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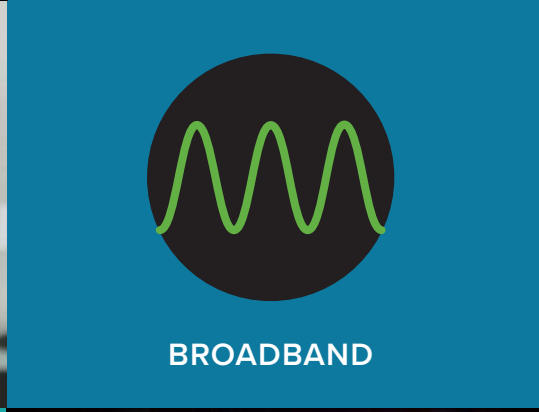
Digital Media Trends To Follow in 2022

A Primer on Artificial Intelligence and Blockchain
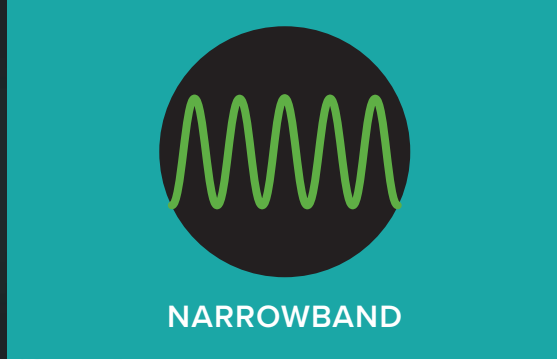
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Table of Contents

BROADBAND

NARROWBAND

INTRODUCTION

The media industries historically have been shaped by paradigm shifts in technological development – radio to television, broadcasting to cable, narrowband to broadband, and analog to digital all represent dramatic changes that generated major adjustments to business models and operational practices. Now and in the future, a new array of technological developments, emphasizing software over hardware, promise to influence these industries significantly, too.
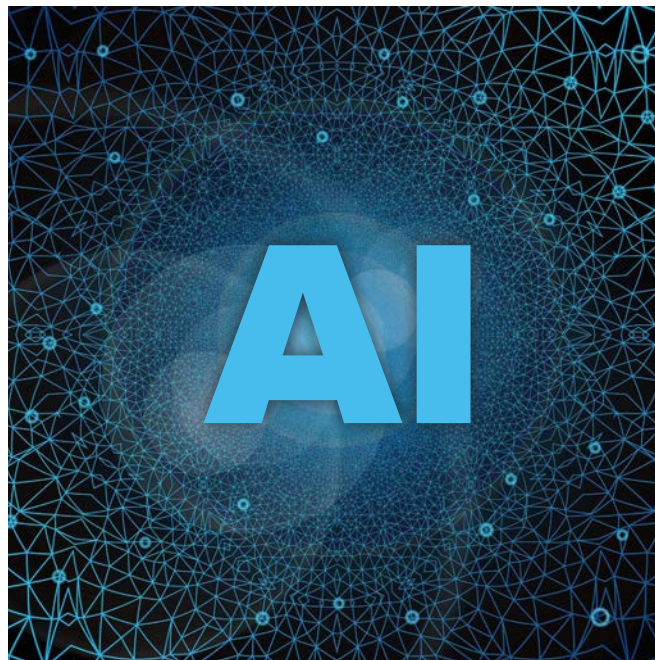
This timely Primer from The Media Institute's Digital Media Center offers perspectives about two prominent examples – Artificial Intelligence (AI) and Blockchain.

ARTIFICIAL INTELLIGENCE (AI)

I.   Technology Overview

In recent years, there has been an explosion of machine learning (ML) in the media industries. In advertising, algorithms identify the correct audience and display ads to them as a means of being more efficient with media spend. This programmatic advertising is machine learning at the most basic level: a set of inputs (e.g., demographics, data analytics, and the actual content) coupled with technology to deliver ads in the intended fashion and to improve messaging for a brand.

need must reflect good data. This will require building intelligence into the data collection process to ensure that the right data is being collected. This focus on quality data collection at the outset will help identify the problems that need to be fixed and any information gaps. Only then can AI tools be really useful.

Making the jump from machine learning tasks such as programmatic advertising (where speed and precision matter) or logo creation (where the design process can be simplified and automated) to artificial intelligence will require additional levels and layers of complexity added to the technology.

Artificial intelligence (AI) is not the same as machine learning, however. Rather, it takes machine learning to a more intuitive level, so that AI can create content that is on par with what humans can do. The foundational blocks that will create the AI engines that we

As the use of AI grows, decision making also will be made within an AI engine, which will use the outcome to improve for the next iteration of that same decision – all without any manual/ human interaction.

II.   Utilizing AI in Media Companies

AI-based tools enable new media cataloging, utilization, and monetization possibilities. AI systems, such as those of Microsoft, Google, or IBM, facilitate the automation of repetitive tasks and processes that would normally require greater time and resources, especially in the areas of production, cataloging, and media management.

Currently, the main areas of application of AI in broadcast and cable television are cataloging and metadata detection, automated thanks to these tools. Content cataloging, for example, now can be done on almost a real-time basis. This means that for day-to-day work at a TV station or network, there now are more powerful analytical tools for news and live production.

AI's benefits extend beyond generating

information directly from broadcast or cable media. Its accuracy, speed, and amount of information also enable other applications. These include:

- **Advanced Search:** Greater accuracy in browsing through content due to the larger amount of available parameters. This allows for the adaptation of search criteria to each user's needs, which can reduce the number of relevant results returned by the search engine, focusing only on those really relevant and useful. Machine learning processes can train the system for the specific needs of its users. An example would be identifying people within the system, who then could be recognized both in new media files and in those previously archived without any further manual intervention.

- **Specific Segment Retrieval:** Through content analysis, AI can retrieve specific video segments from different files, according to the criteria introduced in the search engine, including mark-in and mark-out. Again, this means that it no longer will be necessary to select each of them manually. For example, it will be easier to retrieve all segments where a politician speaks about a specific

topic or every goal, shot, or foul from a basketball game.

- **Quicker and Easier Content Creation:** Enabling users to generate video clips from an automatic video segment search and unify them in a single clip ready for broadcast, such as news and sports highlights.

- **Content Monetization:** By integrating AI tools within media management systems, greater control of all the available media is possible, which can result in a better usage of all media and content available. This helps avoid creating or editing content already available, saving time and creating better content for viewing audiences.

- **Automatic Captioning and Subtitling:** Current and future FCC requirements for closed-captioned programs can be met in a more cost-efficient manner through AI. Audio-to-text processing, automatic language analysis, translation, and speech-to-text functionalities can create automatic subtitles and caption generation in several languages.

- **Content Moderation:** Image and object

analysis, as well as language analysis, allows editors to easily detect sensitive or adult content, both on image and audio layers. Users then can block, adapt, or eliminate these elements from a video editing system.

- **Automated Journalism:** Creation of news coverage possibilities based on algorithmic selection of relevant information sources, and the minimization of "fake news."

- **Automated Music Selection:** Development of music format playlists based on actual listener behavior.

- **Marketing and Advertising Personalization:** Enhancement of the capability to customize digital targeting that appeals to individualized consumer preferences.

- **Search Engine Optimization:** Assistance in having a station or network's presence move to more prominent placement when searched for on Google and other search engines.

We already are seeing AI engines that are creating content from scratch. For example,

Phrasee can write Facebook copy by analyzing the language that gets the most engagement. G-mail account holders are increasingly using Google's Smart Compose, an AI tool that suggests what you should write next. Soon Google's AI automatically will scan your past writing to suggest how to complete a phrase or suggest the next word based on your unique writing style.
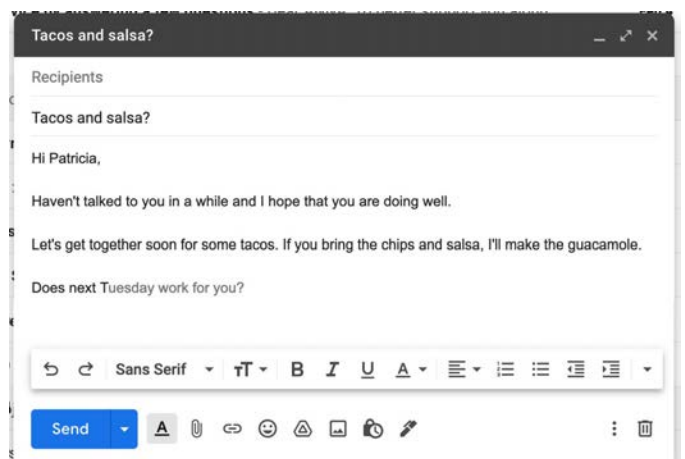
These companies are demonstrating the possibilities of AI. In the advertising context, this can be a valuable tool to make it easier or faster for an in-house or outside advertising agency to get better information, thus allowing it to make strategic decisions. Media and creative teams will get better insights about consumers and attractive branding for them, and what they need from the brand. And as a sign of things to come, WPP, a major advertising holding company, recently became an industry pioneer. It named a Chief Artificial

Intelligence Officer as part of its planned acquisition of Satalia. This new C-level position sends a message throughout the advertising world that AI, like finance or legal, now is mission critical.

Once an AI system becomes part of a media company's operations, it will be important to put audit and control processes in place. Ideally, such controls should be part of the planning process for integrating AI into station or network operations. Here are seven key questions to be addressed in AI audit and control:

#1 Is AI fulfilling its mission within the company?

#2 How "clean" and accurate is the inputted data for an AI engine?

#3 What level of data cleaning (e.g., data discards, data normalization) is in place?

#4 Are there procedures in place for monitoring and revising AI algorithms, queries, and data on a continuous and ongoing basis?

#5 Are big data repositories and AI systems monitored on a 24/7 basis to ensure that only users who are authorized to use the data and systems are accessing them?

#6 Are there lockdown procedures in place if the AI engine is compromised internally or externally?

#7 Has a disaster recovery plan been established to address a scenario in which the AI engine becomes inoperable?

III. AI Implementation Concerns

The potential negative consequences of unregulated AI advancements continue to gain prominence. Former Google Chairman and CEO Eric Schmidt, for example, warns that the artificial AI of the future will be much more powerful than today, and will have the ability to manipulate people in ways that some might not have imagined. "[T]his new generation of AI over the next decade or two will be an epochal change in human experience, because we've never had another intelligence that's human-like, that's not human," he said. "We'll be working with it, but we'll also get mad about it. We'll be worried about it ... it will change the way a child grows up. It will change military strategies."

At the international level, the United Nations Educational, Scientific and Cultural Organization (UNESCO), which includes

the United States as a member, has issued a series of non-binding recommendations for AI's development. As Gabriela Ramos, UNESCO's Assistant Director General for Social and Human Sciences, notes: "[AI] [d]ecisions impacting millions of people should be fair, transparent, and contestable. These new technologies must help us address the major challenges in our world today, such as increased inequalities and the environmental crisis, and not deepen them."

These recommendations address:

- **Protecting Data:** Mandates action beyond what tech firms and governments are doing to guarantee individuals more protection by ensuring transparency, agency, and control over their personal data. It states that individuals should all be able to access or even erase records of their personal data. It also includes actions to improve data protection and an individual's knowledge of, and right to control, his or her own data. It also increases the ability of regulatory bodies around the world to enforce this.

- **Banning Social Scoring and Mass Surveillance:** Prohibits the use of AI systems for social scoring and mass surveillance, which infringe on human rights and fundamental freedoms, and are used in a broad way. UNESCO stresses that when developing regulatory frameworks, Member States should consider that ultimate responsibility and accountability must always lie with humans and that AI technologies should not be given legal personality themselves.

- **Helping to Monitor and Evaluate:** Sets the ground for tools that will assist in its implementation. An Ethical Impact Assessment is intended to help countries and companies developing and deploying AI systems to assess the impact of those systems on individuals, society, and the environment. Readiness Assessment Methodology will help Member States assess how ready they are in terms of legal and technical infrastructure. This tool will assist in enhancing the institutional capacity of countries and recommend appropriate measures to be taken to ensure that ethics are implemented in practice. Additionally, Member States are encouraged to consider adding the role of an

independent AI Ethics Officer or some other mechanism to oversee auditing and continuous monitoring efforts.

- **Protecting the Environment:** Emphasizes that AI actors should favor AI methods that are efficient in terms of data, energy, and resources, which will help ensure that AI becomes a more prominent tool in the fight against climate change and in tackling environmental issues. Governments are asked to assess the direct and indirect environmental impact throughout the AI system life cycle. This includes its carbon footprint, energy consumption, and the environmental impact of raw material extraction for supporting the manufacturing of AI technologies. If there are disproportionate negative impacts of AI systems on the environment, UNESCO instructs that they should not be used.

In the United States, the Federal Trade Commission may take regulatory action regarding AI, which would result in specific rules that the FTC would develop and enforce. On Dec. 10, 2021, the FTC filed an Advanced Notice of Proposed Rulemaking (ANPRM) with the Office of Management and Budget that initiates consideration of a rulemaking process on privacy and artificial intelligence. Right now, it is not known how much of this proceeding may directly address AI as a distinct aspect of digital privacy.

This filing described the FTC's intent as seeking to "curb lax security practices, limit privacy abuses, and ensure that algorithmic decision-making does not result in unlawful discrimination." ANPRMs are aimed at soliciting stakeholder comments before an official rulemaking process is carried out under a Notice of Proposed Rulemaking. The FTC's filing is currently dated for February 2022, so it will either commence its solicitation period under the ANPRM or begin its rulemaking process then. In any event,

media companies should plan on following this proceeding closely and weighing in, as interested stakeholders in AI's development file formal comments.

AI also raises unresolved issues concerning the intellectual property created by AI engines. Currently, under the Copyright Act, no material that is created by a machine instead of a human would qualify for protection under the law. Courts have not yet ruled on applying copyright law to the outputs of AI machines, however. Additionally, the application of copyright law to the inputs may be different, since there will be some human activity that enables the data to be ingested, so that the issue of fully automating the creation of protectable intellectual property is less acute.

Meanwhile, the private sector is moving ahead to develop its own guardrails, in an effort to forestall any government regulatory intervention. As the FTC has warned, "Hold yourself accountable – or be ready for the FTC to do it for you."

> " *Hold yourself accountable – or be ready for the FTC to do it for you.*
> ---
> **FEDERAL TRADE COMMISSION**
> "

For example, Microsoft released a set of guidelines in 2021 to stimulate the discussions and critical thinking necessary to foresee and mitigate the risks of AI systems. It articulated that responsible AI "requires a cultural shift within an organization. Truly operationalizing responsible AI requires broad changes across leadership, governance, processes, and talent."

Microsoft

The Microsoft guidelines were created specifically to serve teams that are building AI models. They are organized according to key phases of the product development cycle and include some relevant questions.

Assess and Prepare:

- Assess the merits of developing the product, considering organizational values and business objectives. What is the desired business outcome for this product? How will the business impact be measured?

- Assemble team reflecting diverse perspectives and with clearly defined roles and responsibilities. Do we have a diverse (e.g., gender, age, ethnicity), multidisciplinary team with a range of functional expertise?

- Assess the potential product impact

by including input from domain experts and potentially impacted groups. What are the product's potential unplanned uses?

Design, Build, and Document:

- Evaluate data and system outcomes to minimize the risk of fairness harms. What fairness metrics (e.g., statistical parity, equalized odds), tests, and shipping criteria will we use?

- Design AI product to mitigate the potential negative impact on society and the environment. What design choices are critical to ensuring proper use, legitimate and transparent data collection, and respect for user privacy?

- Incorporate features to enable human control. Which decisions or functions require human oversight as a critical component of the AI product?

- Take measures to safeguard

data and AI products. How will the product team make sure the product doesn't inadvertently disclose sensitive or private information during use (e.g., indirectly inferring user locations or behavior)?

- Document throughout the development lifecycle to enable transparency. How can the product team best keep track of data sources and their authorized uses?

Validate and Support:

- Validate product performance and test for unplanned failures as well as foreseeable misuse unique to AI products. How will the product team validate the AI product's performance against technical standards and benchmarks?

Communicate Design Choices, Performance, Limitations, and Safety Risks to End Users:

- What information and instructions should the product team provide to the end user(s) to enable safe and reliable use?

In December 2021, some of the largest American companies announced an effort to prevent AI technology from delivering biased results that could perpetuate or even worsen past discrimination. The Data & Trust Alliance includes companies from various industries, such as CVS Health, Deloitte, General Motors, Humana, IBM, Mastercard, Meta (Facebook's parent company), Nike, and Walmart. This group, which is not a lobbying organization, has developed an evaluation and scoring system for artificial intelligence software. They are responding to concerns, backed by an ample body of research, that AI programs can inadvertently produce biased results. Seemingly neutral data sets – such as "proxy" data including cellphone type, sports affiliations, and

social club memberships – when combined with other data, can produce results that discriminate by race, gender, or age.

This system is embodied in a 55-question evaluation that covers 13 topics, which was developed and refined for nearly a year. The goal is to detect and combat algorithmic bias. It was developed by internal personnel at these companies who are involved in human resources, data analysis, legal, and procurement, along with software vendors and outside experts. The result is a bias detection, measurement, and mitigation system for examining the data practices and design of human-resources software.

"Every algorithm has human values embedded in it, and this gives us another lens to look at that," notes Nuala O'Connor, senior vice president for digital citizenship at Walmart. "This is practical and operational." Kenneth Chenault, the former American Express CEO who serves as co-chair of the Data & Trust Alliance, observes: "The promise of this new era of data and AI is going to be lost if we don't do this right."

BLOCKCHAIN

I.   Technology Overview

A blockchain is simply a distributed ledger that keeps various records, such as cryptocurrency transactions, financial transactions, supply chain information, and asset information. It is a continuously growing record of transactions, which are known as blocks. The transactions in blockchain are secured by cryptography, which makes them immutable, and work on a peer-to-peer network. Every transaction recorded in the blockchain ledger is visible to every participant (user or implementer). Because it is a distributed record of transactions, the need for any centralized authority for verification is eliminated.

Blockchain is in its infancy stage, but already has gained the attention of media companies because of its ability to replace a centralized gatekeeper with peer-to-peer network management techniques. Already, there are companies such as LiveTree, Hubii Network, and ALLRites that are emerging with the goal of exploring blockchain technology for the democratization of the content. Consequently, the entry of blockchain technology inevitably will increase the competitive pressure on streaming video services and the cable industry, both of which are organized around a centralized content distribution model, with fees flowing to them as middlemen.

As Steve Goeringer, principal security architect at CableLabs, has noted: "[The] [c]able industry's interest in blockchain and similar solutions seems to be increasing … some use cases are becoming clearly attractive." This is because blockchain may

increase the cost efficiency of transaction processing, records and data management, and security practices.

II.   Utilizing Blockchain in Media Companies

Media companies will be able to implement blockchain technology throughout their entire business models. Content housing, content acquisition, distribution rights, transaction processing, and records management all could be managed with greater transparency on a distributed ledger. Advertising campaigns also could be implemented in more efficient ways, since in the current environment, up to 70 percent of ad spending can be lost due to fees to middlemen or fraud. The practical possibilities already are apparent, but actual implementation on a large scale still lies ahead.

Currently, content providers, brands, and advertisers have to sort through multiple, separate data sources to identify which content will generate the best ROI. Blockchain technology can connect viewers, content creators, and advertisers directly through a peer-to-peer system. Through user

interaction, content creators and advertisers could directly collect data on viewing habits, then display more relevant content for users. As the data is stored on a secure blockchain, users could decide which information they wanted to make available. Users could, for example, share with content creators and advertisers that they like to travel, while keeping medical records private.

With a blockchain infrastructure, users could pay with tokens every time they purchased goods or services, rather than paying a monthly flat fee as they do with video streaming services. And users could purchase directly from content creators and thus cut out the middlemen. As a result, both parties would retain more value, because no percentage would be paid to third parties.

Tokens also could be used to reward users for their loyalty. During a TV show, viewers could participate in some way with the content they are watching. Every time viewers responded to a call to action via a device, for example through an app, they could earn rewards in the form of tokens provided by advertisers or content creators. These tokens then could be used by users to obtain more content.

Blockchain technology also could allow users to pay for services based not only on how

much they consume, but also on how much they like what they watch. For example, the start-up company Stream rewards content producers on the basis of the number of views that their videos receive.

Blockchain-based video services can innovate in ways that traditional Internet-based streaming video companies cannot. Using a decentralized video streaming service, such as Viewly or Livepeer, anyone can create and distribute content with little overhead. This model e mpowers content producers to generate custom content that a service like Netflix would not otherwise distribute.
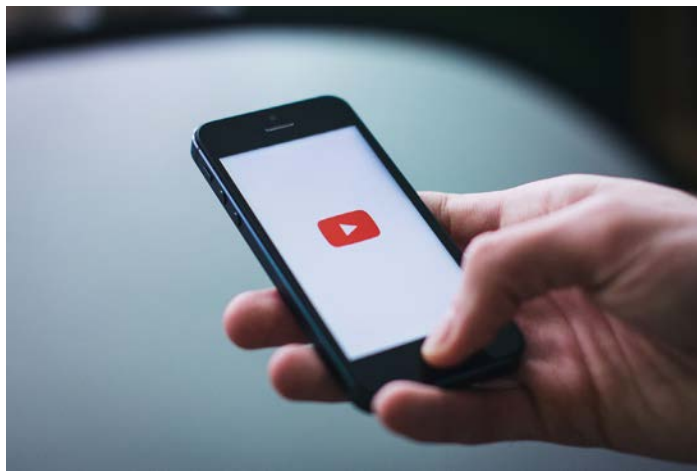
On the broadcast side, a local TV station might distribute its evening programming via a blockchain-based network in order to reach users without relying on a cable network. This approach is also more advantageous than

uploading videos to a site such as YouTube, where the station would have little control over who can view its content or how it is redistributed. This is because blockchain technology makes it easy to customize the terms that govern content consumption.

A centralized streaming video platform such as Netflix requires a massive IT infrastructure, including cloud storage. In this way, Netflix is similar to cable companies. These costs are part of the reason that Netflix and Hulu now charge for their services. In contrast, blockchain-based streaming video does not require such overhead. Using a blockchain and software such as Livepeer's decentralized media server nodes, users could create the infrastructure required to stream video using ordinary computers they already own. The much lower infrastructure costs associated with the blockchain video streaming model

could translate to low-cost or free video services, a major advantage over the likes of Netflix or cable TV.

These lower infrastructure costs for blockchain-based video streaming can allow it to provide significantly more cost-efficient service. If users pay a fee at all, it could be aligned with the amount of content they consume, rather than based on a flat subscription rate, which is the current norm for video streaming and cable. In addition, fees could be offset by the work that users contribute to the network; this is the business model that Livepeer follows, for example.

Blockchain also could help users who do not have sufficient broadband network bandwidth to support streaming video in real time and are unable to use services such as Netflix.

There is no ability to download a Netflix video over a period of time and watch it later when the download is complete. For others, data cost concerns associated with streaming content from a mobile phone may deter video streaming downloading.

Although most current blockchain-based video platforms are designed primarily for real-time streaming, there is no reason they could not also support content downloads in the future. Blockchain platforms can potentially achieve higher bandwidth rates than centralized streaming services by leveraging decentralized networks to serve video. In short, blockchain technology could solve the infrastructure challenges for distributing media content due to bandwidth limitations and inefficient pricing models that stifle both online video streaming and cable companies.

However, since most blockchain technology firms are small venture-backed technology start-ups, they currently are not in the position to acquire distribution rights for big-name programs or series. Looking ahead, companies may form for this express purpose, with blockchain distribution in mind. Or content companies may incorporate blockchain as a bedrock technology to

cut costs and expand their audience base, especially as competition in the video marketplace intensifies.

In the long term, however, blockchain technology promises to enable a new generation of innovation in video streaming and consumption that poses a fundamental challenge to both online streaming services and the cable industry. Given this challenge, legacy media companies may move for government regulatory intervention, as is being pursued for cryptocurrency, in order for blockchain not to impede the current competitive environment. This may be accompanied internally by greater blockchain utilization as another mechanism for addressing competitive concerns that arise once there no longer is a need for a middleman.

CONCLUSION

With the start of the New Year, which typically is a period at media companies for year-long strategic planning and resource allocation activities, this Primer can become part of these processes. The takeaway of this Primer is clear: Artificial Intelligence and Blockchain need to become less abstract and more real as technologies that media companies should be focusing on as operational concerns.

The Media Institute's Digital Media Center will continue to track relevant developments in both areas throughout 2022. It will provide additional perspectives to assist media companies as they gain a greater understanding and comfort level in implementation for both the short term and long run.

Stuart N. Brotman is a Distinguished Fellow of The Media Institute and a member of the Institute's First Amendment Advisory Council. His most recent books are **Privacy's Perfect Storm** *(2020) and* **The First Amendment Lives On** *(2022). Brotman coordinates the program activities of the Institute's Digital Media Center.*

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