2D License Plate Recognition based on Automatic Perspective Rectification

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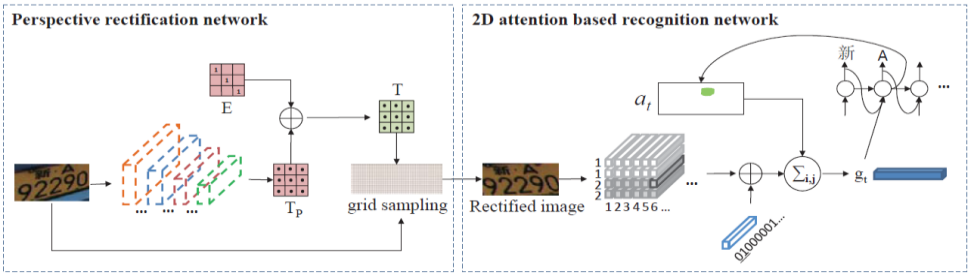
Introduction

Chinese license plates (LPs) include many kinds, varying in background color, length of numbers and character arrangement. The numbers consist of Latin letters, digits and Chinese characters. The diversity of Chinese LPs is a challenge to LPR. In addition, the plates in the images are likely to be distorted due to shooting angles, which directly affect the recognition results.

Motivation

- Existing LPR methods either rely on character segmentation or can only recognize LPs with no or minimal deformations.
- Existing irregular text recognition methods are designed for arbitrary-shaped text, which can not achieve good effectiveness in LPR.
- LPs can only generate perspective deformations in the images because to the property of the rigid body.

Proposed Method



The License plate alig - nment based on PRN

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Features concatenation based on location-aware attention

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LP recognition based on 2D-attention

Perspective rectification network (PRN) is proposed to predict the perspective transformation T and generate the rectified LP image.
2D attention based recognition network identify both single-line and double line LPs with location-aware attention.

Experimental Results

Results of PRN:

Rectification	Recognition	CLPD	T-CCPD
NULL	2D-Attn	98.12%	72.72%
TPS[10]		98.33%	80.78%
MORN[11]		98.22%	74.27%
PRN (ours)		**98.5%**	**82.2%**

Experimental Results

Results of our model:

Rect.	Recognition	CLPD	T-CCPD	D-SYSU
-	1D-Attn [10]	97.4%	59.7%	87.72%
	2D-Attn [34]	98.12%	72.72%	93.8%
LPRNet[8]		97.3%	67.41%	-
Yu [18]		94.5%	68.4%	89.1%
Baseline [10]		97.71%	79.26%	90.4%
Ours		**98.7%**	**83.1%**	**94.2%**

Conclusions

- We have proposed a novel 2D LPR method based on perspective rectification
- We have improved the recognition performance of LPs with heavy deformations

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