Applications in Home Improvement Retailer, Koctas

Nouh Sabri Elmitwally
School of Computing and Digital Technology, Birmingham City University, Birmingham B4 7XG, UK *Department of Computer Science,*

Abstract— **It sounds like Koçtaş is a leader in the home improvement sector in Turkey, and they are focused on providing the best service and customer experience possible. They are also actively working to accelerate their digital investments and use their vast amount of customer data to innovate in the industry. One way they are using this data is by collecting and analyzing video camera images using AI. This allows them to detect humans and identify which products and shelves are most viewed in their stores. This information can then be used to optimize store layout and product placement for a better customer experience. Another way Koçtaş is innovating is through the implementation of kiosks that use Natural Language Processing (NLP) to interact with customers. These kiosks can understand and respond to questions asked by customers using AI, providing a more personalized and human-like experience.**
Finally, Koçtaş is using Dynamic Creative Optimization to create personalized advertisements for their customers. This method allows them to optimize the content and format of their ads based on the individual preferences and behavior of their customers, leading to more effective marketing.
Overall, Koçtaş is using technology and data to drive innovation and provide a better customer experience in the home improvement industry.

Keywords— Natural Language Processing (NLP), Koçtaş, video camera, FSA-Net

INTRODUCTION

It's interesting to learn that Koçtaş has been in the home improvement industry since 1955, starting as a wholesaler and transitioning to a leading retail company in the sector. With over 100,000 products and 177 physical stores as well as a strong digital presence, the company serves a large number of customers and has a wealth of data to work with.
As a registered R&D center, Koçtaş is focused on innovation and operational efficiency, with the goal of becoming a technology company that is leading the way in building Retail 4.0. This means they are actively investing in technology and using data to drive their business forward.The COVID-19 pandemic has had a significant impact on the way businesses operate and how customers behave. Koçtaş, like many other companies, has had to adapt to the changing circumstances and find innovative solutions to meet the needs of customers who prefer contactless shopping and spending less time in physical stores. By leveraging their strong digital presence and using technology, Koçtaş is well-positioned to meet the challenges of the current business landscape [1-3].
Given the current trend towards online shopping, it is important for companies like Koçtaş to focus on providing a seamless and personalized customer experience across all shopping channels. Previously, multiple techniques such as deep learning [4,5], transfer learning etc are being used for this purpose. Here are some of the major (AI) applications used by Koçtaş to enhance client assistance: Virtual Assistants: Koçtaş has implemented virtual assistants powered by AI to help customers find products and answer their questions. Customers can chat with the virtual assistant through the company's website or mobile app and get personalized recommendations based on their preferences. Personalized Product Recommendations: Using data analytics and multiple machine learning algorithms [6-9, 20-31] , Koçtaş is able to provide personalized product recommendations to customers. This helps customers find products that are most relevant to their needs and can also increase sales for the company. Visual Search: Koçtaş has also implemented a visual search tool that allows customers to search for products using images. This is particularly useful for customers who are looking for a specific product but are not sure what it's called. Predictive Analytics: By analyzing customer data, Koçtaş is able to predict which products will be popular in the future and adjust its inventory accordingly. This can help the company stay ahead of the competition and provide better service to its customers. Overall, by leveraging AI technologies, Koçtaş is able to provide a better customer experience and improve sales across all shopping channels[10].
To enhance security and risk mitigation in home improvement applications, control systems and convolutional neural networks can be used for threat detection and prevention [32-34].
Secure communication [35], mobile agent protocol [36], machine learning [37], artificial neural networks [38], blockchain technology [39,57], electronic health records [40], novel secret key generation techniques [41], secret sharing schemes [42], and secure information management [43] can be applied in home improvement to enhance security and privacy of personal and financial data [44]. Machine learning approaches can be used in home improvement to analyze user data, predict preferences, and provide

personalized recommendations for design, renovation, and maintenance [53-56].

VIDEO ANALYTICS

Human Appearance as well as Moment of the View Detection

FSA-Net achieves high accuracy in determining the pose of the human face. With the use of FSA-Net, Koçtaş was able to accurately determine the pose of the human face in their video analytics study. This information can be used to determine the customer's age, gender, and other demographic information, which can then be used to offer targeted products or promotions. Additionally, the data collected through video analytics can help retailers optimize store layouts and improve the customer experience. It is important to note that the use of video analytics in retail stores raises concerns about privacy and data security. Retailers must ensure that they are collecting and using data in a responsible and ethical manner and comply with relevant regulations and laws. Consumers should also be informed about the data being collected and how it is being used.[1] "Video Analytics Market Size, Share & Trends Analysis Report by Type, By Application, By Deployment, By Vertical, By Region and Segment Forecasts, 2020 - 2027", Grand View Research[11-12].

It's important to note that FSA-Net was chosen for the Koçtaş study specifically because it offers some advantages over other methods for estimating the pose of the human face. While the study found that FSA-Net performed well for their purposes, it may not necessarily perform better than all other methods in all contexts. Furthermore, it's important to distinguish between estimating the pose of the human face and estimating human face exposure. Estimating face exposure typically refers to determining the amount of a person's face that is visible in an image or video, while estimating pose refers to determining the orientation and position of the face in the image or video. FSA-Net was specifically used in the Koçtaş study for estimating face pose, not face exposure.In summary, while FSA-Net may perform well for estimating face pose in certain contexts, it may not necessarily perform better than all other methods, and it is important to use the appropriate method for the specific task at hand [13].

Yes, you are correct. The ability to determine the direction a person is facing, in addition to their pose, can provide valuable insights for retailers to optimize the shopping experience for customers based on the direction they are facing, retailers can offer personalized recommendations and improve the customer experience. As you mentioned, in the advanced stages of this work, retailers may be able to use this information to direct store employees to customers who may need assistance or to help customers navigate the store more efficiently. This could lead to improved customer satisfaction and increased sales for retailers. However, it's important to balance the benefits of these technologies with potential privacy concerns. Retailers must be transparent about the data they collect and how it is used, and take steps to protect customer privacy and data security. Additionally, retailers must comply with relevant laws and regulations related to data collection and use[14].

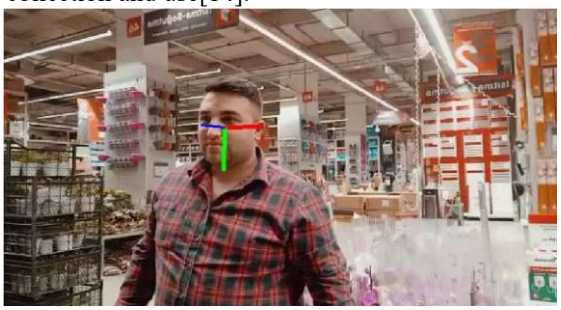

Fig.1. The direction of customer view-1.

Fig.2. The direction of customer view-2.

Thank you for the additional information. The use of vectors to represent the pose and direction of a person can be a useful way to visualize the data collected through video analytics. By representing the pose and direction with different colored vectors, it can be easier to interpret the data and make decisions based on it. However, it's important to note that the interpretation of this data should be done carefully and with consideration for potential biases and limitations of the technology. For example, the accuracy of the pose and direction estimation may be affected by factors such as lighting, occlusion, and the position of the person's head. Additionally, the interpretation of this data should be done in a way that respects customer privacy and data security. Overall, while the use of vectors to represent pose and direction can be a helpful tool for retailers, it's important to use this data responsibly and with an understanding of its limitations [15].

INTERACTIVE KIOSKS

It's true that the pandemic has had a significant impact on customer behavior, and many retailers have had to adapt to changing trends. The increased use of self-service points in stores is one example of this.By offering self-service kiosks, retailers like Koçtaş can provide customers with a convenient way to manage their time and complete tasks instore. However, it's important to ensure that the kiosks offer a user-friendly interface and provide customers with the information and functionality they need to complete their tasks efficiently. The basic functions offered by the kiosks in Koçtaş stores viewing, are a good starting point. However, as customer expectations continue to evolve, retailers may need to expand the functionality of their selfservice kiosks to include additional features such as personalized recommendations, virtual try-on, or real-time inventory information. Overall,

the use of self-service kiosks in retail stores can be a valuable tool for managing customer time and improving the in-store experience. However, it's important to ensure that these kiosks are designed with the customer in mind and offer the functionality that customers need to complete their tasks efficiently [16].

Deep neural networks [45] and Collaborative Networked Learning [46] can improve the accuracy of predictions by analyzing complex patterns in data. Mobile learning [47] systems, analogical reasoning [48], m-learning [49], ensemble learning [50], and Augmented Reality [51] and deep learning [52] can enhance the learning experience and support various applications, including accounts privacy and management, by providing personalized and engaging content.

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Fig.3. The kiosk in stores.

It is worth noting that the use of virtual digital assistants in retail is becoming increasingly popular due to their ability to provide personalized recommendations and assistance to customers, as well as their cost-effectiveness compared to traditional human staff. In addition, they can operate 24/7, provide consistent service quality, and collect valuable customer data that can be used for targeted marketing and product development. As a result, virtual digital assistants are expected to continue to drive growth in the smart kiosk market and play an important role in shaping the future of retail.

Using natural language processing technology to interact with customers in their local language can provide many benefits to Koçtaş stores. It can help customers to easily and quickly find the products they need, place orders, and get more information about products and prices. By integrating natural language processing technology into their kiosks, Koçtaş can improve the overall customer experience, reduce wait times, and increase customer satisfaction. Furthermore, having continuous dialogues with customers using natural language processing can help Koçtaş better understand customer needs, preferences [], and behaviors. This information can be used to improve marketing strategies, product offerings, and store layouts to better meet the needs of their customers. Overall, integrating natural language processing technology into their kiosks is a smart move for Koçtaş in their ongoing digital transformation journey, and can help them stay competitive in the rapidly changing retail industry [18].

DYNAMIC CREATIVE OPTIMIZATION

The Dynamic Imaginative Optimization project began in 2019 designed to go beyond the standard targeting strategies by deepening Kostas's persona strategies and developing detailed customer profiles. The project utilized data obtained from both 1st party and 3rd party sources to create four personas: garden and terrace owners, decoration enthusiasts, families with children, and those who are moving or renovating their homes. Consumers who had formerly buy groceries above a particular hoop median in the lawn, carving, heating system, as well as freezing types at Koçtaş were found as the preferred target meeting. Programmatic advertisements were then created on DV360, displaying several goods with different tinted posters to every one. In total, 3,506 variations of size, persona, and colors were generated, allowing for a highly personalized advertising experience for each customer [17].

It's interesting to see how Dynamic Creative Optimization can be used to optimize ad variations in real time using artificial intelligence. It's also notable that the test results showed that users were more likely to click on Koçtaş logo in the last picture, indicating the importance of branding in advertising. By continuing to use data-driven approaches like this, Koçtaş can continue to refine its advertising strategies and improve its overall marketing performance.

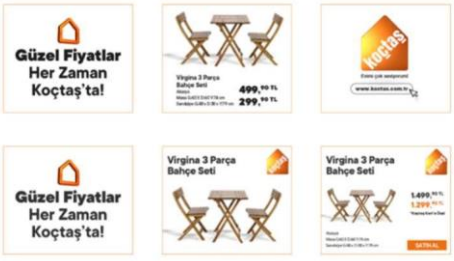

Fig.4. The banners logo as well as without logo.

Color can have a significant impact on consumer behavior and decision-making, and it's interesting to see how different

colors affect conversion rates in this context. It's worth noting that color preferences and meanings can vary by culture and context, so the results may not be generalizable to all markets and situations. However, in the context of Koçtaş's digital advertising campaign, it's useful to know that black and blue were the most effective colors for driving conversions among the targeted personas. This information can inform future advertising campaigns and help to optimize their effectiveness.

Fig.5. The various painted banners with logo as well as without logo.

That's great to hear! It sounds like Koçtaş was able to use data and artificial intelligence to gain a better understanding of their target audiences, which allowed them to optimize their advertising and marketing strategies. By doing so, they were able to increase their turnover and achieve a high return on their advertising spend. It's also noteworthy that they were able to adapt to the changes in customer behavior due to the pandemic, which is important for businesses in today's rapidly changing environment. Overall, it seems like Koçtaş has been successful in their digital transformation journey and has leveraged data and AI to provide better customer experiences and achieve better business outcomes [19].

CONCULUSION

In conclusion, home improvement retailers such as Koçtaş offer a wide range of products and services to help homeowners improve their living spaces. From basic construction materials to high-end decor items, Koçtaş provides a comprehensive selection of products to suit various needs and budgets. In addition to its products, Koçtaş also offers various services to help customers with their home improvement projects. These include installation services, tool rental, design consultations, and workshops to teach customers how to complete specific projects. Koçtaş's success as a home improvement retailer can be attributed to its focus on customer satisfaction. The company has invested in creating an engaging in-store experience, providing quality products at competitive prices, and offering excellent customer service. Overall, Koçtaş has become a go-to destination for homeowners in Turkey who are looking to improve their living spaces. Its comprehensive product selection, diverse service offerings, and customer-centric approach have helped the company stand out in a competitive retail landscape.

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