

Use of Generative Artificial Intelligence Technology to Design More Sustainable and Recyclable Polyolefin Based Automotive Parts

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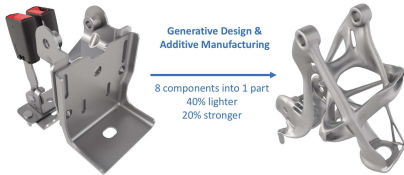
During the recycling of vehicle parts there is often times problems that arise due to the existence of foreign objects embedded in the plastic lining of car bumpers and door panels. Many of these items are designed to improve the driver experience such as sensors that help avoid car accidents and help open and lock doors to a car. An artificial intelligence (AI) bot can be used to identify generate improved designs that make the vehicle more sustainable and recyclable. The purpose of this research project is to investigate the viability of generative AI in vehicle design for TPO based materials

THE PROBLEM

No artificial intelligence (AI) application has been developed to help increase recyclable efficiency of TPO based automotive parts. We need to come up with new ways to make cars more sustainable through the use of smarter and more reliable information systems.

THE SOLUTION

Develop an AI application that can redesign a part on demand using updated and improved previously used models, while also integrating the improvements needed, into the future part to provide the desired benefit.

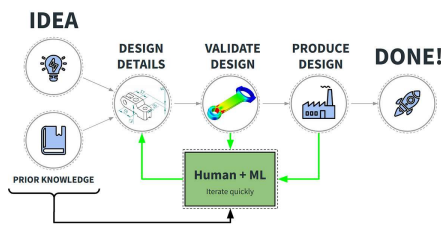


RESEARCH PLAN

- Understand the recycling process for automotive parts- bumpers, doors,
- Understand AI technology- POE and Generative AI
- Understand the features of smart phones and AI compatibility
- Understand how to train a smart phone and develop an AI library
- Develop a framework work for AI in sustainability for automotive



EXPERIMENTAL SECTION

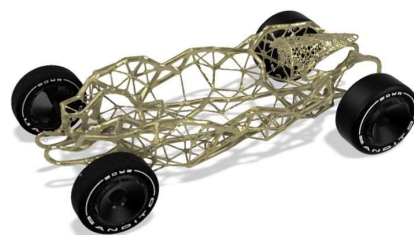


My strategy involved developing a framework for an artificial intelligence application that could use its data library to design a part with recyclability, sustainability and affordability in mind. To do this, I have created an AI bot that can go across multiple platforms to instantly generate parts schematics for vehicles.



Features of Poe AI

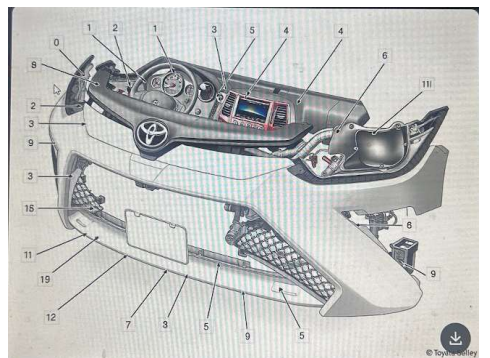
Feature	Description
Large Language Models	Integrates with GPT-4, Claude AI, and others for diverse conversational capabilities.
Customizable Chatbots	Users can create personal bots with prompts, offering tailored AI interactions.
User Interface	Offers an intuitive, user-friendly platform for accessing a range of chatbots.
Sync Across Devices	Ensures continuity of conversations across different devices for a seamless experience.
User-Created Bots	Facilitates the creation and sharing of personalized AI Chatbot with the wider community.
Linkification	Automatically transforms relevant words into clickable links for deeper exploration.
Safe Environment	Maintains a strict policy against NSFW content, ensuring a safe space for all users.
Language Support	The user interface supports multiple languages, including English, Japanese, and more, for broader accessibility.
Dark Mode	Offers Dark Mode for a more comfortable use in low-light environments, protecting users' eyes.
Compute Points System	Allows users more control over interactions with bots, offering flexibility in how they engage with the platform.



RESULTS

I have created a baseline AI library using automotive parts to train my computer to classify them based on shape and structural analysis. The software will use a bot to identify and generate images automotive parts

Create a highly detailed, labeled diagram of any car part requested, such as a bumper, dashboard, or engine component. Ensure that the image includes clear, readable labels pointing to a specific section of the part, similar to a diagram found in a car manual or engineering schematic. The style should prioritize accuracy and clarity, making it easy to identify materials and components



FUTURE WORK

- Expand library to include a wide range of automotive parts.
- Train computer to use object detection scanning technology to identify foreign or suspicious objects during the production and recycling process

Conclusion: Generative AI has really changed the landscape of product design and it has shortened the production cycle. I am still learning POE. The image generator requires more sophisticated chatbots in order to make it more functional for the automotive industry. This project shows that it has long term value.