

AI Engineer Take-Home Challenge

Background

AMP is a rapidly growing technology company that provides innovative solutions to car wash operators across the country. As we continue to expand our platform capabilities, we're exploring automated vehicle identification systems to enhance our customer experience and operational efficiency.

You've been tasked with developing a prototype AI system that can automatically read license plates from images captured at car wash entrances. This system would help streamline the customer experience by automatically identifying vehicles and associating them with customer accounts.

Challenge Overview

Your challenge is to build an end-to-end license plate recognition system that can extract license plate numbers from vehicle images.

Dataset

For this challenge, you should use publicly available datasets such as:

- **Chinese City Parking Dataset (CCPD):** Large-scale license plate dataset
- **Application-oriented License Plate (AOLP) Dataset:** Taiwanese license plates
- **OpenALPR Benchmark Dataset:** Various international license plates
- **Any other of your choice**

The Challenge

Build a complete system that takes a vehicle image as input and outputs the license plate number(s) detected in the image.

Your solution should:

1. Process the provided training images to understand the problem
2. Develop an approach to locate and read license plates
3. Create a working system that can process new images
4. Handle various real-world conditions present in the dataset

Sample Output Format

Your system should output results in JSON format. Here is an example of what the format could look like (feel free to adjust or expand on this):

```
{  
  "image_name": "vehicle_001.jpg",  
  "license_plates": ["ABC123", "XYZ789"],  
  "confidence": [0.85, 0.92],  
  "processing_time_ms": 250  
}
```

Deliverables

1. Working Code

- Complete implementation that processes the training images
- Inference script that can process new images
- Requirements file with all dependencies

2. Documentation

- **Technical Report** (1-2 pages) explaining:
 - Your approach and methodology
 - Technologies used
 - Limitations and potential improvements

3. Results

- Process training images and provide results
- Include sample outputs showing successful detections
- Discuss any failure cases or limitations you observed

Evaluation Criteria

Technical Implementation

- Problem-solving approach: How you tackled the challenge without annotations
- Code quality: Clean, well-structured, maintainable code
- Solution robustness: How well your system handles various image conditions
- Innovation: Creative approaches to solving the problem

Results and Analysis

- Performance: Quality of license plate detection and recognition
- Coverage: How many images your system successfully processes
- Error analysis: Understanding of when and why your system fails
- Validation: How you assessed your system's performance

Documentation and Communication

- Technical writing: Clear explanation of methodology and results
- Code documentation: Well-commented and documented code
- Reproducibility: Clear instructions for running the system
- Critical thinking: Thoughtful analysis of limitations and improvements

Questions?

If you have any questions about the challenge or need clarification on requirements, please don't hesitate to reach out.

Good luck! We're excited to see your approach to this computer vision challenge.