Ride Along

DAR report for Vehicle Profile

Team Specs

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VP1 - Create Vehicle Profile

Technologies Options:

1. Rapid API (https://rapidapi.com/dfskGT/api/car-utils/)
2. NHTSA Datasets and APIs (NHTSA Datasets and APIs | NHTSA)
3. CarsXE API (https://api.carsxe.com/vehicle-plate-decoder)
4. VinCario (vincario/vincario-vin-decoder-api-services)
5. Vehicle Databases (https://vehicledatabases.com/classic-vin-decoder-api)

Metrics:

Evaluation on scale from 1-5 with 5 being the best and 1 being the worst.
Weights from 1 to 1.2 with 1.2 being the most important

1. **Max number of request per month**
    a. **Scoring guidelines**:
        i. [5]: services provide unlimited requests per month for free
        ii. [4]: services provide over 1000 requests per month for free
        iii. [3]: services provide less than 1000 request for free
        iv. [2]: services does not provide free request but charge less than 100$ for a month subscription that allowed more than 100,000 requests (0.1$ for 100 requests)
        v. [1]: services does not provide free request but charge more than 100$ for a month subscription that allowed more than 100,000 requests (0.1$ for 100 requests)
    b. **Weights: 1.2** due to this metrics affect tremendously to the cost and performance of our product
2. **Average response time over 1000 iterations**
    a. **Scoring guidelines:**
        i. [5]: services provide result in less than 1 second for 15 iterations
        ii. [4]: services provide result in less than 2 second for 15 iterations
        iii. [3]: services provide result in less than 3 second for 15 iterations
        iv. [2]: services provide result in less than 4 second for 15 iterations
        v. [1]: services provide result in more than 5 second for 15 iterations
    b. **Weights: 1.0** even though this metric is importance since it's affect our performance, but it's not our major concern at the moment
3. **Highest range of vehicle production year**
    a. **Scoring guidelines:**
        i. [5]: Support all vehicles before and after 1980
        ii. [4]: Support vehicles from latest to 1912
        iii. [3]: Support vehicles from latest to 1981
        iv. [2]: Support vehicles from latest to early 2000s
        v. [1]: Does not support latest vehicles
    b. **Weights: 1.0** even though this metric affect our range of supported vehicles, but it's not our major concern at the moment

4. **Number of items per request**
    a. **<u>Scoring guidelines:</u>**
        i. [5]: Allow more than 100 items per request
        ii. [4]: Allow more than 70 items per request
        iii. [3]: Allow less than 50 items per request
        iv. [2]: Allow less than 20 items per request
        v. [1]: Allow 1 item per request
    b. **Weights: 1.1** this metrics also affect both the cost and performance of our product, due to the more items per request, we can make less queries for both testing and in deployment.
5. **Request per minute - How many request can we make to the API in a minute (Rate Limiting)**
    a. **<u>Scoring guidelines:</u>**
        i. [5]: More than 100 requests per minute
        ii. [4]: More than 60 but under 100 requests per minute
        iii. [3]: 60 requests per minute
        iv. [2]: Less than 60 requests per minute
        v. [1]: Less than 10 requests per minute
    b. **Weights: 1.1** this metric affect the performance of our product

	Rapid API	NHTSA	CarsXE	VinCario	Vehicle Databases
Max number of request per month [Weight: 1.2]	500,000 calls per month [4]	Unlimited number of calls per month [5]	NO FREE TIER only 7 days trial after that 0.10$ for 1000 call for Vehicle Specification [2]	20 request per month [3]	15 request per month [3]
Average response time over 15 iterations [Weight: 1.0]	3.81010723 11401367 seconds [2]	2.80007672 3098755 seconds [3]	3.30351053 298123 seconds [2]	3.943510532 37915 seconds [2]	2.486091375 350952 seconds [3]
Highest range of vehicle production year	2024 - 1981	2024 - 1981	2024 - 1981	2024 - 1981	2023-1912

[Weight: 1.0]	[3]	[3]	[3]	[3]	[4]
Number of items per request [Weight: 1.1]	1 VIN per request [1]	Up to 50 VINS per batch [3]	1 VIN per request [1]	1 VIN per request [1]	1 VIN per request [1]
Request per minute - Rate Limiting [Weight: 1.1]	50 requests per minute [2]	250 requests per minute (Testing was able to request 238 times in a minute without error on one machine) [5]	60 requests per minute [3]	60 requests per minute [3]	50 requests per minute [2]
TOTAL	13.1/27	20/27	11.8/27	13/27	13.9/27

Analysis:

- **Max number of request per month**: Rapid API and NHTSA are the most promising options for this metric, with Rapid API allow up to 500,000 request per month while NHTSA due to being government funded service, it appears that they do not charge for their services or any of the API, hence we do not have to pay for requesting information from their API.
- **Average response time over 15 iterations:** We use the same black box testing methods, running a python script to make request to the API 15 times and record the time it takes to complete all 15 requests. Then we compare the time accordingly.
- **Highest range of vehicle production year:** Vehicle Database API has the highest range as they also allowed VIN number before 1981 for classic vehicles. As for the rest, they all support the 17 characters VIN which is essentially from 1981 to current.
- **Number of items per request:** While the rest only allow the standard one 1 VIN number per request, NHTSA does have a bulk request feature which allow up to 50 VIN numbers for one request.
- **Request per minute - Rate Limiting:** Since NHTSA that does not mention rate limit in their document nor answer our email, we try to run a python script to query to the API as many time as possible in one minute until either the time run out or the API reject the request. The number of time we get a response back from the API is recorded and display at the end in order for us to compared.

Conclusion

In conclusion, NHTSA is the best performed API, exceeding all of other options at almost every metrics, with the pricing being the most important as they don't limit as much compare to the others nor do they ask for money or subscription to their services. Moreover, the allow bulk decoding, which all other options do not offer, even though the metric is not as prioritized due to the small scale of our application, it will definietly prove to be useful in the future. Surprisingly, Vehicle Database API came in second due to its performance and wide range of supported vehicles even though it's not free compare to RapidAPI, it is still a good backup plan for our product in case the NHTSA API goes down.

Reference:

1. Rapid API
    a. Pricing: (https://rapidapi.com/products/pricing/#pricing-features)
    b. API Request Documentation (https://echo.paw.cloud/)
    c. Supported Vehicle Year Range: (https://www.autocheck.com/vehiclehistory/vin-basics)
    d. Rate Limiting: (https://docs.rapidapi.com/docs/rate-limiting)

2. NHTSA API
    a. API Request Documentation:(https://vpic.nhtsa.dot.gov/api/)
    b. Supported Vehicle Year Range: (https://www.nhtsa.gov/part-583-american-automobile-labeling-act-reports)

3. CarsXE
    a. Pricing: (https://api.carsxe.com/pricing)
    b. API Request Documentation: (https://docs.carsxe.com/specifications#vehicle-specifications)

4. VinCario
    a. Pricing: (https://platetovin.com)

5. Vehicle Databases:
    a. Supported Year:(https://vehicledatabases.com/vin-decode-api)