
Scrap Craft AI Hub: Where Innovation Meets Creativity

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Abstract—The saying "One person's garbage is another person's gold" highlights the diversity of individual preferences and needs, implying that what appears worthless to one person can be valuable to another. This project focuses on tackling waste challenges by turning recycled materials into things that people want to buy. This program merges traditional craftsmanship with revolutionary technology, like web development and artificial intelligence, to produce original and distinctive abstract artworks. The project involves creating, designing, and adding features to websites using different web tools like HTML, CSS, JavaScript, various backend programming languages, database systems, frontend frameworks, and web servers. The Scrap Craft Hub platform comprises two sections: Scrap Swap: A marketplace for individuals and businesses to exchange scrap items, facilitated by a user-friendly interface and advanced search options. Users can buy, sell, and rate products securely, promoting transparency and trust. Additionally, AI technology provides price recommendations for vendors. Crafter's Corner: An area for artists to exhibit their creations crafted from scrap materials. EcoMarket serves as a dedicated platform for artistic expression, emphasizing sustainability and upcycling. Artists can engage with their audience through features like comments, likes, shares, and subscription options. The project wants to bring a fresh approach to eco-friendly art by combining imagination, new technology, and innovative ideas. It aims to bring order to disorder by reusing neglected materials and discovering new possibilities.

Index Terms—Scrap Swap, Crafter's Corner, Price recommendations, EcoMarket, revolutionary technology, Artificial Intelligence, artistic expressions, User-friendly Interface, Sustainability.

I. INTRODUCTION

Scrap recycling has long served as a backbone of our economy, alleviating the immense burden of global garbage production, totaling 2.12 billion tons per year. Household scrap constitutes a significant portion of this volume, with its collection steadily increasing and posing considerable environmental concerns if not managed effectively. Recycling emerges as a sustainable solution, providing both financial and environmental benefits. Beyond metals, properly treated domestic scrap can yield valuable goods.

The scrap sector not only fosters economic growth and job development but also promotes recycling, diverting objects from ending up in landfills and encouraging community involvement in the pursuit of a more sustainable future.

The two main sections of our website, Scrap Swap and Crafter's Corner, aim to advance this cause.

People can utilize Scrap Swap to display and sell their scraps through images, while artists can purchase used items to showcase their own creations or display their own creative works in Crafter's Corner. This effort fosters an artistic community by encouraging collaboration and skill development. One of our website's standout features is the price prediction tool for vendors in both the Scrap Swap and

Crafter's Corner areas.

Additionally, by providing artists with a platform to increase their visibility through features like comments, likes, shares, and subscriptions, they can effectively showcase their talents.

Creating a scrap art website is just the beginning; the next step is to leverage AI technology for client satisfaction and website performance. AI plays a vital role in e-commerce, supporting operations such as consumer engagement, product search, and recommendation. Our website harnesses AI technologies, including Natural Language Processing (NLP) for text analysis, machine learning (ML) for recommendation systems, computer vision for image recognition, and chatbots for personalized assistance. We also utilize web scraping to gather data, predictive analytics to forecast demand, sentiment analysis to collect feedback, and customization engines to deliver tailored user experiences.

These technologies enhance the functionality of our website and offer customers a smoother experience. We utilize AI technology to create a tailored and seamless client experience, ultimately leading to business growth and success.

II. LITERATURE SURVEY

ML transforms platform creation, empowering customized client interactions. Nonetheless, addressing challenges such as safeguarding data and mastering technical expertise remains imperative, despite its potential to enhance site functionality and client satisfaction.[1]

This study suggests using smarter pricing methods for e-commerce highlighting personalized pricing to make more money. It offers a way to blend different ways of looking at data to make pricing better.[2]

The virtual scrapyard tackles declining art enthusiasm and the surge in waste with a platform promoting material reuse. Utilizing secure technology and also user-friendly features, it promotes recycle of materials for environmental protection.[3]

Scrap-Q is built to assist convenient management of scrap items in conjunction with eco-friendly methods. The website is carefully developed to provide user-friendly interface, simultaneously communicating knowledge about environmental issues and nurturing community engagements.[4]

The website makes shopping easier with the MERN stack. It divides items into creative and scrap categories, making it simple to find what you need. You can browse through listings and pay securely. It's all about improving online shopping and helping businesses thrive.[5]

The Scrapyard is a virtual marketplace nurturing creativity and sustainability via upcycled items. With a user-friendly experience and robust security, it supports a community valuing local craftsmanship. Despite challenges, its features and pricing bolster recycling efforts and drive economic development online. [6]

Creative Scrapyard promotes reusing and creativity. Users can buy, sell and exchange old items, nurturing community engagement. With categories like "Scrapyard" and "Creative Store", it encourages sustainability initiatives like vocalforlocal, driven by user interaction.[7]

Global recycling is of utmost importance in the realm of environmental preservation as well as in ensuring economic stability. Platforms like Inventive Scrapyard promotes reuse and waste reduction supporting sustainability. They tackle discarding obstacles and advocate for eco-friendly practices via analysis of regulations and user capacities.[8]

The significance of recommender system, leveraging expensive databases to personalise content across domains is highlighted by Data overload. Regardless of the improvements, challenges continues in text analysis and visual recognition. This project strives to upgrade online shopping via a framework using convolution neural networks for reverse image search.[9]

By using ML(machine learning) and artificial neural models. AI transforms e-commerce ,elevates operations and user participation. E-commerce models or digital commerce structures employ AI to customise services and adjust according to B2B, C2B, B2C, and C2C dynamics, still managing staff transformations and moral concerns remains vital for persistent achievement.[10]

With the usage of LMSs and speech command feature, increase in the application of chatbots in various sectors like user assistance is observed and it highlights the advancement in integration. Chatbots can't be a substitute for humans but help a lot in reducing the workload providing accuracy and reliability.[11]

There is focus on audience division and utilisation of massive data, information interpretation for boosting the advertising strategies and enhancing market assessment and utilisation of large scale data,ML(machine learning).[12]

It proposes a new way to custom e-commerce searching by using elasticsearch benefiting compact and medium-sized businesses. Testing shows real-world capability with future research focusing on improvement and scalability for practical use.[13]

The study highlights web scraping's importance for accurate data in business intelligence. It proposes not only a

systematic approach to overcome challenges, but also notes obstacles like adapting to changing data sources.[14]

Website creation demands departure from traditional methods due to the dynamic web environment. The WDLG integrates adaptable techniques, prioritizing scalability and user engagement for streamlined development.[15]

The paper examines online verification challenges in ecommerce, emphasizing authenticity and trust. It underscores the necessity of innovative approaches to address deficiencies in current methods, particularly concerning product authentication and intermediary reliability.[16]

S.no	Title of the paper	Authors	Conference /Journal	Year	Problem Address	Solution
1.	Machine Learning in Website Development: Enhancing User Experience and Personalization	Abhil Robert, Kadelio Potter, Louis Frank	Conference	2024	Website developers strive for improved user experience and security simultaneously. Machine learning tackles challenges like personalized interactions and fraud detection by analyzing user data and optimizing design.	The study emphasizes machine learning roles in website construction focusing on individualized user satisfaction, adaptive content and fraud detection while recognizing ethical constraints and skill gaps.
2.	E-commerce Management And AI Based Dynamic Pricing Revenue Optimization strategies.	Dr. Vijayakumar Thota Dr. Nagalakshmi M.Dr. Kiran Kumar M.Dr. Sano Kumar,UzmaMomin., Dr. Prashant Mishra	Conference	2024	E-commerce static pricing models, especially subscription-based models, are inadequate for changing market dynamics, which leads to lower sales and profitability.	E-commerce enterprises employ AI for time-based pricing that alter in real-world problems depending on market dynamics and client behavior to make optimal judgments
3.	Virtual scrapart	Asst.Prof. Bharti Sabu, Vipul Patil, Shrujan Sonawane , Musam Singh, Anuj Kumar	Conference	2023	The article covers two issues: the first is a lack of sufficient platforms for purchasing, selling, and renewing discarded things; and the second is the decline of various creative forms due to a lack of recognition and a marketplace for those engaged in that field.	The solution for the problem address is to create Virtual Scrapyard, an online marketplace for buying, selling, and renewing scrap items. This platform encourages recycling, supports local artists, offers affordable options for buyers, and leverages modern technology for seamless transactions and communication.
4.	Creative Scrapyard Web Application	Prof. P. A. Kuchewar, Ritik Uprethkar, Mohit Parbat, Mamata Moan, Akanksha Mankar	Conference	2022	The problem statement for the given paper is that there is a need for an e-commerce website where people can sell their old scrap items, and moreover, the artists can buy these items to customize them, and users can purchase the customized items.	The idea is to create an online marketplace called 'The Creative Scrapyard,' where people can sell their used and discarded items. Additionally, artists can buy them to renew and resell as unique products. This platform will help to reduce waste by encouraging recycling, serving as a market for leftover goods, and stimulating artistic expression.
5.	The application & impact of artificial intelligence (ai) on e-commerce	Mr. Anshu Srivastava	Conference	2021	As Artificial Intelligence (AI) increasingly spreads throughout the E-commerce industry, there is a need to understand its impact and implications. The challenge lies in effectively harnessing AI to enhance customer experiences,optimize operations, and drive business growth while also addressing potential concerns such as job displacement and ethical considerations.	The impact of AI on online shopping is examined in this study, with particular attention paid to innovations that improve the buying experience and offer individualized support, including chatbots and visual search. AI revolutionizes e-commerce and changes the job environment, but it also raises concerns about job displacement despite its benefits in enhancing efficiency and customer service.

Table1: Summary of literature survey

III. DESCRIPTION OF THE PROBLEM STATEMENT

Earth is challenged by a significant problem: annually, 2.12 billion tons of waste are generated, mainly from households, posing environmental risks without proper management. Despite recycling efforts, current methods struggle to meet consumer demands for eco-friendly products and creative expression due to technological limitations.

Current platforms for scrap exchange overlooks the artists who utilize recycled materials, hindering sustainability initiatives. Additionally, these platforms lack AI integration, restricting improvements in user experience. A comprehensive strategy is necessary, encompassing the promotion of eco-friendly art, facilitating scrap exchange, and integrating AI advancements.

IV. EXISTING WORK

Existing scrap management focuses mostly on traditional upcycling approaches, which may not fully utilize contemporary technologies or adapt to the growing interest in eco-friendly artwork. While some online platforms promote scrap exchange, they frequently lack full functionality for both vendors and buyers, creating a market need for a user-centric solution that values sustainability and artistic innovation. Furthermore, existing platforms may fail to employ Artificial Intelligence (AI) and modern web development tools in order to improve client experiences and promote sustainable practices efficiently.

V. PROPOSED WORK

In response to these limitations, our project aims to develop the Scrap Craft Hub platform, a innovative solution that smoothly integrates web development technologies and AI algorithms to facilitate scrap exchange and promote eco-friendly artistry.

Scrap Craft Hub will consist of two main sections: Scrap Swap: This marketplace will enable individuals and businesses to buy and sell scrap materials securely, with advanced search functionalities and AI-driven price recommendations enhancing user experience. By providing a user-friendly interface and transparent transactions, it aims to encourage widespread participation in the recycling economy. Crafter's Corner: Serving as a dedicated space for artists to showcase their creations made from recycled materials, it will foster a community of Eco conscious creators. Artists will be able to engage with their audience through features such as comments, likes, shares, and subscription options, promoting collaboration and skill development within the artistic community.

VI. OBJECTIVES

The goals of Scrap craft AI hub include:

- Develop a robust online marketplace for scrap trading with a focus on enhancing user experience and security.
- Utilize AI algorithms to offer accurate pricing guidance for suppliers and strengthen scrap swap functionality.
- Create "Crafter's Corner" as a dedicated space for artists to exhibit eco-friendly creations and engage with like-minded individuals.
- Employ cutting-edge web development tools to design intuitive interfaces for seamless navigation.
- Promote recycling and sustainability by emphasizing the environmental benefits of recycling and artistic expression with recycled materials.
- Facilitate collaboration and skill development within the arts community through platform features that encourage interaction and knowledge exchange.
- Continuously assess platform effectiveness by leveraging user feedback and performance metrics to refine features and optimize engagement.

VII. METHODOLOGY

A. PRICE PREDICTION

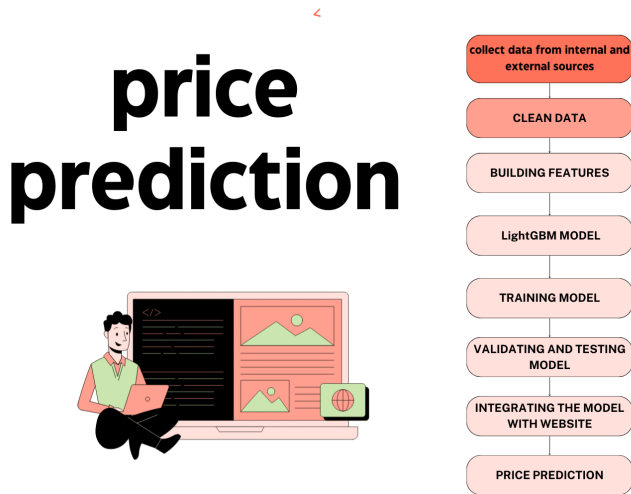


Figure 1: workflow of price prediction

- **Data Collection:** Gather data internally and externally via web scraping, ensuring legal compliance and accuracy. Develop custom scripts, test, and validate for systematic extraction. Clean and process data for structured storage.



Figure 1: Web scraping process

- **Data cleaning:** Remove duplicates, handle missing values, and encode categorical data. Preprocess text entries for accurate pricing information.
- **Building features:** Create custom features like brand and subcategory average prices. Convert categorical variables to numbers using one-hot encoding. Transform text features into TF-IDF vectors for relevance prediction.
- **LightGBM model:** Utilize Light GBM for fast and accurate gradient boosting. Define numerous well-crafted features for optimal model performance. Train, test, and refine the model for precise price predictions.
- **Integration:** Integrate the trained model into the website to provide effective price prediction functionality.

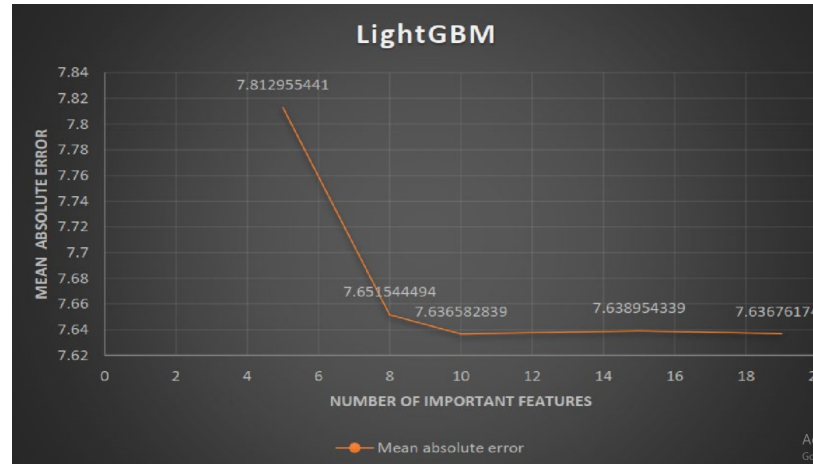


Figure 3: Model performance with different number of features (LightGBM model)

LightGBM models work better when there are a large number of features defined. Use an appropriate number of well-defined functions to make your price prediction model work better. The model is trained and tested using selected features and refined data to accurately predict product prices. It will eventually be integrated into the website to provide price prediction functionality.

B. ENGAGEMENT FEATURES

1) Likes:

- HTML/CSS/JS (w/ AJAX, React.js) for frontend, PHP/Node.js with MySQL/MongoDB for backend. Implement WebSockets, push notifications for updates.

2) Comments:

- Use HTML/CSS/JS for UI, AJAX for interactions, PHP/Node.js with MySQL/MongoDB for backend. Integrate WebSockets, push notifications for real-time comments.

3) Shares:

- UI with HTML/CSS/JS, JavaScript widgets for social media, server-side languages for dynamic content, RESTful APIs for sharing. Customize link previews with OGP or Twitter Cards.

4) Subscriptions:

- Design forms with HTML/CSS/JS (w/ AJAX), PHP/Node.js for backend, database storage, APIs for communication. Use SMTP, third-party platforms for email marketing.

C. WEBSITE DEVELOPMENT TOOLS

Requirement gathering, layout planning, user-friendly UI (HTML/CSS/JS), backend selection (language, framework, database, authentication), CMS integration, search optimization, payment system, security measures, deployment (hosting, maintenance, monitoring, updates).

D. IMPLEMENTATION AND MAINTENANCE OF USER ACCOUNT FUNCTIONALITIES

Registration (details, CAPTCHA, email verification), security (HTTPS, encryption, multi-factor authentication), profile customization, content creation, notifications, account recovery, data security, performance optimization.

E. EFFECTIVE SEARCH FEATURES

Utilize NLP (collect, preprocess, vectorize), model training (point modeling), indexing, query processing, relevance ranking. Incorporate client feedback for continuous improvement. NLP innovations ensure quick and accurate data retrieval.

F. RECOMMENDATION OF PRODUCTS IN WEBSITE

Data Gathering: User interactions tracked comprehensively.

Key elements extraction: User ids, item ids, timestamps, interaction nature.

Model: Dual-stack learning-based recommender model (DLRM).

DLRM components: Categorization, numerical input processing

Continuous improvement: Model is progressively refined by iterative learning from historical data.

Result: Personalized recommendations matching user preferences and needs.

G. ENSURING PRODUCT AUTHENTICITY PRIOR TO LISTING IT FOR SALE

scrapcraft verifies products with curated photos a trained cnn legal database integration and thorough examination aiming to enhance user confidence and legal compliance.

H. WISHLIST MAINTENANCE

Scrap Craft ensures efficient wishlist usage with user-friendly interface, secure backend, relational databases, dynamic updates, cross-device compatibility, and rigorous testing.

I. VIRTUAL ASSISTANT

Scrapcraft integrates a virtual assistant with front-end (htmlcssjavascript reactjsvuejs) and back-end (pythonnodejs postgresql) employing nlp nltkspacy and ml for adaptability aiming to optimize user interaction.

J. MULTI-LANGUAGE SUPPORT

Scrap Craft Hub offers multi-language support with internationalized interface, efficient translation, dynamic language switching, Unicode support, SEO optimization, thorough testing, and user feedback-based iteration for global expansion.

K. FEEDBACK GATHERING FROM USERS

We prioritize user feedback through surveys testing and social media monitoring and employ sentiment analysis and natural language processing to find critical insights feedback is iteratively integrated utilizing agile methodologies and usability testing with data-driven changes deployed this constant interaction influences future improvements ensuring scrap craft maintains a lead in user happiness.

VIII. RESULTS

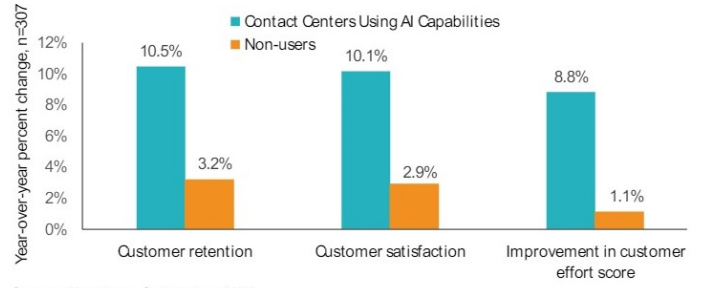


Figure 4:Enterprises harnessing AI capabilities demonstrate superior enhancements in customer experience performances

The source of graph is Aberdeen that depicts the client fulfilment maintenance, exertion, score increments by executing AI capabilities. The website moreover includes the trending ai advances there by it is more client centric and also better in execution.

The usage of different highlights and innovations on the scrap Craft platform yielded promising results. The integration of a cost prediction tool utilizing web scraping methods encouraged exact cost suggestions for merchants, upgrading the proficiency of the Scrap Swap and Crafter's Corner segments. Intuitively highlights such as likes, comments, shares and subscription cultivated client engagement and community building inside the platform.

The incorporation of effective search highlights utilizing NLP empowered clients to recover pertinent data quickly, in this manner progressing overall client involvement.

Moreover, the recommendation system based on past client history and search queries contributed to personalized and custom fitted substance conveyance, further upgrading client fulfilment. The confirmation process utilizing CNN models essentially reinforced item verification and legitimacy checks, instilling trust and certainty among clients. Generally the usage of these techniques and advances results in a strong and user-centric platform, driving expanded client engagement and fulfilment.

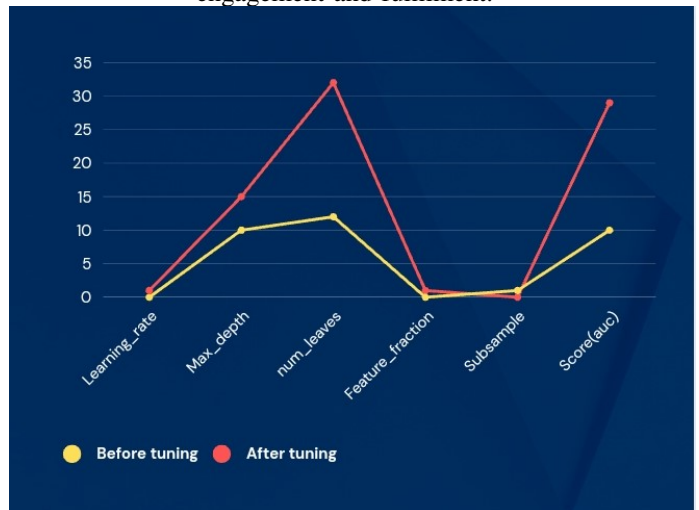


Figure 5:Hyperparameters of LightGBM model tuning results

By tuning these parameters into the LightGBM model the model performance in predicting the prices increases. Giving and accuracy of about 95.05 percentage.

IX. DISCUSSIONS AND ANALYSIS

On performing research on the waste management we analysed and arranged them in the following order:

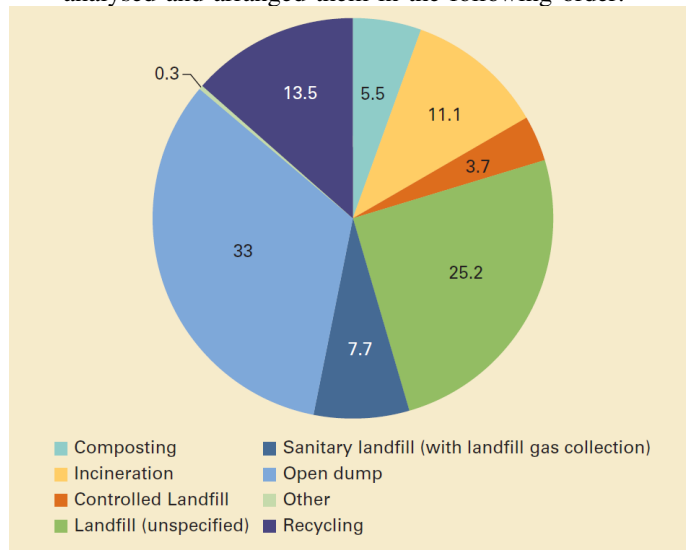


Figure 6:Trends in solid waste management

The above pie chart explains the various kinds of waste management strategies along with their percentages. The recycling process contributes only 13.5 percent which is very low and needs to be increased as it is the only eco-friendly strategy in waste management.

X. CONCLUSION

The Scrap Craft platform successfully leveraged advanced technologies and innovative methodologies to address the challenges and limitations in the scrap recycling and eco-friendly art industry. By integrating web development tools and AI algorithms, Scrap Craft Hub emerged as a comprehensive solution that facilitated scrap exchange, promoted sustainability, and fostered artistic innovation. The platform's two main sections, Scrap Swap and Crafter's Corner, provide users with a seamless and intuitive experience, encouraging active participation and collaboration within the community. Furthermore, the utilization of AI technologies such as NLP, machine learning, and computer vision enhanced the platform's functionality and performance, ensuring accurate price recommendations, efficient search functionalities, and reliable product verification. Overall, the Scrap Craft platform represents a significant advancement in the integration of technology and sustainability, contributing to a more eco-conscious and creative society.

REFERENCES

[1] Robert, Abill, Kaledio Potter, and Louis Frank. "Machine Learning in Website Development: Enhancing User Experience and Per." (2024).

[2] Thota, Vijayakumar, et al. "E-Commerce Management And Ai Based Dynamic Pricing Revenue Optimization Strategies." *Migration Letters* 21.S4 (2024): 168-177.

[3] B. Sahu, V. Patil, S. Sonawane, M. Singh, and A. Kumar, "Virtual Scrapart," *IJRASET*, vol. 11, no. 5, pp. 1609–1616, May 2023, doi: 10.22214/ijraset.2023.51844.

[4] Lenkalapally, Shriya, and Sanjana Konda. "SCRAP-Q MANAGEMENT SYSTEM USING WEB DEVELOPMENT."

[5] Bhasin, Chetna, Himanshi Sadhwani, Laiba Tahir, Satendra Singh, and Sugandha Chakraverti. "COOLABEE-GARAGE (E-COMMERCE END-TO-END WEB APPLICATION)."

[6] Dhasmana, Harshit, Pankaj Bansal, and Rohan Sharma. "THE SCRAPART SHOP"

[7] Prof. P. A. Kuchewar, Ritik Upreshkar, Ritik Upreshkar, Mohit Parbat, Mamata Moon, and Akanksha Mankar, "Creative Scrapyard Web Application," *IJARST*, pp. 471–473, Dec. 2022, doi: 10.48175/IJARST7712.

[8] Priya, G., Raghoottama Vaidya, and Chandrakanth Biradar. "CREATIVE SCRAPYARD USING WEB DEVELOPMENT."

[9] P. Badave, B. Bhomaj, B. Bindu, R. Shivarkar, and P. N. Dhavase, "Ecommerce Website with Recommendation System Including Chatbot and Reverse Image Search," *IJRASET*, vol. 10, no. 9, pp. 1663–1680, Sep. 2022, doi: 10.22214/ijraset.2022.46904.

[10] M. A. Srivastava, "THE APPLICATION IMPACT OF ARTIFICIAL INTELLIGENCE (AI) ON E-COMMERCE," vol. 1, no. 1, 2021.

[11] [1] M. Mekni, "An Artificial Intelligence Based Virtual Assistant Using Conversational Agents," *JSEA*, vol. 14, no. 09, pp. 455–473, 2021, doi: 10.4236/jsea.2021.149027.

[12] H. Singh, "Improving Customer Segmentation in E-Commerce using Predictive Neural Network," *IJETER*, vol. 9, no. 2, pp. 2326–2331, Apr. 2020, doi: 10.30534/ijetec/2020/215922020.

[13] K. N. Vavliakis, G. Katsikopoulos, and A. L. Symeonidis, "E-commerce Personalization with Elasticsearch," *Procedia Computer Science*, vol. 151, pp. 1128–1133, 2019, doi: 10.1016/j.procs.2019.04.160.

[14] P. Milev, "Conceptual Approach for Development of Web Scraping Application for Tracking Information," no. 3, 2017.

[15] A. M. French, "Web Development Life Cycle: A New Methodology for Developing Web Applications," vol. 16, 2011.

[16] A. Basu and S. Muylle, "Authentication in e-commerce," *Commun. ACM*, vol. 46, no. 12, pp. 159–166, Dec. 2003, doi: 10.1145/953460.953496.