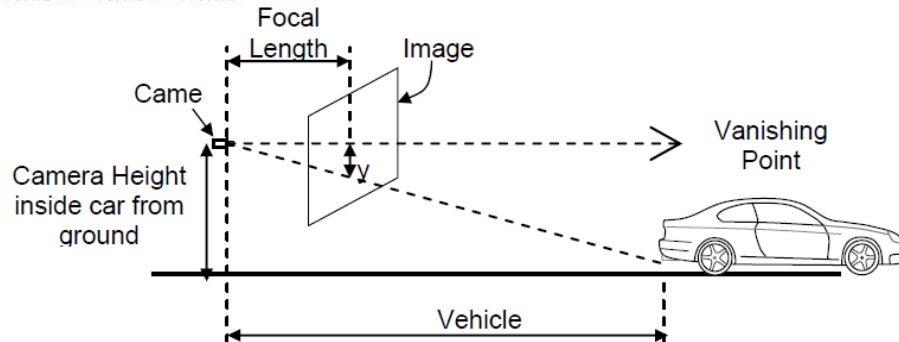


图 4.2 标定板参照图 (分别为向上翻、向下翻、向右翻、向左翻、
右上角斜翻、右下角斜翻、左上角斜翻、左下角斜翻)



- ITP/006/09AP
- Previously for distance estimation in ADAS applications
- Single camera inside moving car
- Vanish point / calibrations / intrinsic / extrinsic parameters

Patent related progresses

Title of Invention: 一種基於圖像的車輛防撞預警方法

Division: APAS

Types of patent: PRC new invention patent

Patent ref: 201110039667.9

Grant year: 2015

Funding reference code: ITP/006/09AP

- Forward collision detection on LRT (MTR)
- Public trial scheme (PSTS) for ADAS (ITT/005/12AP, ITT/006/12AP, ITT/016/17AP)
- ITF/2nd generation ADAS system (ITP/015/13AI)
- ITF/Signalized Intersection Collision Avoidance Platform (wip)



Application in Moving Platform

Portable device deployment at Light Railway applications for forward collision warning



Application in Moving Platform



Application in Moving Platform

False Alarm Rate Test (nighttime)

1/12/2014 Route 507

New improvement ...

Main features

- Roadside single camera
- Full-HD or higher resolution (pixel size sensitivity)
- Self calibration
- Adapt to various camera configurations
- Automatic measure of large statistical data with motion to generate heat map
- Deep learning model
- Estimation of object distance, speed & location

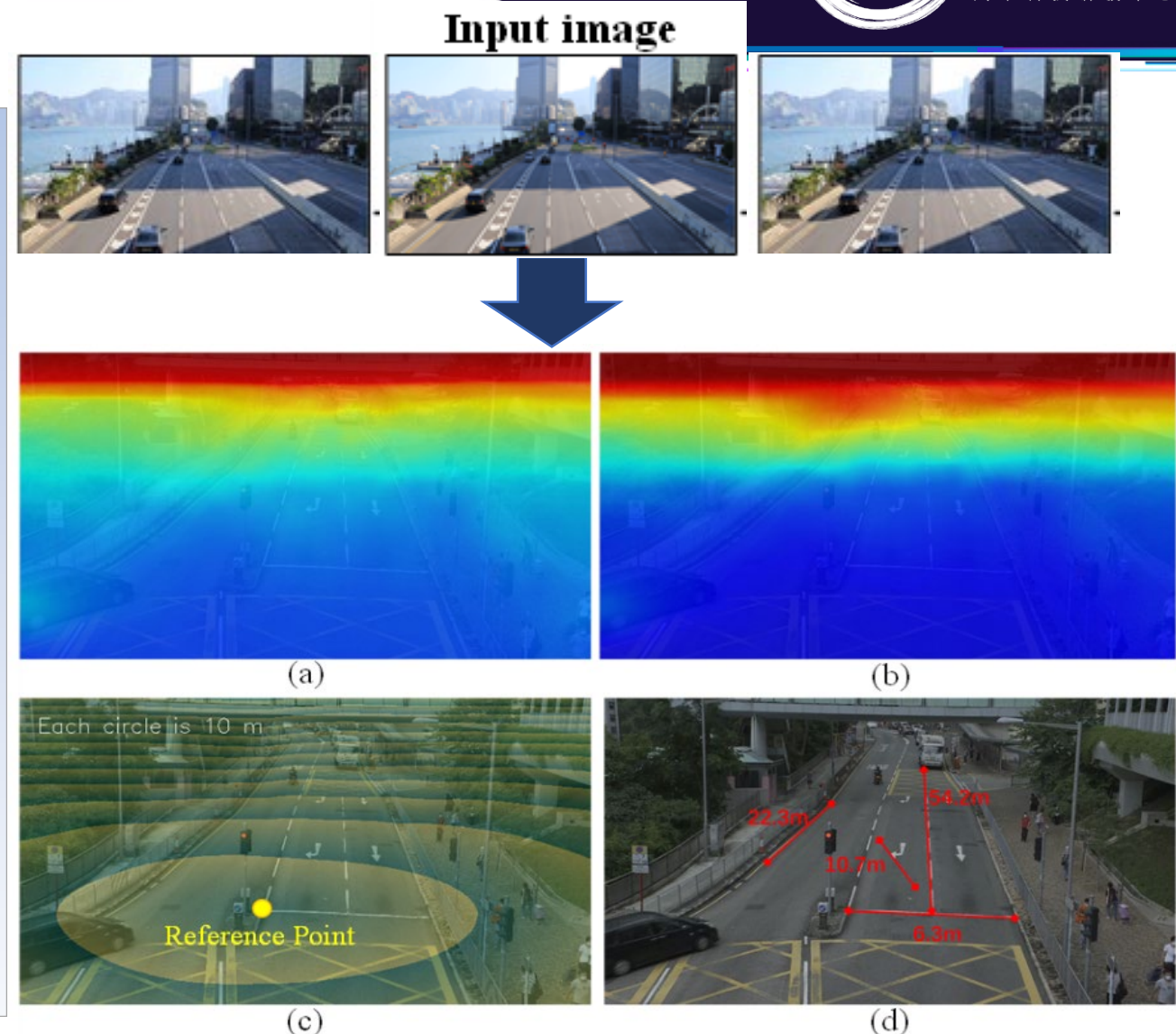
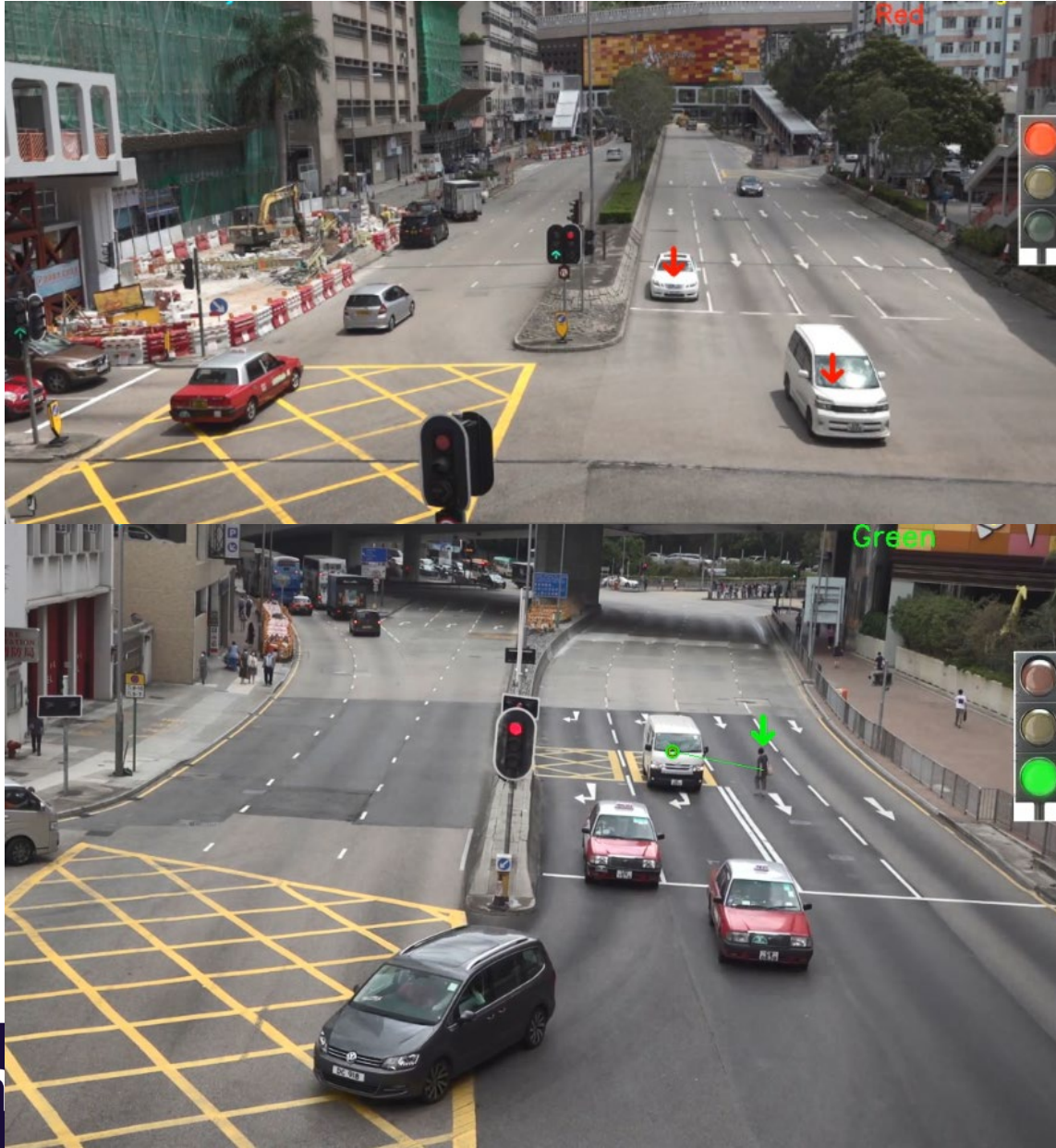


Figure 8. (a) and (b) are the estimated weight maps (in horizontal and vertical directions separately) by the proposed approach. (c) visualize distances to the reference point, where each circle denotes ten meters. (d) we can use the weight map to calculate the distance between any two points on the road.

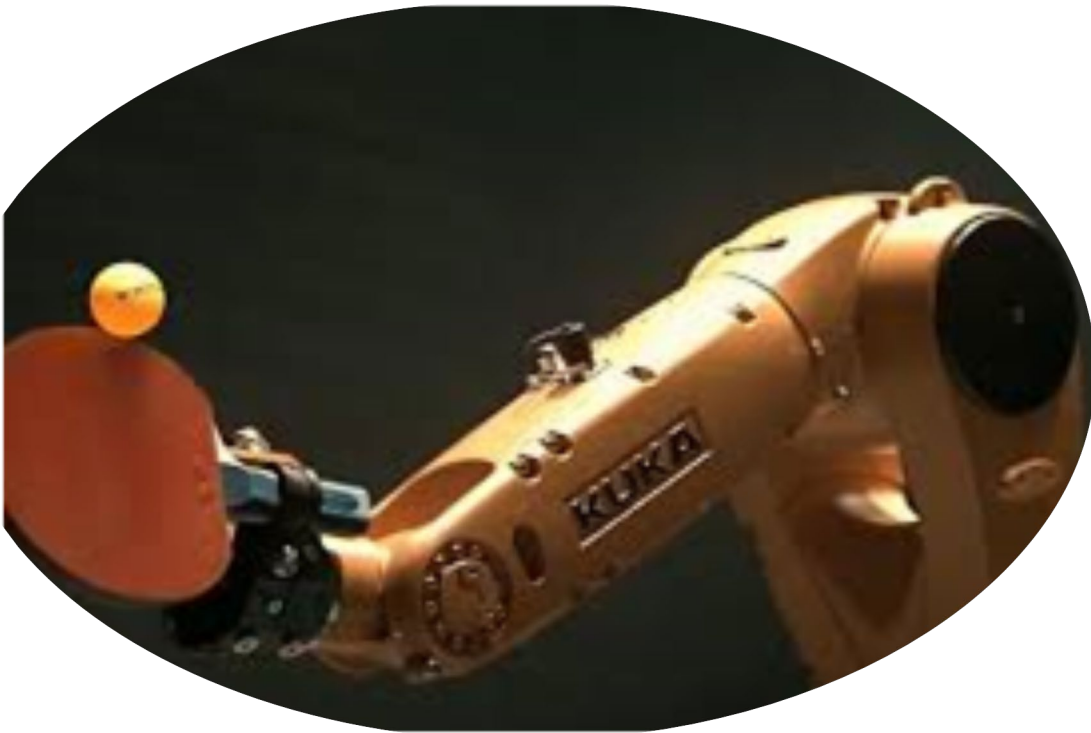
Application at traffic scene

Main features

- Automatic distance map by traffic flow
- Estimate vehicle speed and lane position
- Estimate vehicle time-to-stop-line
- Predict tendency of red-light violation
- Predict time-to-collision between vehicle and violating pedestrians
- Enhance road safety



Potential Applications



- Automotive & smart city applications
 - Smart traffic applications
 - ADAS & image-based autonomous applications
- Smart manufacturing / robotic applications
 - Robotic arm
 - Objects moving with variable / undetermined speed
 - Surveying
- What's more?

Further Discussion

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Thank you