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How Spotify Uses AI (And What You Can Learn from It)

By
**Mike Kaput
(https://www.marketingaiinstitute.com/blog/author/mike-
kaput)**
on January 26, 2024

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Spotify uses artificial intelligence in a ton of smart ways to create an incredible listening experience across its audio streaming platform. This includes an AI DJ feature that curates a personalized selection of music for you based on your preferences, AI that translates podcasts into different languages (/blog/the-marketing-ai-show-episode-66), AI-powered music and podcast recommendations, and AI-driven search capabilities.

(Maybe that's why Spotify is the world's most popular audio streaming service, with upwards of 574 million active users across more than 180 countries.)

Understanding how Spotify uses AI is valuable for a few reasons:

1. If you use Spotify, you may discover new uses for the platform...

2. Even if you don't use Spotify, it can help anyone who produces a podcast understand how their content is getting found on the platform...

3. And even if you don't have a podcast, the company is a sterling example of how important it is for any brand to build AI Native and AI Emergent companies (/blog/the-future-of-business-is-ai-or-obsolete).

So, let's dive in.

How Does Spotify Use Artificial Intelligence?

Spotify uses AI in a handful of core ways that impact users.

Spotify AI DJ

The most high-profile and popular AI feature in Spotify is AI DJ.

Spotify's AI DJ is an AI-powered disc jockey that will choose what to play for you based on your specific music tastes and listening behavior. The AI DJ curates tracks for you based on your individual user data, then narrates its selections in a hyper-realistic voice created by generative AI.

AI DJ will switch up songs and vibes based on your real-time feedback (just hit the DJ button and it'll change it up), and it can surface music you haven't listened to in awhile or new selections based on what it thinks you'll like.

Discover Weekly

Spotify's Discover Weekly is a series of custom-made AI playlists, uniquely crafted each Monday for every user by the platform's AI algorithms.

Each personalized playlist is a compilation of 30 songs, carefully chosen to align with each user's specific listening preferences. It's designed to introduce listeners to new tunes by considering various factors, such as their streaming history, songs they've added to their playlists, and their likes and dislikes.

This feature has gained widespread popularity as a means for Spotify users to unearth new music, offering a gateway to explore unfamiliar artists and genres.

Spotify Wrapped

Spotify Wrapped

A popular seasonal use of AI at Spotify is the company's yearly Spotify Wrapped feature. At the end of each year, Spotify users can access Spotify Wrapped which is a personalized summary of their listening patterns throughout the year. It highlights your most frequently played artists, songs, albums, and podcasts, as well as stats on total listening minutes and favorite genres. Spotify will even curate a playlist of your top 100 tracks in the last year.

AI-Powered Recommendations

Spotify's AI models recommend music, podcasts, playlists, and other content to users.

To do that, Spotify's AI models use data on your behavior and preferences to predict what you might want to listen to next. That data includes what you listen to, how long you listen to it, what playlists you create, and much, much more. These AI-powered recommendations are served up in various areas on Spotify's Home screen, such as the "Shows you might like" section, which recommends new podcasts based on your interests.

Spotify leans heavily on reinforcement learning, a type of machine learning model that uses signals to optimize toward a goal. While Spotify doesn't reveal the secret sauce behind its AI, it likely optimizes recommendations towards a range of user-centric metrics, like increased likes or saves of tracks and increased user engagement with the platform. Basically, Spotify's AI is engineered to get you to come back to listen more and more often.

In this way, Spotify's AI-powered recommendations are the company's competitive advantage. Spotify doesn't have a monopoly on music streaming. While it does own the exclusive rights to some podcasts, you can typically find your favorite music, podcasts, and audiobooks on other platforms. What Spotify does have that's unique is a superior way to surface the right audio at the right time for you specifically.

This ability to hyper-personalize audio recommendations to each and every Spotify user is impossible without AI. This means, in a very real sense, Spotify as a business today would not exist at its current scale without AI. According to the company, at least half a trillion events are processed daily (https://newsroom.spotify.com/2021-10-13/adding-that-extra-you-to-your-discovery-oskar-stal-spotify-vice-president-of-personalization-explains-how-it-works/) to inform machine learning models. And the more data these models gather, the better they are at making higher-quality recommendations.

AI-Powered "Daylists"

Spotify has also now launched an innovative feature called "daylists," offering users three unique, algorithmically-generated playlists daily, each with a quirky and ultra-specific title.

These titles, ranging from "Midwest Emo Flannel Tuesday Early Morning" to "Witchy Ethereal Tuesday," have sparked considerable amusement on social media, enhancing the service's popularity since its introduction. The titles, created by AI, are based on thousands of descriptors related to genre, mood, and themes, and are the brainchild of a team comprising data scientists and music experts at Spotify.

Molly Holder, Spotify's Senior Product Director, describes these playlists as "hyper-personalized, dynamic, and playful," aiming to reflect users' unique audio identities, according to The New York

reflect users' unique audio identities, according to The New York Times (https://www.nytimes.com/2024/01/24/style/ai-spotify-music-playlist-algorithm.html).

The daylists align with Spotify's strategy of hyper-specificity, resonating with 80% of its users who appreciate the platform's personalized offerings. Notably, users have expressed both amusement and bemusement at the titles, often sharing them on social media for their uniqueness and sometimes bizarre relevance to their personal tastes. This innovative approach to playlist naming appears to be a modern twist on the classic mixtape, offering a new way for users to engage with and share their music.

Podcast Voice Translation

In 2023, Spotify announced Voice Translation for podcasts, an AI-powered feature, which translates podcasts into different languages—all in the podcast host's original voice. The tool uses OpenAI technology to match the AI-generated voice to the speaker's individual tone and style automatically. This means a podcast host can record an episode in English, then translate it into other languages in their own voice. Currently, the feature is being piloted with popular podcasters like Lex Fridman and Bill Simmons, with plans to expand access to these AI-powered capabilities over time.

Natural Language Search

Spotify uses artificial intelligence to power natural language search.

Previously, Spotify used exact words typed into a search bar to match content to queries. This approach was better than nothing, but it was limited: it didn't always provide high-quality results because it could only match terms very close to those used in a song, album, or podcast title.

Natural language search is different. Using AI technologies like natural language processing (NLP) and deep learning, natural language search understands the semantic correlation between words, so it doesn't need to exactly match your search with the words in a title to find what you're looking for. That's because natural language search can understand synonyms for different words, paraphrasing, and any content that means the same thing as what you searched.

This AI-powered feature is critical to navigating the platform, allowing you to quickly and easily find music, podcasts, and audiobooks—even if your search doesn't match the exact keywords in the title of the audio.

Spotify's Artificial Intelligence Investments and Acquisitions

It's no surprise, then, that Spotify has acquired AI companies, or companies related to AI, at a steady clip for almost a decade.

- In 2013, Spotify acquired Tunigo to power better music recommendation algorithms.
- In 2014, the company acquired Echo Nest, a music intelligence company that Spotify used to improve recommendations.
- In 2015, Spotify acquired data science company Seed Scientific.
- In 2017, Sonalytic was acquired by Spotify. Sonalytic uses machine learning to detect audio and recommend music.

- Also, in 2017, Spotify acquired Niland, an AI startup, to optimize music searches and recommendations.
- In 2018, Spotify started a regular event called Machine Learning Day, which brings together company researchers to discuss core topics in AI.

In its most recent AI-related acquisition, Spotify acquired Sonantic, an AI-powered text-to-speech generator. The acquisition was announced in 2022. One of the first applications of Sonantic is in the company's AI DJ feature, which provides AI-generated commentary for each user's AI-generated playlist.

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MIKE KAPUT (HTTPS://WWW.MARKETINGAIINSTITUTE.COM/BLOG/AUTHOR/MIKE-KAPUT)

As Chief Content Officer, Mike Kaput uses content marketing, marketing strategy, and marketing technology to grow and scale traffic, leads, and revenue for Marketing AI Institute. Mike is the co-author of Marketing Artificial Intelligence: AI, Marketing and the Future of Business (Matt Holt Books, 2022). See Mike's full bio. (https://www.marketingaiinstitute.com/mike-kaput-full-bio)

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No matter your background or level of understanding, there is a simple, non-technical way to answer the question: "What is AI?"

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