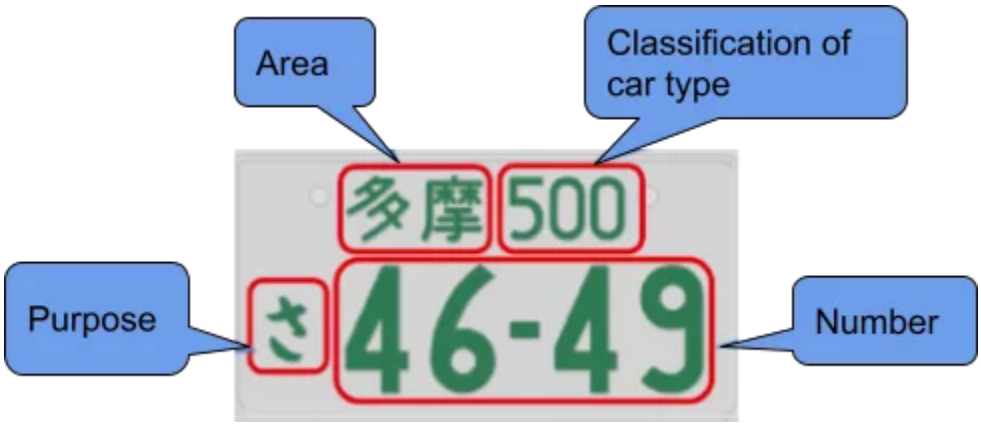
SUNDAY JUNE 27

Special Features of Japanese License plates

The Japanese license plate consists of 4 main sub portions . The following figure depicts each of the sub regions.



Also different color license plates indicate the engine capacity of the vehicle . The following figure describes different colors and corresponding engine capacity.

The top line contains the name of the issuing office and a vehicle class code. The bottom line contains a hiragana character and a four-digit serial number divided into two groups of two digits separated by a hyphen. Any leading zeros are replaced by centered dots.

Characteristics Derived from Plate


```
 area_label:  群馬
purpose_label:  ま
vehicle type:  Yellow: Less than 1000cc, for private
area_code_txt:  590
number_txt: 18
```

Japanese Place Names 日本の地名

Akita 秋田
Aomori 青森
Asahikawa 旭川
Ashibetsu (Hokkaido) 芦別
Ashikaga 足利
Ashiya 芦屋
Atami 熱海
Atsugi 厚木
Beppu 別府
Chiba 千葉
Chigasaki 茅ヶ崎
Chitose 千歳
Chofu 調布
Daito 大刀
Fuchu (Tokyo) 府中
Fuji 富士
Fujioka 藤岡
Fujisawa 藤沢
Fukuchiyama 福知山
Fukui 福井
Fukuoka 福岡

Fukushima 福島
Fukuyama 福山
Funabashi 船橋
Furano 富良野
Gifu 岐阜
Ginowan (Okinawa) 宜野湾
Goshogawara 五所川原
Gushikawa (Okinawa) 具志川
Hachinohe 八戸
Hachioji 八王子
Hakodate 函館
Hakone 箱根
Hakuba 白馬
Hamamatsu 浜松
Hikone 彦根
Himeji 姫路
Hino 日野
Hiratsuka 平塚
Hirosaki 弘前
Hiroshima 広島
Ibaraki 茨城
Ibusuki 指宿
Ichihara 市原
Ichikawa 市川
Ichinomiya 一宮
Ikeda 池田
Ikoma 生駒
Imabari 今治
Imari 万里
Ise 伊勢
Itami 伊丹
Izumo 出雲
Kagoshima 鹿児島
Kakogawa 加古川
Kanazawa 金沢
Karuizawa 軽井沢
Kasugai 鎹
Kasukabe 春日部
Kawagoe 川越
Kawaguchi 川口
Kawasaki (Kanagawa) 川崎
Kirishima 霧島
Kiryu 桐生
Kishiwada 岸和田

Kita-Kyushu 北九州
Kobe 神戸
Kochi 高知
Kofu 国府
Koriyama 郡山
Koshigaya 越谷
Kumagaya 熊谷
Kumamoto 熊本
Kurashiki 倉敷
Kure 呉
Kurume 久留米
Kusatsu 草津
Kushiro 釧路
Kyoto 京都
Machida 町田
Maebashi 前橋
Matsubara 松原
Matsue 松江
Matsumoto 松本
Matsuyama 松山
Memanbetsu 女満別
Mitaka 三鷹
Mito 水戸
Miyazaki 宮崎
Mobara 茂原
Morioka 盛岡
Muroran (Hokkaido) 室蘭
Nagano 長野
Nagaoka 長岡
Nagasaki 長崎
Nagoya 名古屋
Naha 那覇
Nara 奈良
Narita 成田
Nasu 那須
Niigata 新潟
Niihama 新浜
Nikko 日光
Niseko ニセコ
Nobeoka 延岡
Noboribetsu (Hokkaido) 登別
Numazu 沼津
Obihiro 帯広
Odawara 小田原

Ogaki 大垣
Oita 大分
Okayama 岡山
Okazaki 岡崎
Okinawa 沖縄
Omiya 大宮
Osaka 大阪
Otaru 小樽
Saga 佐賀
Saitama 埼玉
Sakai 堺
Sapporo 札幌
Sasebo 佐世保
Sendai 仙台
Seto 瀬戸
Shimizu 清水
Shimonoseki 下関
Shizuoka 静岡
Suzuka 鈴鹿
Tachikawa (Tokyo) 立川
Takamatsu 高松
Takaoka 高岡
Takarazuka 宝塚
Takasaki 高崎
Takatsuki 高槻
Takayama 高山
Tateshina-Kogen 蓼科高原
Toba 鳥羽
Tokushima 徳島
Tokyo 東京
Tottori 鳥取
Towada 十和田
Toyama 富山
Toyohashi (Aichi) 豊橋
Toyota 豊田
Tsu (Mie) 津
Ube 宇部
Uji 宇治
Unzen 雲仙
Urasoe 浦添
Urawa 浦和
Utsunomiya 宇都宮
Wakayama 和歌山
Wakkanai 稚内

Yakushima 屋久島
Yamagata 山形
Yamaguchi 山口
Yao 八尾
Yokkaichi 四日市
Yokohama 横浜
Yokosuka (Kanagawa) 横須賀
Yonago 米子
Yunohira 湯平
Yuzawa 湯沢
Zushi 逗子

Vehicle codes details

- **11 (10-19) on a white on green plate stands for commercial use trucks over 2000 cc.**
- **33 (30-39) on a green on white plate stands for private use cars over 2000 cc.**
- **45 (40-49) on a green on white plate stands for private use 4 wheel trucks between 661 and 2000 cc.**
- **57 (50-59) on a white on green plate stands for private use 4 wheel cars between 661 and 2000 cc.**
- **71 (70-79) on a white on green plate stands for 3 wheel cars up to 2000 cc.**
-
- **100 (100-199) on a green on white plate stands for private use trucks over 2000 cc.**
- **200 (200-299) on a white on green plate stands for private use buses over 2000 cc.**

- **300 (300-399) on a green on white plate stands for private use cars over 2000 cc**
- **400 (400-499) on a green on white plate stands for private use 4 wheel trucks between 661 and 2000 cc.**
- **500 (500-599) on a green on white plate stands for private use 4 wheel cars between 661 and 2000 cc.**
- **800 (800-899) on a green on white plate stands for special vehicles.**
- **900 (900-999) on a white on green plate stands for private assorted vehicles.**

Plate color

- **White bg Green text :- private use 4 wheel**
- **Green bg white text :- commercial special vehicles**
- **Yellow bg Black text :- private use 4 wheelers**
- **Black bg yellow text :- commercial use 4 wheel**

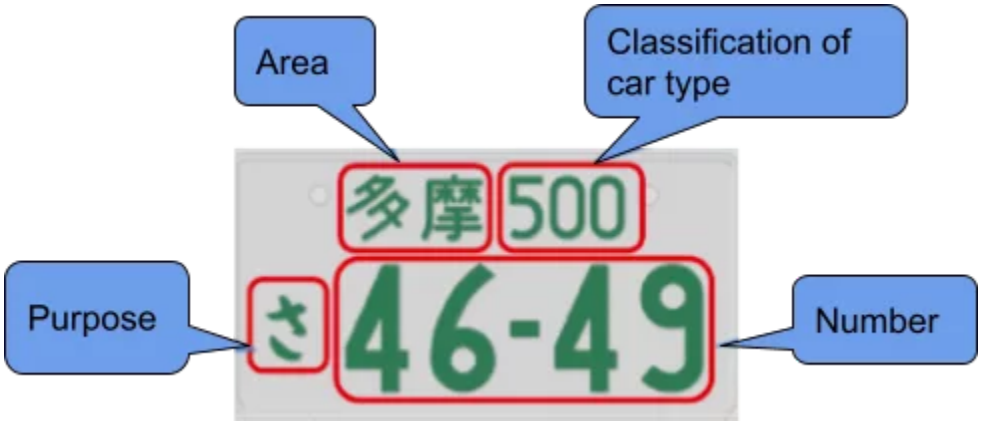
#e7b716

AREA (Hirangana Characters)

ほ はねせ さ ひろま ぬ いうえ お か きくけ こ し す そた ち つ て
と な に の ふ へ み む め も や ゆ よ ら り る れ わ を

Fonts used :- Hirangana, Kanji characters,

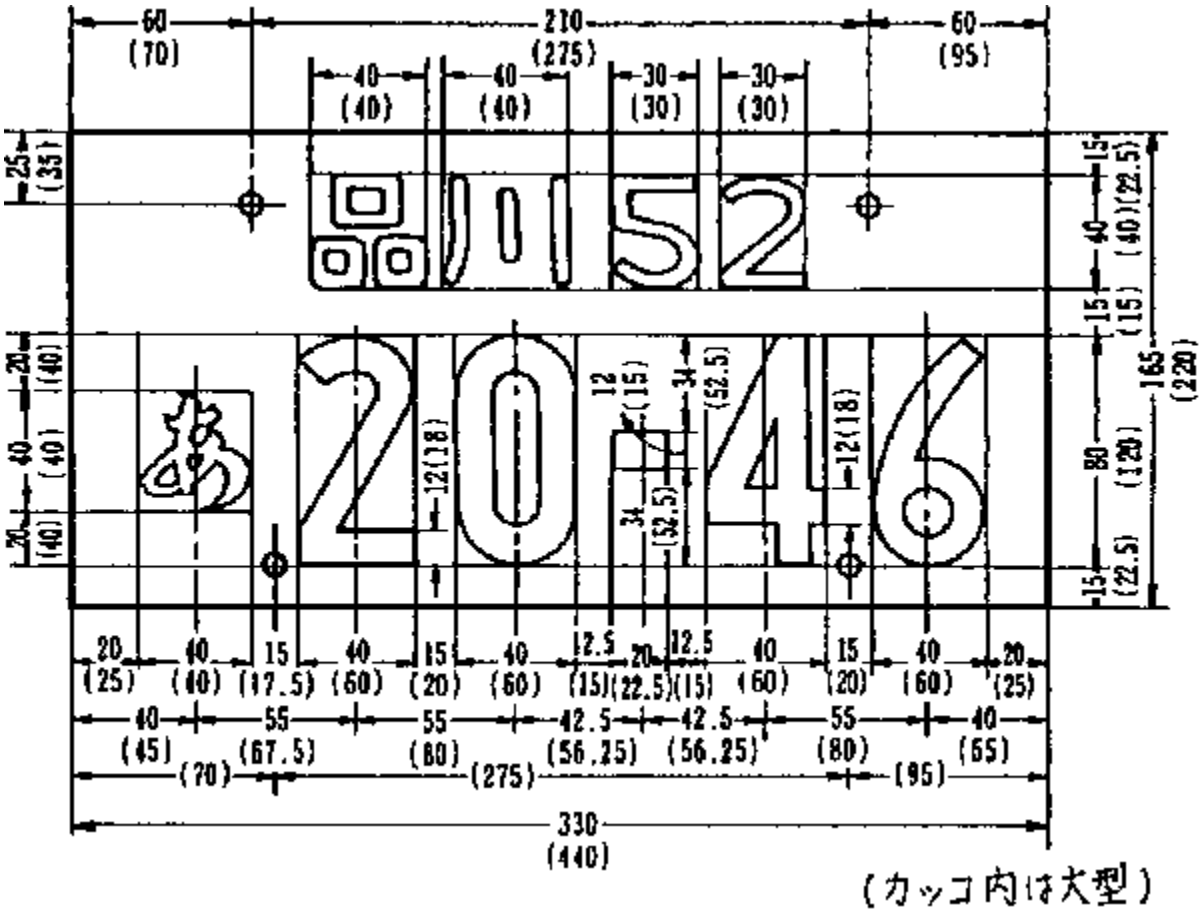
Japanese Authentic Size = 2:1 330:165



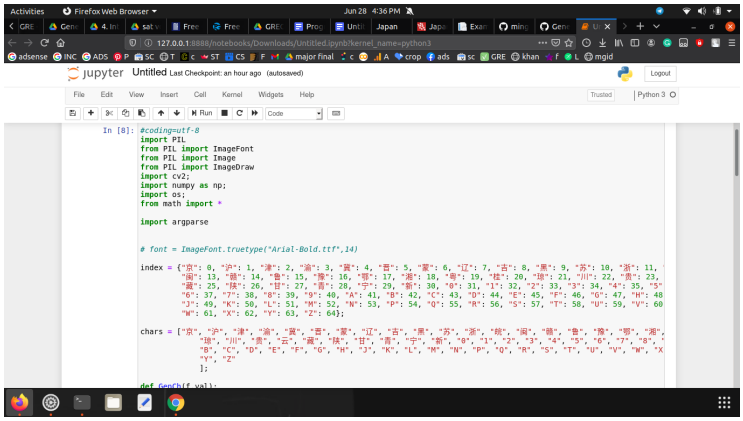
We have collected all the details of vehicles plates till now (exceptional & Special cases not included)

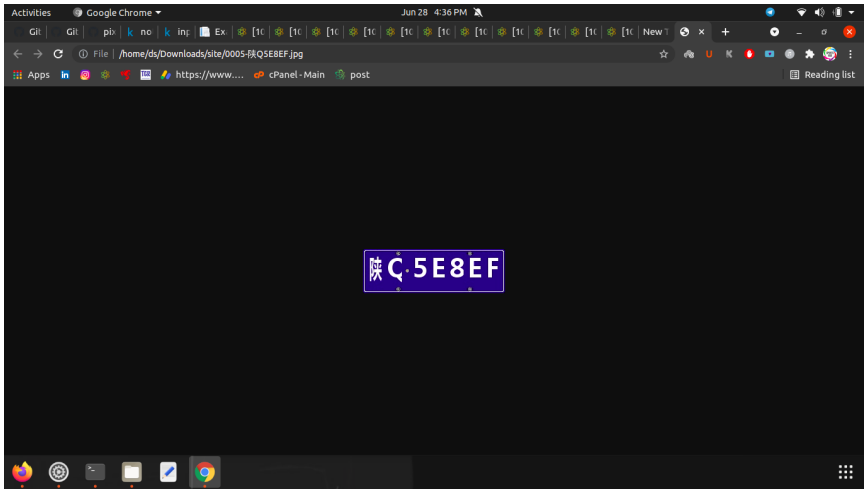
MONDAY JUNE 28

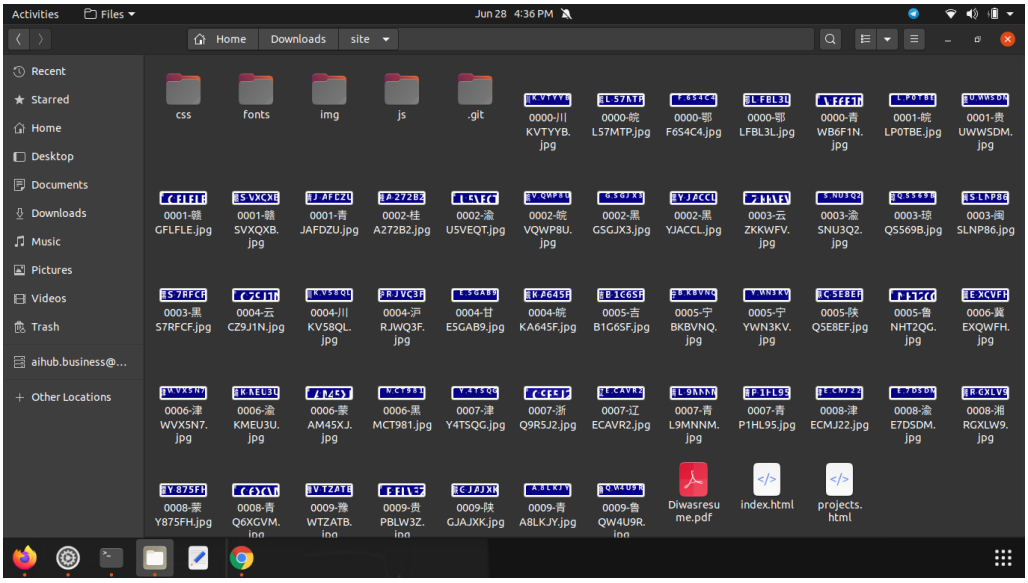
- Created font for Number plate



I am executing the codes from github today :

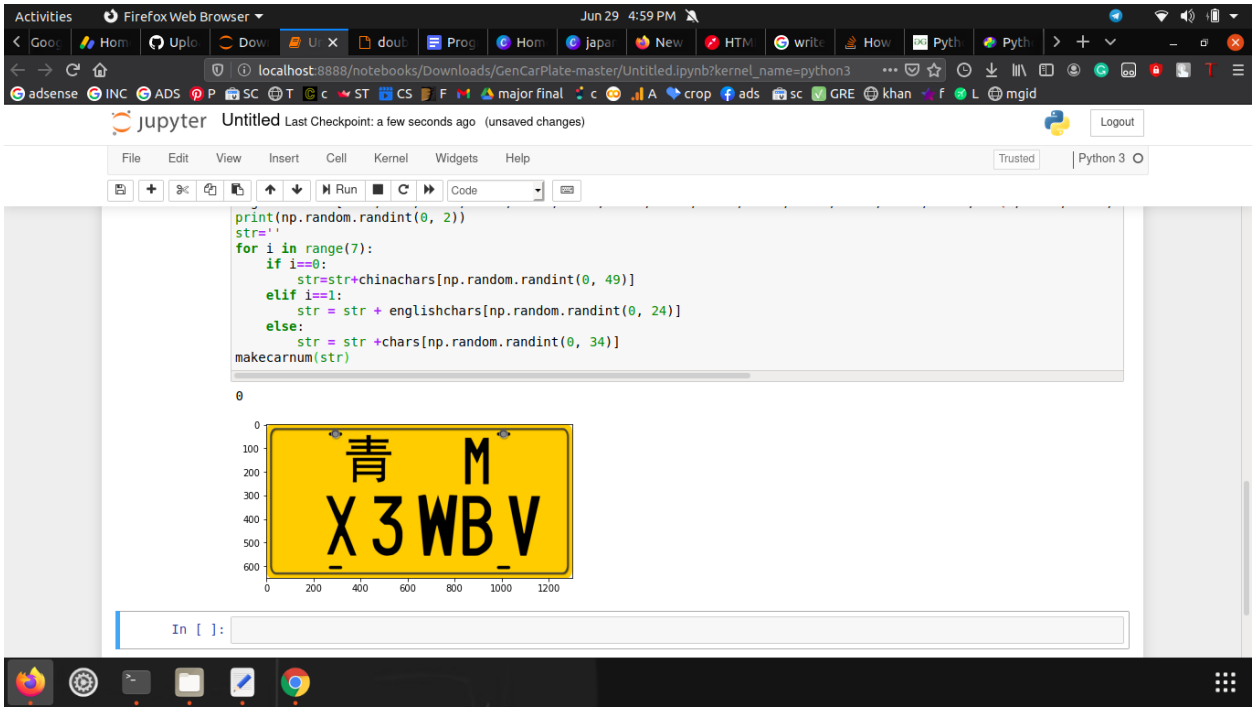






TUESDAY JUNE 29

Testing Dual rowed Plate



WEDNESDAY JUNE 30

WORKED ON FONT & PLATE CHARACTERS DIMENSIONS

THURSDAY JULY 01

Dataset Generation

FAKE DATASET

REAL DATASET

FRIDAY JULY 02

Worked on some noise addition model (still in progress)

SUNDAY JULY 04

Paper 1 : We apply computer graphic scripts and Generative Adversarial Networks to generate and augment a large number of annotated, synthesized license plate images with realistic colors, fonts, and character composition from a small number of real, manually labeled license plate images. Generated and augmented data are mixed and used as training data for the license plate recognition network modified from DenseNet.

The main difficulties are different license plate fonts and colors, character distortion caused by the image capture process and non-uniform illumination, and low-quality images caused by occlusion or motion blur.

In this paper, we propose a license plate recognition system, in which we cope with challenges such as low light, low resolution, motion blur, and other harsh conditions. Fig. 1 shows the license plates which can be correctly recognized by our proposed method. From top to bottom are the license plate images affected by the shooting angle, uneven illumination, low resolution, detection error and motion blur.

Data augmentation plays a larger role in accuracy improvement when there are many labeled license plates but when the number of labelled license plates is small, data generation more significantly increases accuracy.

Methods that depend on segmentation first preprocess the license plate image and then segment individual characters through image processing. After this, each character is classified

by a convolutional neural network. This method is very dependent on the accuracy of text segmentation, and the recognition speed is slower.

A recognition method that does not require segmentation is proposed by Li et al.It is composed of a deep convolutional network and a Long Short-Term Memory(LSTM), where the deep CNN is directly applied for feature extraction, and a bidirectional LSTM network is applied for sequence labeling.

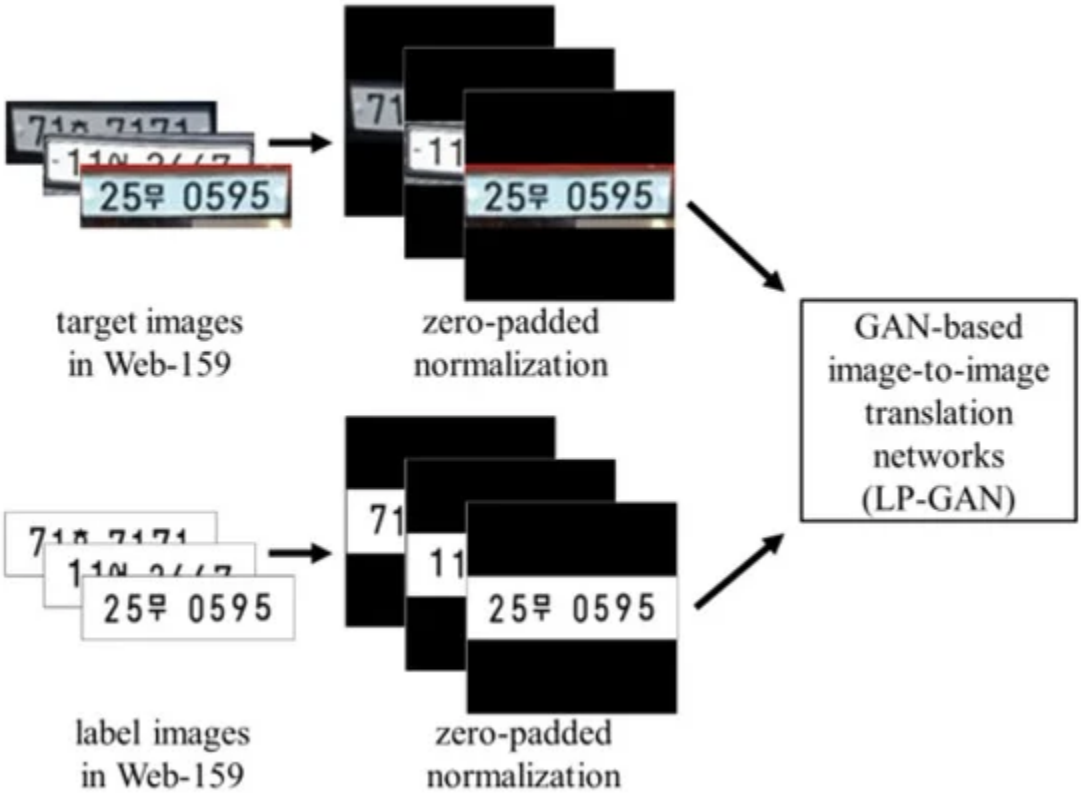
Therefore, [18] applies CycleGAN to convert the style of license plate generated by the script into a real license plate, which can greatly reduce the gap between the generated image and the real image. We apply data generation and data augmentation methods at the same time, and use the data generated by different methods directly as the training set for the recognition network. Therefore we need very little real data.

CycleGAN

CycleGAN [21] learns to translate an image from a source domain X to a target domain Y in the absence of paired examples. Our goal is to train a mapping relationship G between the script license plate domain X and the real license plate domain Y. CycleGAN contains two mapping functions G : X Ñ Y and Y Ñ X, and associated adversarial discriminators DY , DX.

Fig. 2. Three data generation methods (a)Examples of license plates generated by OpenCV scripts. (b)Examples of license plates generated by CycleWGAN. (c)Examples of license plates generated by CycleWGAN-GP.

JULY 5



https://www.mdpi.com/2076-3417/10/8/2780/htm

----- END OF PROJECT UNDER LOGICTRONIX. WILL BE CONTINUED AS SELF RESEARCH PROJECT -----