AI-POWERED TIRE DAMAGE DETECTION: SOLVING WARRANTY CLAIM DELAYS AND IMPROVING ACCURACY

The client, one of India's top tire manufacturers, faced challenges in their warranty claiming process due to the manual and time-consuming nature of identifying tire damages. To address this issue and enhance the efficiency of the warranty claim resolution, the client sought assistance from our team to develop an automated tire detection and damage type classification solution.

Client Profile:

Streamlining the warranty claiming process with faster and accurate identification of tire damages.

Solution:

Tire Detection and Damage Type Classification using state-of-the-art machine learning models.

Project Scope:

Our team took on the challenge and embarked on the project with the following key objectives:

1. Develop a robust tire detection system to identify tires in images.
2. Classify tire damage into 32 different damage types for accurate claim categorization.
3. Address the data imbalance across damage types and tackle noisy data.
4. Improve classification accuracy to at least 90%.
5. Create a streamlined pipeline that integrates the detection and classification models.

Approach:

1. Data Collection and Cleaning:
The initial dataset provided by the client was large and diverse, but it suffered from data imbalance and noise. We meticulously cleaned the data, removing irrelevant and low-quality samples, and addressed the data imbalance through resampling techniques.

2. Tire Detection Model:
We implemented the computer vision model with state-of-the-art object detection algorithm, to identify tires in images. This model provided precise bounding boxes around tires, enabling efficient damage classification.

3. Damage Type Classification Model:
To classify tire damage into 32 different types, we employed a powerful image classification algorithm. We trained this model on the augmented dataset and with other advanced model optimization techniques to improve its performance.

4. Augmentation Techniques:
To tackle the challenge of data imbalance and further improve classification accuracy, we applied advanced augmentation techniques like rotation, flipping, scaling, and color jittering to increase the diversity of the training dataset.

5. Model Integration:
After training both the detection and classification models, we integrated them into a seamless pipeline, enabling the automatic identification of tire damage in images.

Results:

The implementation of our Tire Detection and Damage Type Classification Solution resulted in significant improvements for the client's warranty claiming process:

- **The time required for warranty claims reduced drastically, from weeks to mere minutes.**

- **The accuracy of damage type classification reached an impressive 93%, exceeding the initial target of 90%.**

- **The automated process eliminated the potential for human error in manual identification and categorization.**

- **The streamlined operations led to faster claim resolution, enhancing customer satisfaction.**

Conclusion:

Our cutting-edge solution revolutionized the warranty claiming process for the client, allowing them to expedite and accurately resolve claims. By leveraging advanced computer vision techniques and state-of-the-art models, we overcame challenges related to data imbalance and noisy data to achieve remarkable accuracy in tire damage classification. The successful implementation of this project not only benefited the client but also set a new standard for efficiency and accuracy in the automotive industry.

About Ahana Systems and Solutions:

Ahana Systems & Solutions is a leading IT Infrastructure Management Services and Digital Transformation company based in Bengaluru, India. Our expertise extends to a wide range of solutions, including Cloud, RPA, DB & EDW, BI & Analytics, and Application Development. Our 100+ roster of clients relies on us for our deep domain expertise, skilled resource base, and proven partnership with the best technology providers.

Contact Us:

sales@ahanait.com | info@ahanait.com | +91 9148724605