AI in Product Management

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Lecture - 17
Personalization Engines using AI

.... Welcome to this NPTEL online certification course on artificial intelligence in product management. Now we are talking about module 17, and we will be discussing personalization engines using AI. So, this is what we are talking about in part 4: category management and customer analysis using AI. To give an overview of this module, we will start with introducing and discussing the application of AI in personalization engines.

Then, we will learn about the working of AI personalization engines. We will describe the use and types of AI-powered recommendation systems, understand AI-enabled personalization throughout the customer journey, explain the benefits of AI personalization for business, discuss the best practices and trends for AI in personalization, and then we will explain the challenges associated with personalization using AI. So, let us start with the introduction to personalization engines. In the ever-expanding digital landscape, where choices seem limitless, AI-powered personalization has emerged as a game-changer.

Whether it is selecting the next movie to watch from thousands of options or navigating the vast array of products on e-commerce platforms, AI recommendation and personalization engines are becoming indispensable tools for enhancing customer experience. AI personalization is helping to address the choice overload phenomenon, where individuals report lower choice satisfaction when faced with too many options. Consider also the manufacturer's challenge of identifying the right number of colors or feature factors to produce each season. Too many SKUs with declining sales returns risk destroying margins.

But with AI personalization, the length of time for identifying a preference is shortened from months to days, maybe even minutes, allowing for new forms of just-in-time manufacturing and enabling competition on micro-features and real-time production. Personalization and recommendation algorithms have become the backbone of the digital world. Taking them to the next level with AI enables users to discover relevant content and products with ease while simultaneously enabling new categories of competition within

every industry. Recent advancements in AI technology, such as generative AI, have enhanced marketing practices by generating personalized experiences in close to real time.

These advancements are assuring in an era of omni-channel hyper-personalization, a customized and seamless customer experience across platforms that responds to customer behaviors immediately. So now we will talk about AI personalization in marketing, which is the application of artificial intelligence and machine learning to discover customers' needs and preferences. Companies can use these insights to forecast customer behavior better and modify their products and marketing strategies to improve customer experience. Personalization engines are sophisticated tools that leverage artificial intelligence and machine learning to create tailored customer experiences. By analyzing user data and behavior, these engines deliver customized content, recommendations, and marketing messages across various channels, enhancing user engagement and satisfaction. Rather than developing generic campaigns,

AI personalization helps you speak directly to your customers, increasing the likelihood of conversion. Now we will look at how a personalization engine works. The first form is data collection and integration. Personalization engines gather data from multiple sources, including website interactions, purchase history, and social media activity. This data is integrated to

Form a unified view of each customer. The second is customer profiling. The collected data is used to create detailed customer profiles that reflect individual preferences and behaviors. These profiles are continuously updated in real-time as new data is collected. The third is AI and ML algorithms. These algorithms analyze customer profiles to identify patterns and predict future behavior. Techniques such as collaborative filtering Based on group behavior and content-based filtering, based on product characteristics, are commonly employed to enhance recommendation accuracy. Real-time personalization. Based on the insights gained from the analytics, personalization engines deliver customized experiences in real-time. This includes tailored product recommendations, personalized marketing messages, and content.

Continuous learning. Personalization engines adapt over time by learning from user interactions and feedback. Allowing them to refine their algorithms for improved accuracy and relevance. Now, let us look at the top AI personalization engines. So, one is Insider.

The key feature of this engine is omnichannel personalization and predictive segmentation. Ideal use cases are in e-commerce, finance, and travel. Another engine is Dynamic Yield.

That also leads to real-time personalization across multiple channels, and it can be used in retail and online services. The third is Evergage.

The key features are comprehensive customer engagement analytics, and the ideal use case is in B2B services. The fourth is Optimizely, which can be used for A/B testing integrated with personalization features, and it can be used for digital marketing campaigns. Algolia, search optimization combined with personalized results, can be used for e-commerce platforms. Now we will look at applications of AI personalization tools. The first is AI-powered chatbots.

AI-powered chatbots and virtual assistants provide personalized interactions in conversational language by reading and understanding user queries, then offering tailored responses. These chatbots can handle customer service, provide product recommendations, and assist in troubleshooting, creating a more efficient and personalized user experience. Available at all hours of the day, these chatbots also collect valuable insights into consumers' buying patterns and engagement habits, driving efficiency. Then comes content personalization.

It includes using AI to deliver It involves using AI to deliver tailored emails, articles, product descriptions, videos, text messages, or other media to users based on their interests and behavior. By using content personalization, organizations can deliver high-quality and engaging assets that resonate with the target audience while saving time and resources. Some AI technologies that enable personalized campaigns include natural language processing.

NLP allows machines to comprehend and respond in a manner that feels natural to the customers. Then comes natural language generation. NLG creates customized text based on user input, helping marketers easily craft personalized messages on a large scale. Then comes sentiment analysis.

Sentiment analysis features examine customer feelings about specific products or brands, enabling marketers to adjust their strategies accordingly. Now, let us look at the application of AI personalization tools in customer segmentation. AI-powered customer segmentation features identify customers with similar traits and target them with customized campaigns based on their individual preferences. Leveraging AI-powered customer segmentation also enables marketers to allocate resources more effectively.

They can focus on the groups with the highest customer loyalty to maximize return on investment. Another is dynamic pricing. So, it is an AI-driven strategy where prices are adjusted in real-time based on various factors. such as demand, supply, consumer behavior, and market conditions. Though historically used most often by hospitality and travel organizations, dynamic pricing is now used in various industries to optimize pricing, maximize revenues, and provide lower rates to consumers during off-peak hours.

The next is predictive personalization. It uses AI to anticipate user needs and preferences before they explicitly express them. By analyzing historical data, AI can predict what products or content a user might be interested in next, enhancing the overall user experience. For example, Starbucks started a predictive personalization program powered by algorithms that offered specific drinks to app users based on their purchase history.

Predictions about what consumers would order based on the time of day or whether they were also integrated into the brand's inventory management system. Landing page. Programmatic SEO involves creating landing pages using usually hundreds, sometimes thousands, to automatically target keywords. This process is done in bulk, which means it can take hundreds of hours if you were to do it manually.

AI can help you do this at scale. You can use AI to create hundreds of programmatic landing pages that meet search terms based on industry or location. Upwork is a great example of this. You can search for any type of freelance service in any city, and Upwork will have a landing page.

The next application is in localization and translation. If you are expanding into international markets, you can use AI to localize your content by translating it into different languages for your various target markets. This can be done for programmatic landing pages. You can also localize ads, product marketing assets, and SEO content. You don't necessarily need to be expanding to different countries to take advantage of localization.

If your audience is global and you want to personalize the ads or landing pages to their languages, AI can automatically translate for you. Now we will talk about AI-powered recommendation systems. An AI-powered recommendation system is a machine learning algorithm that is trained to rank or rate products or users. It is designed to predict the rating a user might give to a specific item and then return those predictions to the users. In a ranked list.

This technology is used by many popular companies such as Google, Amazon, and Netflix to increase user engagement with their platforms. There are many ways to build a recommendation system, and the approaches can vary from algorithms and formulas to modeling-centric. These approaches include PageRank, collaborative filtering, content-based, and link predictions. Now we will look at the types of AI-powered recommendation systems.

The first is a collaborative filtering system. It is a technique used in recommendation systems to predict the interests and preferences of a user based on the data and patterns from many users. The basic principle of collaborative filtering is that if two users have similar tastes in one product, they are also likely to have similar tastes in other products. There are two main types of collaborative filtering approaches: memory-based and model-based. Memory-based approaches, also known as neighborhood collaborative filtering,

use the ratings of user-item combinations to predict their preferences based on their neighborhoods. User-based collaborative filtering recommends products to a user based on the preferences of similar users, while item-based collaborative filtering recommends products based on the similarity between items calculated using user ratings of those items. On the other hand, model-based approaches use predictive models that involve machine learning to parameterize the features associated with the dataset as inputs in the model. This helps to solve an optimization-related problem. Model-based approaches include decision trees, rule-based approaches, and latent factor models. Now, let us look at some examples of personalization engines, and we will start with Amazon, which is famous for its sophisticated, cutting-edge personalization to enhance the customer experience. The e-commerce giant uses product recommendations. The site analyzes shoppers' browsing history, purchase behavior, and items in shopping carts to suggest products they would be likely to buy.

Personalized emails: Shoppers receive emails with product recommendations based on their past purchases and browsing history. Dynamic homepages: The site's homepage and product pages are tailored to cater to people's preferences, displaying recently viewed items, relevant deals, and categories likely to be of interest. So, this is an example of this. AI: Amazon.com has new recommendations for you based on items you purchased or told us you own. And these are the various books.

Another company's example is that of Levi Strauss & Co. This jeans retailer. Creates an engaging shopping experience both online and in stores by applying personalization in

strategic ways. Here is how its approach helps to drive repeat purchases. So, what they do is provide personalized fit recommendations.

Using data from online shoppers' preferences and prior purchases, they offer fit and style recommendations. Then comes tailored marketing campaigns. They use customers' data to send targeted emails featuring products and promotions that align with people's preferences and past behavior. In-store personalization. Levi's taps online data to enhance on-site store experiences, allowing sales associates to provide guidance informed by shoppers' online browsing and purchase history.

So here is an example of this. Try this on. The next example is that of Netflix. Netflix personalizes its online user experience by recommending shows and movies based on subscribers' viewing history and ratings.

To increase user engagement and retention rates, the platform offers personalized recommendations, that is, suggestions for TV shows and movies that are similar to what people have watched and enjoyed. Dynamic Thumbnails: The platform attracts users' attention with thumbnails customized based on what Netflix knows about their preferences. Customized Generates: Netflix creates unique generic categories for viewers based on their preferences, like critically acclaimed dark comedies and science fiction movies with a strong female lead. The next comes AI-enabled personalization throughout the customer journey.

Focusing on the touchpoints of the customer journey and understanding the customer's interaction with AI-enabled personalization, so we will call it AIP, along that journey helps to draw a rich picture of the role of AIP in shaping interactive marketing. Given the important role of AIP in collecting, categorizing, analyzing, and utilizing the data generated from previous customer interactions and in shaping the customer experience at the pre-purchase, purchase, and post-purchase stages. It is important to understand AI applications and managerial implications throughout the customer journey. So, we will see that in Figure 17.1.

This is Figure 17.1. So, it shows AIP applications throughout the customer journey. So in between, we have personalized profiling, that is the previous experience stage, data collection, and customer profiling. And then here we have personalized nudges, that is the purchase stage. So we start with personalized navigation, that is the pre-purchase stage.

Here we optimize search engines and recommend a system. Then, in the purchase stage, there are personalized nudges like AI-enabled customized products, personalized pricing, targeted ads, and personalized promotion offers. And in the post-purchase stage, we have personalized retention, chatbots, and smart home appliances. AIP in the previous experience stage, personalized profiling, a customer's previous experience enables AIP to analyze the purchase history of that consumer, and by doing so, AIP can categorize that. Given the role of previous experiences, AIP specializes in personalized profiling that aims to provide an accurate profile of each customer. Personalized profiling refers to the process whereby

Firms leveraging AI collect fine-grained data at the granular level to historically categorize a consumer and precisely predict the behavior of even one consumer. Unlike traditional targeting, which usually captures a segment of one group, personalized profiling can reach a segment of one group successfully, and thus micro-targeting can be put into practice. AIP can leverage the IoT by involving scenarios, wearables, heatmaps, video surveillance, and beacons to collect individuals' unstructured and structured data. AIP builds profiles by collecting data from a wide range of digital platforms. Consumers are exposed to various digital touchpoints, for example, social media, e-commerce, etc.

When building profiles, marketers are dependent on machine learning, deep learning, neural networks, natural language recognition, and image recognition. In other words, personalized profiling mainly incorporates data collection and customer profiling. Now, AIP in the pre-purchase stage, personalized navigation. In the pre-purchase stage, customers take actions such as need recognition, information search, and considering alternatives.

These interactions with the company and the environment provide AIP with an opportunity to guide customers. The potential customers around online and offline touchpoints. For instance, AIP leverages e-search engines to guide customers' online attention. As such, the tactics of AIP in the pre-purchase stage are called personalized navigation. So, this personalized navigation refers to the process whereby firms leveraging a designed AI system can guide customers to a pre-prepared online site.

It means that AIP designs a technological system to navigate potential customers toward future purchases. Optimized search engines and recommender systems are essential touchpoints of personalized navigation. Firms widely apply text, voice, and visual search

engines to orient customers. Text and voice search engines have become routine search methods.

Visual search engines now offer a new situation in which consumers use their cameras to search for items. AIP in the purchase stage. Personalized nudges. In the purchase stage, consumers are likely to act by making a choice, ordering, and paying. To fulfill a customer's purchase, marketers are highly reliant on interactive marketing nudges.

In this regard, AIP focuses on personalized nudges in the purchase stage. By carrying out personalized nudges, AIP combines traditional marketing thinking with AI to satisfy consumer needs, such as by making personalized promotional offers. So, what are these personalized nudges? Personalized nudges refer to the process whereby firms combine AI technology with the marketing mix to incentivize customers to engage in a purchase. It aims to encourage a purchase decision and includes the touchpoints of AI-enabled customized products, personalized pricing, targeted ads, and personalized promotional offers. Now, we will look at AIP in post-purchase stages, that is, personalized retention. In the post-purchase stage, customers

show behaviors such as usage and consumption, post-purchase engagement, and service requests. At the same time, marketers hold a key objective of developing customer loyalty through marketing efforts, including after-sales services. In this case, AIP can not only consider customer requests in the post-purchase stage but also strive to retain customers and even begin the customer journey process anew. As such, AIP develops itself as a form of personalized retention in this stage. So, personalized retention refers to the process whereby firms leveraging AI preserve the one-to-one relationship with the consumers and even create a trigger that drives the consumers to begin the customer journey again. The aim of personalized retention is to cultivate customer loyalty and engage re-entering in the pre-purchase phase. Personalized retention works by collecting comments about product usage and consumers, enhancing consumer engagement, and offering customer service.

Chatbots and smart home appliances are critical touchpoints in personalized retention. So, what are the benefits of AI personalization for business? First is better conversion. Shoppers want personalization, and they will reward businesses for it. They want to feel understood and catered to.

AI personalization, real-time adoption, Ensures that you can deliver relevant recommendations that reflect each shopper's profile and preferences. By delivering personalized suggestions and offers, it is likely to improve their satisfaction and increase

conversion rates. The next is improved customer retention. 76% of consumers are more likely to purchase from brands, even repeatedly, that personalize.

That means AI personalization can keep customers coming back. For example, if an online bookstore tracks a shopper's reading habits across their past purchases in real time, it can suggest new releases in the shopper's favorite genres. Such personalization tactics would lead to additional purchases as the shoppers come to appreciate their taste being known and catered to by understanding customer preferences. That they have revealed at various touchpoints along their decision-making process can help move forward building long-term relationships with them and reaping the rewards of their repeat purchases. The next benefit is better customer satisfaction.

Supplying shoppers with the personalized experiences they look forward to on their customer journeys can quickly lead them to just what they are interested in and then Higher customer satisfaction levels and a good reputation can transform an e-commerce platform into a real powerhouse. Another benefit is investing in data. Effective and agile AI systems are built on a strong data foundation. Capturing and cleaning this data

Both internal data and third-party information often require significant investments. This might also mean hiring engineers and acquiring the computing power necessary to host an AI system. Now, what are the best practices for AI personalization? One is maintaining consumer trust. Even as today's consumers desire personalization, the average user remains concerned over data privacy.

Effective AI personalization Programs strive to provide consumers with information they can use without unnecessarily mining personal data that they might be uncomfortable sharing. Good data governance can also require an organization to implement robust security protocols to safeguard data from breaches. Ensuring transparency using AI to personalize user experience typically requires Clear communication in which users are informed how their data is being used.

Clear expectations around data use and management can also ensure that AI models are trained on diverse data to prevent biases and discrimination. Using robust AI models, organizations typically achieve better results when they carefully audit the models used to train and tune their personalization AI systems. By choosing an AI model that's well-suited To business cases and personalization tasks, brands can facilitate better-performing products. Successful models are also typically updated regularly and retrained on new data to improve accuracy.

Focusing on value creation, successful campaigns typically involve significant planning before the training of an AI system. Creating a roadmap to align personalization strategies with overall business objectives can help ensure the eventual product drives growth and profitability. Now, what are the emerging trends in AI personalization? Generative AI and other advancements in AI technologies have deeply impacted the practice and development of personalization in commerce settings and the business world.

Increasingly, AI technologies have the capacity to create specific content for individual users and forecast customer needs. We will discuss some of the recent advancements in AI personalization, in the next slide. One is hyper-personalization, which advances the practice of personalization by using real-time data and AI to deliver highly customized experiences. While segmentation groups customers together, the process enables organizations to speak directly to individual customers. This can include real-time product recommendations, dynamic website content that responds to user navigation, and personalized marketing campaigns that adapt based on user interactions. Omni-channel personalization, or channel-less personalization, ensures a consistent and personalized experience across all customer touchpoints, including websites, mobile apps, social media, and in-store buying.

AI can integrate data from multiple channels to create a seamless and cohesive user journey. For example, the beauty retailer Sephora has been effective in its omnichannel personalization strategy by offering a companion app that helps consumers find items. The app unifies data points such as previous purchases and brands tried on at the counter in-store. The next trend is content creation. Generative AI can create marketing copy, articles, and even creative assets based on user preferences and behavior. This enables brands to produce a large volume of relevant content effectively and create far more content based on individual preferences than in the past. For example, generative AI might create a specific advertisement for an individual consumer based on product.

on the time of the day or how close an app user is to a particular store. So, what are the challenges of AI personalization marketing? AI personalization tools are not without their flaws. Let us look at a few of the challenges and how marketers can address them. The first is crafting prompts.

The most common challenge when using AI is with prompting. AI is smart, but it is still learning. In fact, most tools need time and a lot of practice receiving prompts to adjust to

your voice, tone, and requests. This can be challenging when using AI for personalization. It is good to be as specific as possible to generate better prompts.

For example, look at a language learning model as a person, a very intelligent and knowledgeable person, but still a person; it cannot read your mind. Set very specific prompts, tell the LLM exactly what you want, how you want it to write, what you want the outcome to be, how you want things formatted, and what you want and what you do not want. Another challenge is technical knowledge. Another challenge marketers may run into is having a lack of technical knowledge.

Marketing personalization at scale requires a bit more technical expertise than using ChatGPT, for instance. You may need to understand APIs and have a deeper grasp of how AI works to create personalization workflows and automated outputs. Fortunately, with the rise of no-code tools, It has never been easier to tap into APIs and automate your marketing. Tools like Make.com and Zapier, which natively connect with your favorite marketing tools and AI platforms like OpenAI, can help managers accomplish tasks.

So, to conclude this module, We have discussed the concept of personalization engines using AI and their applications. We have discussed how AI personalization engines work. We have learned about the use and types of AI-powered recommendation systems. Then, we have learned about AI-enabled personalization throughout the customer journey.

Thereafter, we have understood the benefits of personalization using AI. We have also learned the best practices and trends for AI in personalization. And finally, we have discussed the challenges of personalization using AI. These are some of the references from which the material for this module was taken.

Thank you.