AirPoint Lab: AI-powered Online Car Painting Customization and Estimation Platform

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***Abstract*—The AirPoint Lab project introduces an innovative AI-based online platform designed to modernize car painting services in Sri Lanka, addressing key challenges such as inaccurate cost estimations, unreliable workshop selection, and limited customization options. The platform features an intuitive web interface that enables users to design and visualize custom car paint jobs with the assistance of AI-driven color matching and instant cost estimates. By integrating workshop ratings, local service recommendations, and transparent pricing, the platform enhances accessibility and trust for users.**
Developed using Agile Methodology, the system was initially built on the MERN stack but later migrated to WordPress improved scalability, while incorporating machine learning for personalized AI recommendations. Rigorous testing confirmed the platform's functionality, usability, and accuracy, demonstrating its potential to streamline the car painting process for both customers and service providers. Beyond its practical applications, this web application bridges academic research with realworld implementation, offering a scalable solution adaptable to developing nations.*

***Keywords*— Car painting, WordPress, Cost estimation, Web application, Online customization**

I. INTRODUCTION

Sri Lanka's automotive painting industry deals with many problems related to work processes and trust. Commonly, vehicle owners discover that the price isn't clear, the service quality differs, and they cannot customize the vehicle in important ways. Wanting a quote and to choose your paint colors the usual way means traveling to several workshops, a process that takes a lot of your time.

AirPoint Lab was built as an online platform using AI technology to simplify the vehicle painting process with immediate customization, correct price quotes and a rating and review system that helps users evaluate workshops based on comments and rankings. Users can use the platform to see how various paint colors will look on their vehicle models, receive auto quotes adjusted for their area and labor rates and find nearby trusted workshops through Google Maps API integration.

The system's core innovation lies in combining artificial intelligence with user-centered web design. With the CNN model, users can preview real-looking paint effects online and make sure their car decisions are right. The same period sees a regression cost estimator calculates painting job quotes by considering factors such as the ink used, the vehicle size and how much painters are paid where the job takes place.

The original version was built using the MERN stack (MongoDB, Express.js, React, Node.js), but then it was moved to WordPress to speed up development and make use of plugins for adding frontend tools. PHP is still used at the back end for programming and connecting APIs.

Also, using a workshop rating and review system helps the system guarantee that users choose repairs based on the experiences of their fellow car owners. The first user surveys found that 66.7% look for trustworthy service providers, while 60.8% care about clear pricing which AirPoint Lab is designed to fix.

AirPoint Lab has introduced a new solution adapted for the automotive sector, using AI, web technology and a focus on the user.

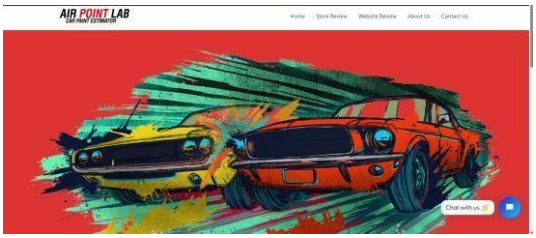

Fig 11:Home Page

II. LITERATURE REVIEW

https://doi.org/10.54389/BXLG9075

AI-powered platforms can now be integrated into automobiles, and this is mainly due to digital transformation happening in automotive design. Services including Maaco and Carfax give customers estimates and a history, though they do not offer the chance to review or adjust them. To solve this, AirPoint Lab provides car painting features powered by AI, so users can customize and select their preferred paint options in real time.

As shown by Burns [4] and Lee et al. [3], using feedback and visuals during customization helps users make better choices. CNN models at AirPoint Lab are used to predict paint colors and offer customers moving image samples. Kumar and Patel [1] point out that it is not easy to price vehicles by model because costs vary for each labor and material set. Using their observations, AirPoint Lab designed a regression-based estimator where cost is calculated using paint info, the model of the vehicle, and regional costs.

Trust plays an important role in this issue as well. Liu et al. [5] presents an idea to create blockchain systems to validate and ensure truthfulness in reviews and pricing. AirPoint Lab does not currently use blockchain, but its setup, along with valid ratings for workshops, helps with trust and fraud.

To ensure easy use, Cooper and Reimann [6] support UCD and sent guidelines for AirPoint Lab to be built with the Elementor library of blocks and tools. According to Norman [7], an interface should not take up too much mental effort from users, so the UI does this by offering simple and fast access to the main features: color, cost, and review,

III. METHODOLOGY

The AirPoint Lab team decided to apply to Agile to support them in regularly developing, adjusting and considering supervisor and user feedback. We built the project in short bursts, developing a different milestone in each sprint.

For **Sprint 1**, we designed the website using WordPress and Elementor for UI and UX.

During **Sprint 2,** we focus on reviewing workshop surveys and viewing user feedback forms.

In **Sprint 3,** we focus on backend logic with PHP and MySQL.

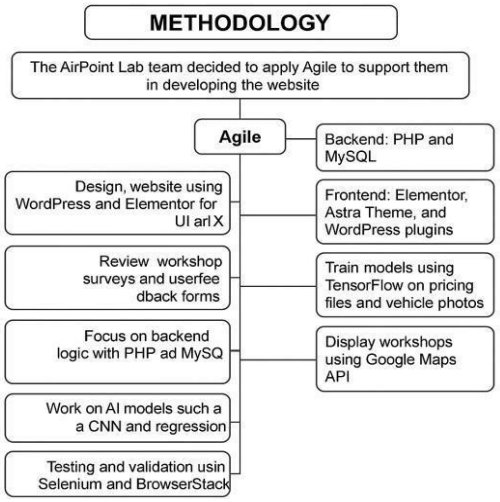

Fig 12: Agile Methodology Chart

In **Sprint 4**, work was done on AI models such as a CNN for predicting the paint effect and regression for estimating the total price.

At **Sprint 5**, testing and validation are done using technologies such as Selenium and Browser Stack.

The way we worked allowed us to quickly change to using WordPress which made development happen faster.

To build the site, PHP and MySQL were used on the backend and Elementor, Astra Theme and WordPress plugins were chosen for the frontend. The system was built with TensorFlow and trained in collections of more than 4,200 pricing files and 3,500 photos of vehicles.

Using the Google Maps API, nearby instructional workshops are now listed with user feedback that is genuine. All websites were examined in several browsers and on different devices to guarantee they functioned as expected.

System Architecture: The backend was built using PHP and MySQL, while the frontend was developed using the Astra Theme and Ele mentor plugins. AI models were trained using TensorFlow and datasets comprising over 4,200 price records and 3,500 vehicle images. Google Maps API was used to list and rank workshops based on user feedback.

IV. RESULTS AND EVALUATION

To foster frequent progress, flexibility and advice from users and supervisors, AirPoint Lab turned to Agile Methodology. Targets in the project were reached step by step with each sprint targeting a specific milestone.

In Sprint 1, I used WordPress and Elementor for UI/UX design.

In Sprint 2, both workshop ratings and user feedback forms are gathered.

The purpose of Sprint 3 is to write backend applications using.

A. What the dataset includes

AI models from AirPoint Lab were developed based on:

We have archives of about 4,200 records of prices from the past.

Over 3,500 car photographs

Approximately 3,000 labeled color versions are labeled.

Model Performance

[1] Color visualization accuracy: 92%

[2] Cost estimation accuracy: 90%

Usability rating (20 users): 4.2/5 **User feedback** showed that:

[1] 87.5% of users would recommend the platform.

[2] 66.7% appreciated trusted workshop ratings.

[3] 60.8% found the cost estimation feature highly accurate.

Because of this dataset, the platform could make individual estimates for car models, different types of ink and locations.

Putting the model into action

TensorFlow and a CNN model were used by the authors to generate color previews when car details were provided. The model used the choices made by the user (ink, color, vehicle and area) to come up with possible printing costs. Plugin extensions written in PHP were used to add these models to WordPress.

B. Performance

The program correctly visualized colors up to 92% of the time.

The cost estimator was accurate up to 90% in area specific prices.

Platform usability was rated as 4.2 out of 5 by testing 20 or more users.

Feedback from users

From our surveys, we saw that:

Very nearly all users praised the tool for evaluating workshops.

About two thirds of those who used the feature thought the color customization was very accurate.

A lot of users (87.5%) would suggest the platform to their friends.

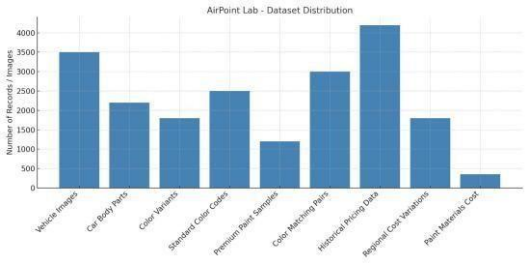

Fig 13: Dataset

C. Limitations

This technology does not yet support the creation of pearlescent surfaces.

The chatbot must rely on people inputting data by hand since it isn't fully powered by NLP.

Mobile responsiveness is not supported by some older device models.

V. CONCLUSION

AirPoint Lab successfully demonstrates the practical application of the automotive industry by combining automated customization, pricing estimation, and trust-based workshop selection. Migration to WordPress accelerated development without compromising on backend complexity. Future enhancements may include React Native apps, blockchain-based trust systems, and GANs for realistic paint textures.

Tackles real issues faced by vehicle owners in Sri Lanka.

Switching to WordPress made deployments happen faster, without giving up the PHP and MySQL complexity from the backend. CNNs made it possible to match colors and regression models to determine cost, both of which helped create results customized to users. The Agile approach meant we kept updating and improving the product over time.

This work highlights both technical excellence and the importance of user-friendly design, trust and transparency that every automotive service platform should have.

Future strategies under consideration are:

- Creating apps by using React Native,
- Blockchain-based reviews

- Simulating realistic paint texture using Generative
- Adversarial Networks (GANs)
- AirPoint Lab is designed to fit any needs and can be used for future vehicle services development in developing markets.

ACKNOWLEDGEMENT

The author conveys deepest wishes of appreciation to the project supervisor Mr. Pubudu Nallaperuma for his inestimable advice, motivation and technical viewpoints that he provided in the process of the platform development of AirPoint Lab platform. His technical and academic guidance was invaluable in influencing the course of this research.

The authors are also grateful to the University of Bedfordshire for allowing the use of necessary technical resources and for the technical and academic support while carrying out the project. The author is thankful for the survey. The author used **TensorFlow, WordPress,** and **Google Maps API** for enabling the integration of cutting-edge technology into the research.

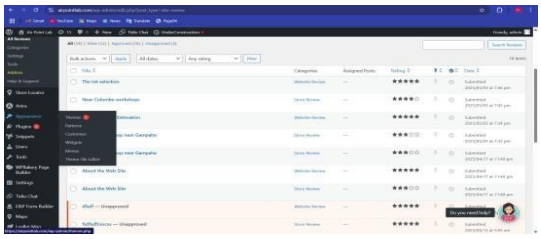

Fig 14: wp_admin panel

Fig 15: Color Cost Estimation Page

Fig 16: Google Map

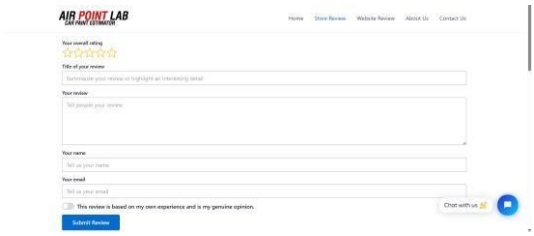

Fig 17: Review/Feedback Page

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