

Adoption Trends

Artificial Intelligence and Machine Learning

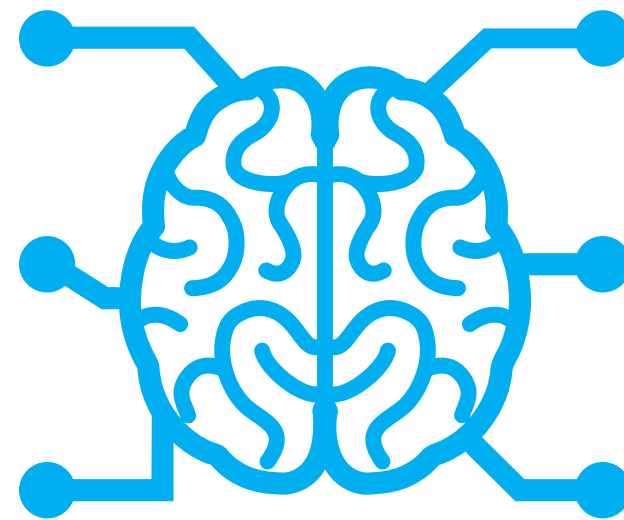


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Introduction

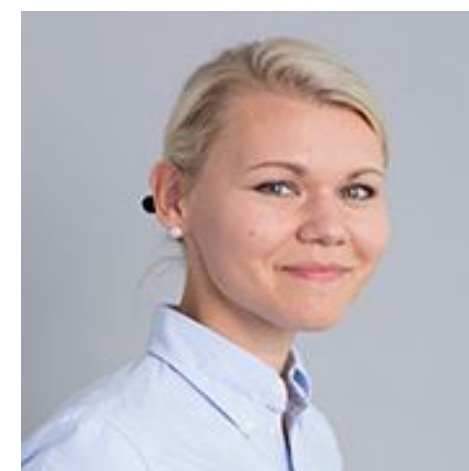
IABM Adoption Trends reports annually track the adoption of specific emerging technologies within the broadcast and media sector. The purpose of these reports is to enable member companies to better understand what is driving the adoption of emerging technologies within customer organizations. This will provide member companies more insight to better address the challenges lying ahead, from new product development to marketing strategy. These reports contain a discussion on the state of adoption of a specific emerging technology in broadcast and media, as well as an analysis of significant customer deployments.



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AI Essentials



AI Essentials

Types of AI algorithms



AI

Artificial intelligence is a branch of computer science that aims at creating intelligent technology capable of replicating human learning and problem-solving skills. Machine learning and deep learning are widely considered to be sub-sets of the wider artificial intelligence field.



ML

Machine learning is an early application of AI, providing computer systems with the capability to **learn from data without being programmed**. Machine learning algorithms can **find patterns in data** and make predictions (and, therefore, decisions) on the basis of them without the need for human intervention.

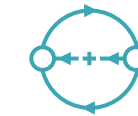
Supervised Learning

Unsupervised Learning



DL

Deep learning is a further development of ML enabling computer systems to **imitate the workings of the human brain in problem-solving**; artificial neural networks - consisting of a system of hardware and/or software - are modeled to mimic neurons interconnections in the human brain. This network **can “learn from its mistakes” by applying different weightings to different input streams** based on their contributions to getting the right answer. Deep learning algorithms are generally more suited to the analysis of complex datasets, including multidimensional data such as video and audio.



RL

A relatively new area of AI is **reinforcement learning**. This algorithm **relies on a trial-and-error approach** for exploring the data and **uses a system of rewards and punishments** to train the algorithms. As opposed to unsupervised learning models, which find patterns in data, reinforcement learning algorithms' objective is to maximize their long-term gains by maximizing the rewards and minimizing the punishments they receive.

In this report, AI refers to any of ML, DL, and RL techniques.

Sources: IABM, Adit Deshpande/UCLA

AI/ML Adoption Tracker



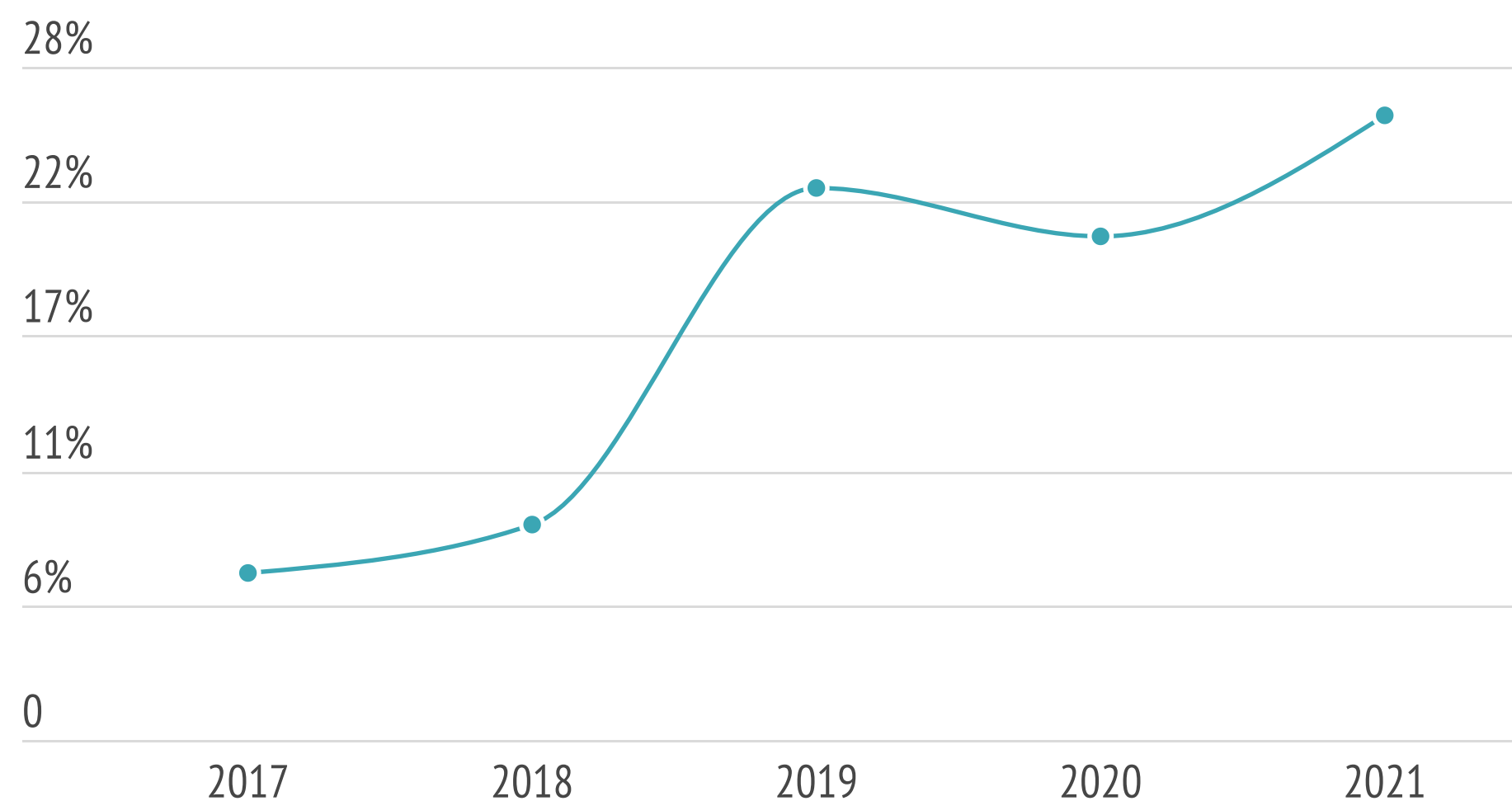


AI/ML Adoption Tracker

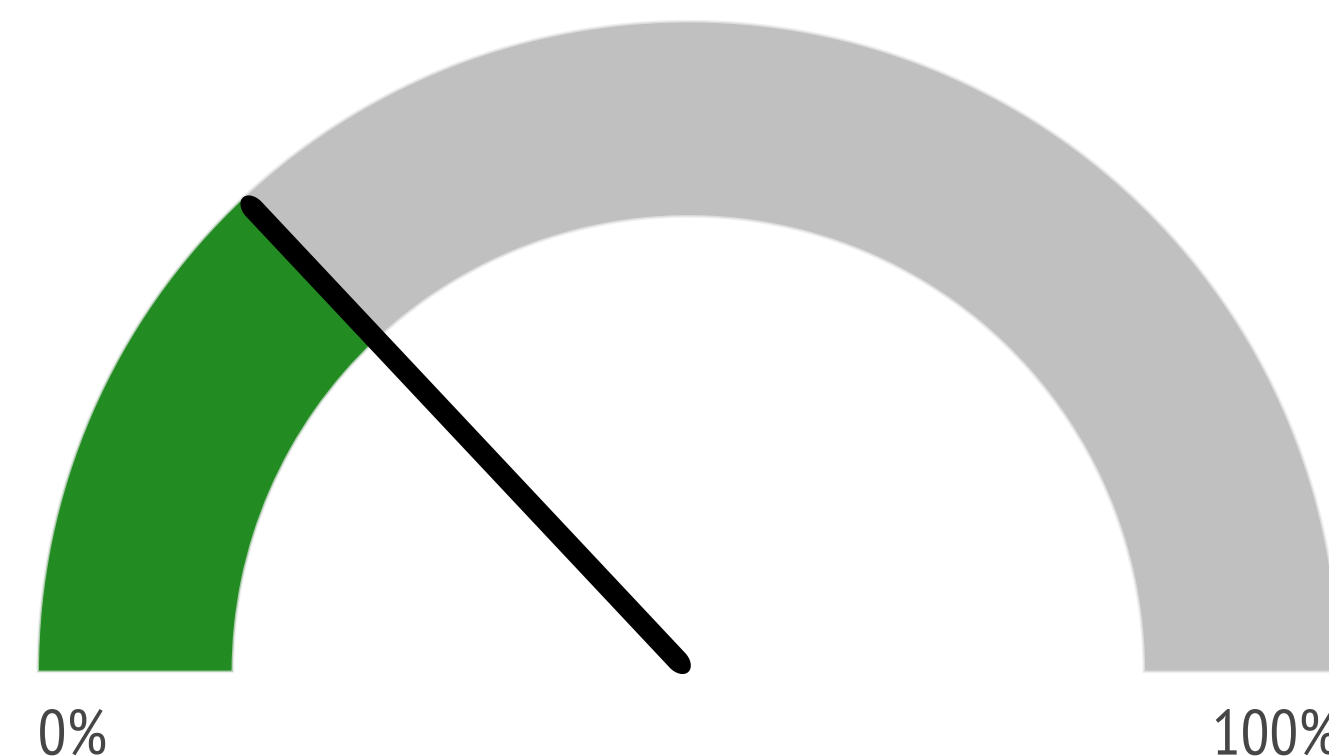
Adoption by Broadcast and Media Industry

According to IABM's [Media Tech Business Tracker](#), about a quarter of broadcast and media companies have already deployed some sort of AI/ML technology as of 2021. Interestingly, those who have already deployed AI/ML have a better outlook on their revenues and higher media technology investment expectations. Most end-users are planning to deploy AI/ML in the next few years.

Historical adoption of AI/ML



The state of AI/ML adoption by broadcast and media industry



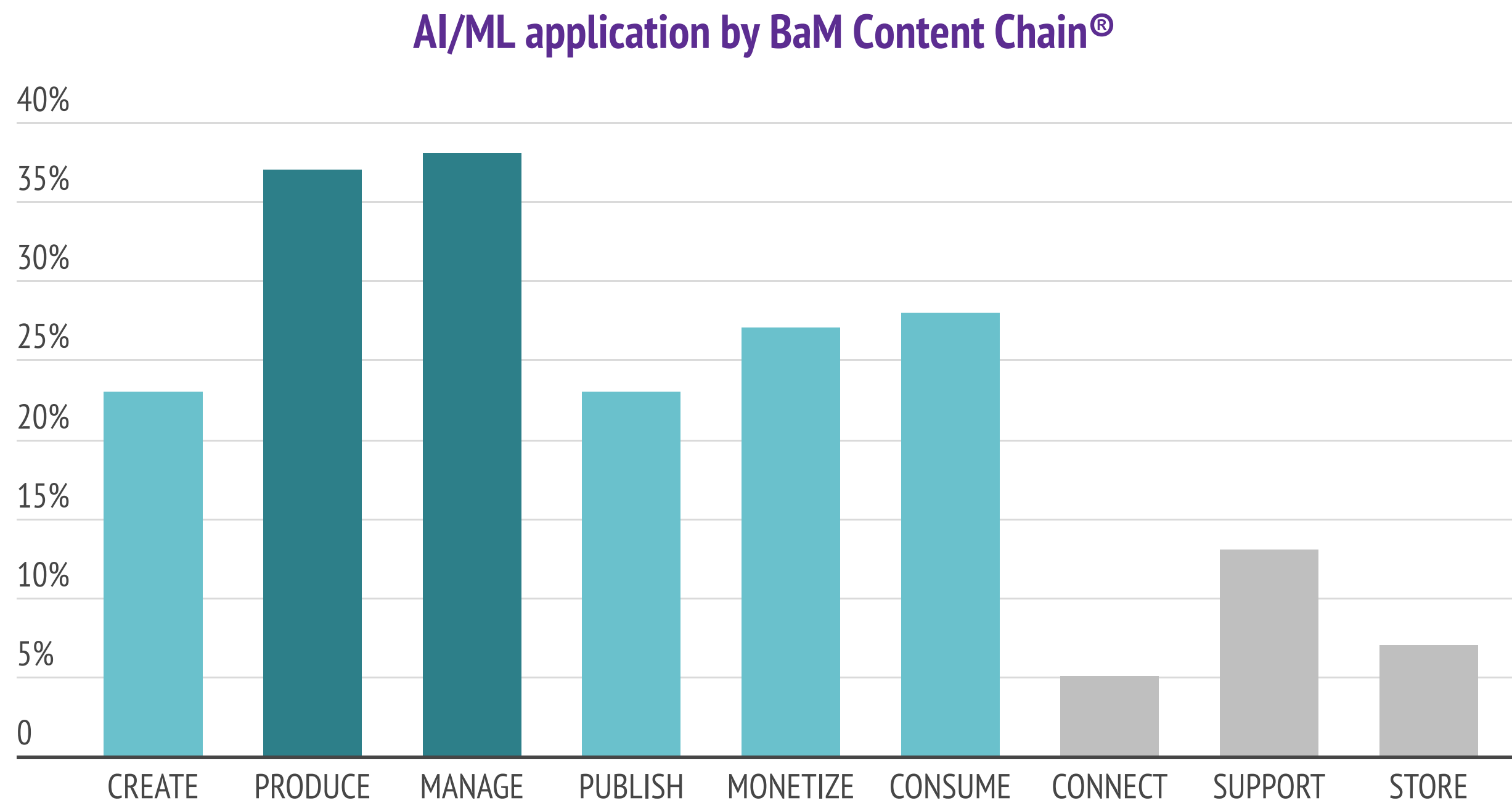
● Share of companies that have already adopted AI/ML

Source: IABM

AI/ML Adoption Tracker

Adoption by Broadcast and Media Industry

From the **BaM Content Chain®** perspective, end-users are most likely to deploy AI/ML in Manage- and Produce-related workflows, followed by Consume, Monetize, and Publish, as well as Create.



Source: IABM

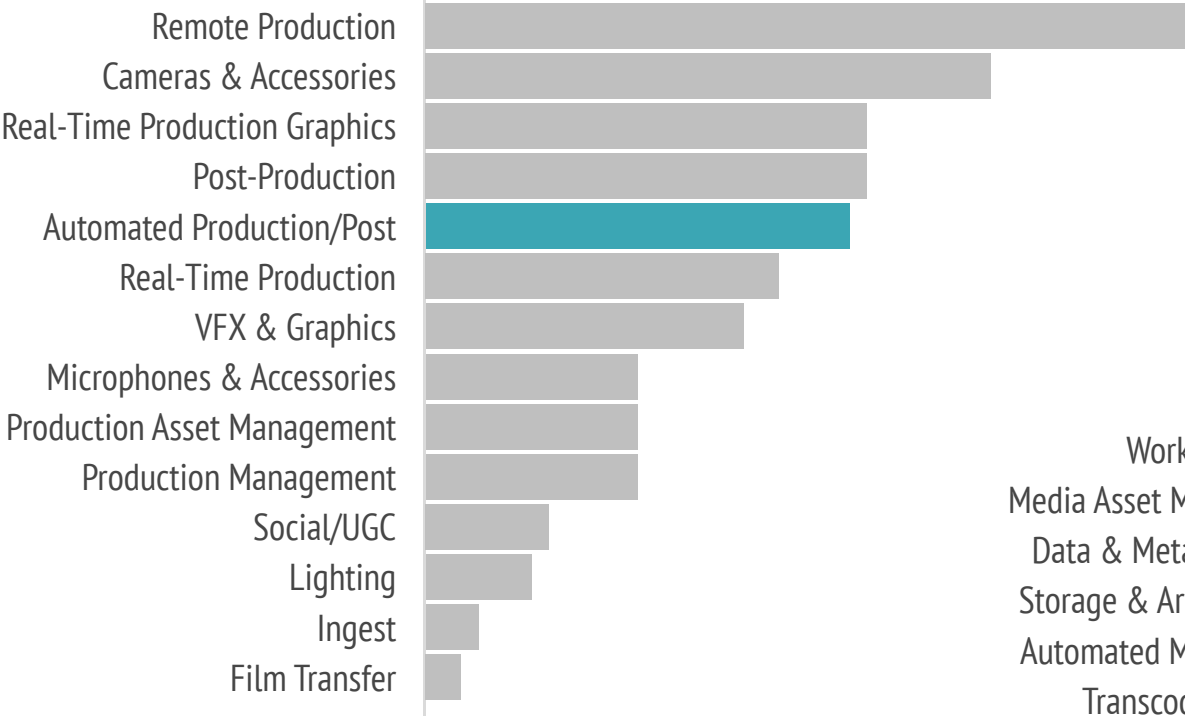
AI/ML Adoption Tracker

Adoption by Broadcast and Media Industry



Create/Produce

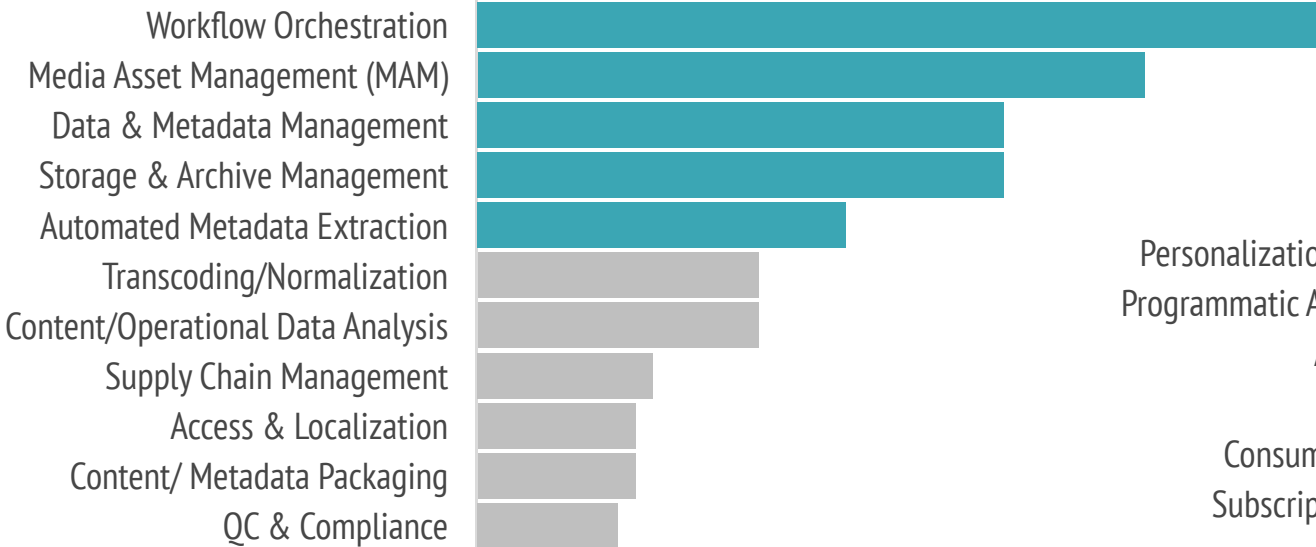
Most use cases of AI/ML in content creation and production are to automate production and post-production processes.



Investment outlook by end-users

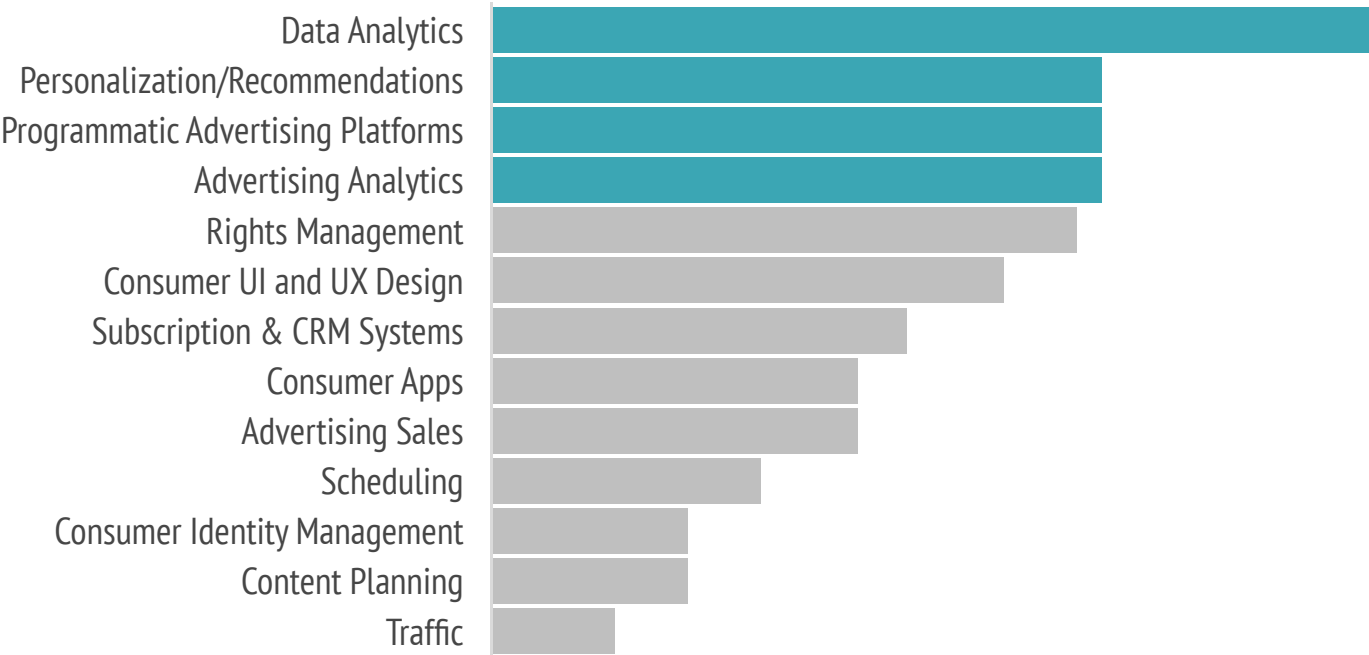
Manage

Most AI/ML use cases in content management systems are to automate routine tasks such as metadata tagging, image recognition, audio/video recognition, and speech-to-text. Particularly with regard to metadata tagging, end-users view this as an extremely important strategy to build up an increasingly granular database of their content.



Consume/Monetize

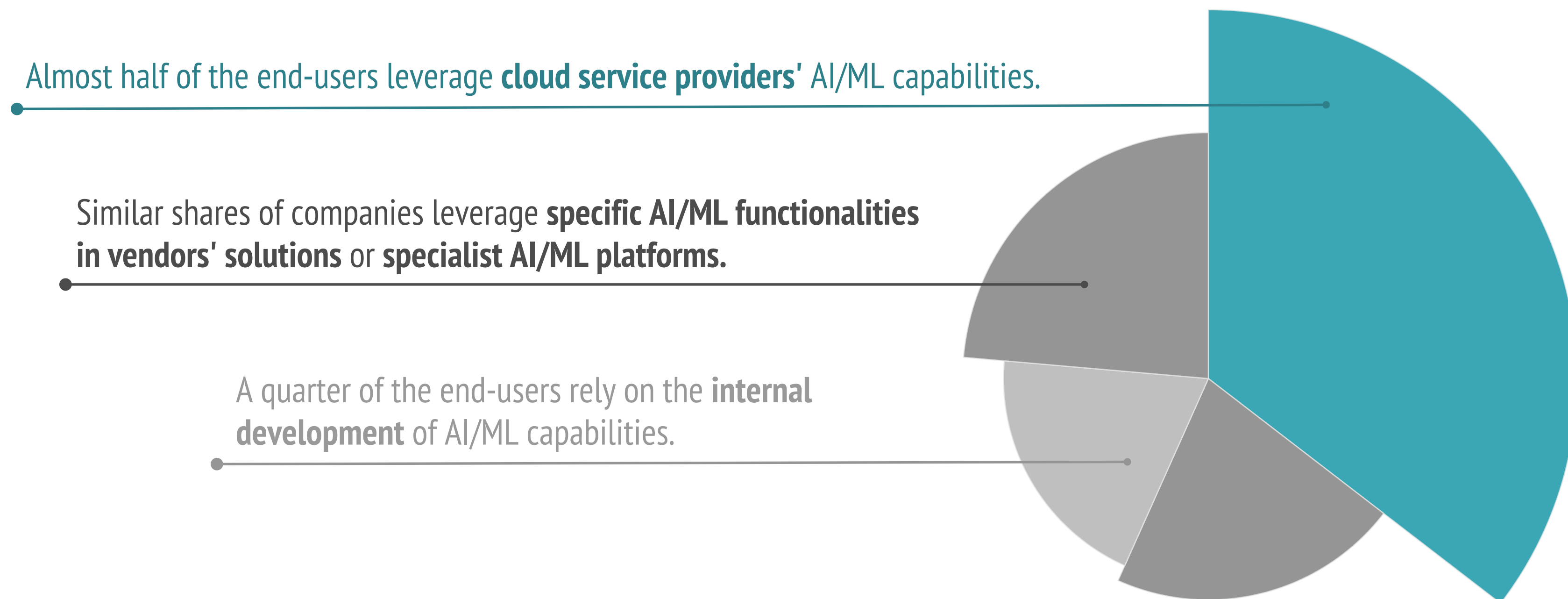
AI/ML is increasingly being used in **data analytics**. By leveraging AI/ML, media companies, particularly streaming services like Netflix and Amazon Prime Video, build comprehensive recommendation systems to increase viewers' engagement.





AI/ML Adoption Tracker

Artificial intelligence and machine learning deployment options



Source: IABM

AI/ML Deployments by Content Chain





AI/ML Deployments by Content Chain

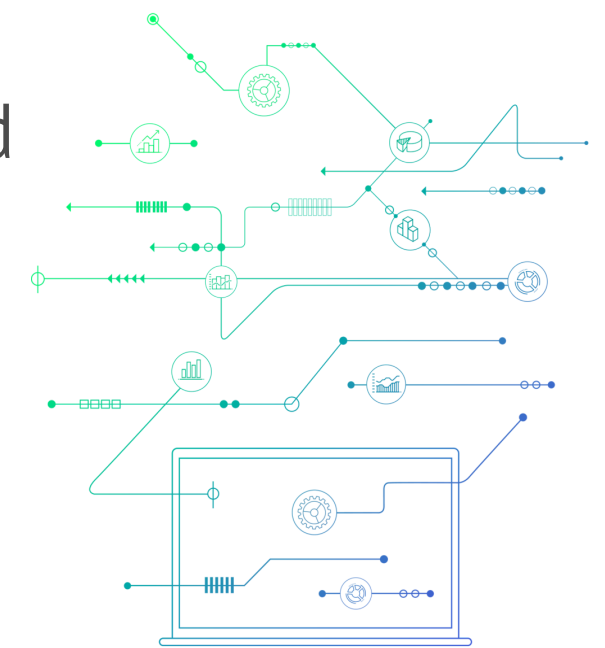
AI/ML in Creating & Producing Content

Creating Content

The primary drivers of the adoption of AI technology – the opportunity to automate routine workflows and to gain increasing insights into audiences – are vitally important in the direct-to-consumer model. At the beginning of the content supply chain, AI/ML can be used both as a “content creator” and as an “automation tool”. For example, AI is already helping content creators to predict their return on investment (ROI) of different content genres via AI-powered script analysis. Rapidly increasing investment in original content is also boosting demand for augmented and personalized storytelling through AI.

RivetAI, Augmented Storytelling Through AI

RivetAI – a natural language processing system – is assisting producers in automating and accelerating the process of script analysis, storyboarding, scheduling and budgeting. Founded by a team of AI experts from companies such as Pixar, Microsoft, and SpaceX, RivetAI’s AI platform helps content creators in augmenting storytelling by generating new ideas and improving writing. For example, by using sentiment analysis and natural language processing, RivetAI’s algorithms can rank traits and emotions related to a scene.



 **RivetAI**

Sources: IABM, RivetAI



AI/ML Deployments by Content Chain

AI/ML in Creating & Producing Content

Media companies are increasingly using AI/ML to automate camera operations. As sports production is getting more expensive due to increasingly intense competition for content rights, end-users are seeking new ways to augment their sports content by covering more events; thanks to AI/ML lowering production costs, broadcasters can also cover lower-tier events. Hence, camera manufacturers globally are now challenged by the fact that they have to create more and higher quality content with fewer resources – particularly in niche sports or lower-tier events. Solutions such as those offered by Pixellot, EVS, and Mobile Viewpoint target this

Solidsport partners with Mobile Viewpoint for AI-automated live sports production

The largest live sports streaming service in Scandinavia, Solidsport, has partnered with a Dutch-based company Mobile Viewpoint to utilize their AI-based sports streaming solution IQ-Sports Producer (IQ-SP) that produces live sports games for linear TV and OTT without the need to have camera operators on-site, thus increasing the efficiency of live sports production. Companies such as BBC, Sky Sports, RTL Group, Discovery, Eurovision, Eurosport, NEP, Al-Arabiya, FC Ajax, and the Premier League have also leveraged Mobile Viewpoint's AI capabilities.



Sources: IABM, Solidsport

AI/ML Deployments by Content Chain

AI/ML in Creating & Producing Content

In August 2021, Mobile Viewpoint was acquired for \$18.3 million by Vislink Technologies, specializing in the collection, delivery, management, and distribution of high-quality live video and data. Vislink's move illustrates the growing importance of 5G and other new networks which can be used in the future for live production of minor events (e.g., amateur and semi-pro athletics). According to Mickey Miller, CEO at Vislink, the acquisition enables Vislink to expand AI-driven automated production and multi-camera solutions and focus on new networks like 5G.



Image credit: Mobile Viewpoint/WMT Twitter

Sources: IABM, Vislink, Mobile Viewpoint, Twitter



AI/ML Deployments by Content Chain

AI/ML in Creating & Producing Content

Producing Content

AI-based offerings in Produce are springing up from content ingest to editing. For example, IBM Aspera uses artificial intelligence to ingest video content and the automated delivery of production.

In live sports production, improving image quality and the calibration of cameras (e.g., to capture slow motion) have become important areas to apply AI/ML. For example, Sony has developed AI-driven technologies such as ball tracking (e.g., in tennis), rotational pattern matching (e.g., in table tennis), face detection combined with cross-checking with archives used for producing highlights, as well as motion detection technology used for sports education and coaching purposes.

EVS, Augmenting Sports Storytelling

EVS' AI-based, automated camera solutions (e.g., multi-camera review system, Xeebra) are being used for live production to improve football TV storytelling. EVS is also using AI for the calibration of cameras. Its AI solutions can generate extra frames in-between two frames that are acquired by the camera, which enables better precision when delivering slow-motion replays without a super motion camera or when doing augmented reality (AR). This is a significant advantage for live sports broadcasters, who need to have the slow-motion replays ready instantly.

Sources: IABM, EVS, Sony, Intel, Keemotion



AI/ML Deployments by Content Chain

AI/ML in Creating & Producing Content

In post-production, AI/ML can facilitate syncing and grouping of clips. AI/ML can take the heavy lifting out of time-consuming bottleneck tasks by cutting time from weeks to minutes, facilitating and speeding up the creators' work. AI-driven computer vision can also augment quality control and speed up editing larger video files (e.g., color correction of the content shot in 4K/UHD).

In the animation industry, the post-production process requires manually composing, tracking, and rotoscoping animation.

Artificial intelligence and deep learning are very good at automating repetitive routine tasks, significantly saving time and cost of production.

Animation Studio LAIKA partners with Intel to leverage AI/ML in rotoscoping

In December 2020, LAIKA, which earned in 2016 a Scientific and Technology Oscar for its innovation in animated filmmaking, partnered with Intel to develop software tools to automate production routine and release time for the creative process. The tools rely on neural networks for rotoscoping tasks with the goal of learning and accurately predicting multiple shapes, spatial smoothness, and temporal coherence of an image.

Sources: IABM, Intel



AI/ML Deployments by Content Chain

AI/ML in Creating & Producing Content

AI/ML can significantly augment visual effects (VFX) creation. Accordingly, the VFX industry is increasingly looking for new, efficient, and cost-effective solutions to augment and automate many of their most labor-intensive and repetitive tasks like match moving, tracking, rotoscoping, compositing, and animation. VFX software developers like Foundry, Kognant, and Arraiy already offer a range of AI-based image processing tools. There is also an increasing demand for communicating relevant metadata to VFX teams.

To automate the routine process of designing and simulating 3D faces, researchers at Disney developed a non-linear method that relies on neural architectures.

Adobe has created an AI-based tool to automate the lip-syncing process to produce voice-overs – Adobe Character Animator.

A former Pixar technical director Jiayi Chong has created Midas Creature – a 2D character animation tool that designs characters and figures out their movements without human intervention.

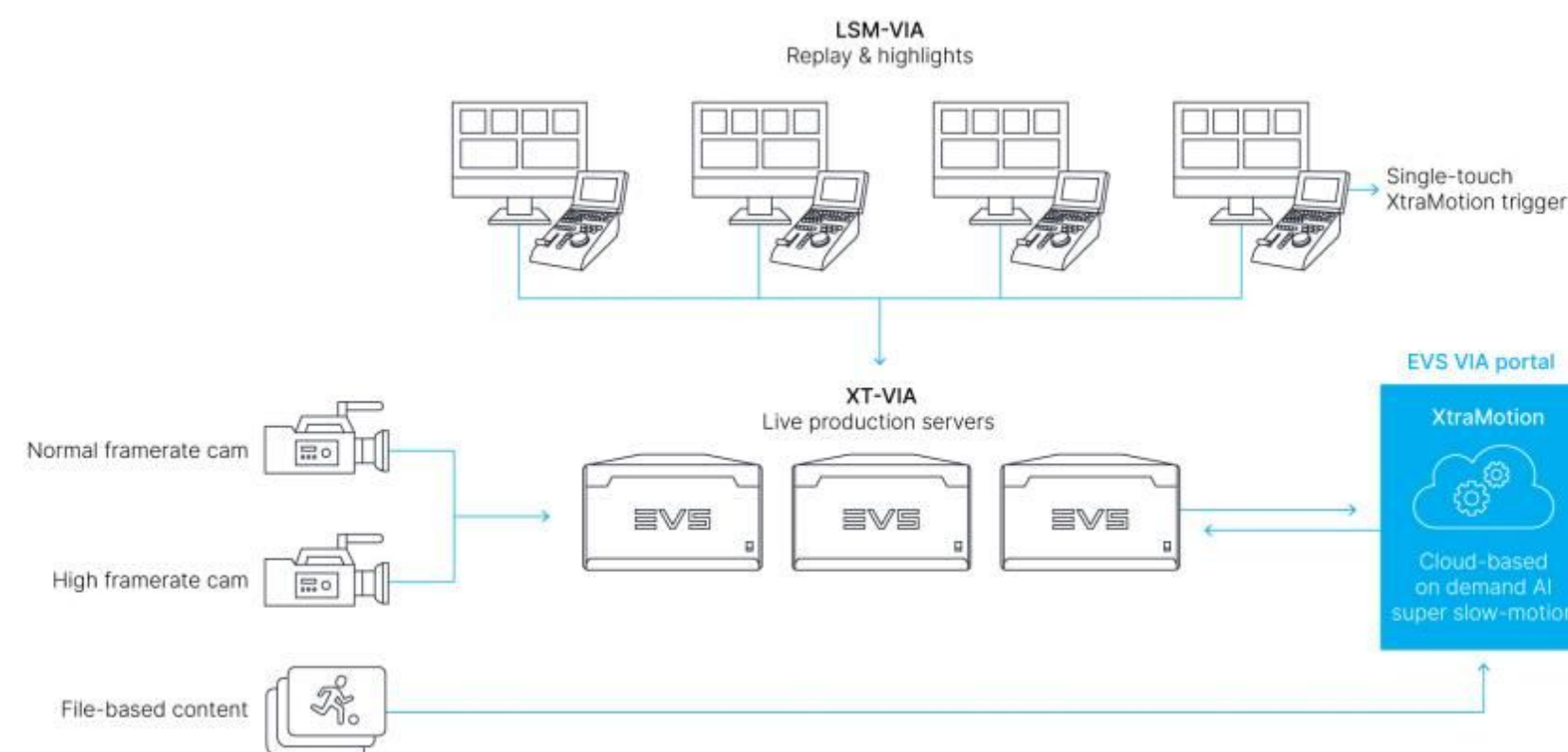
Sources: IABM, IBC365, awn.com

AI/ML Deployments by Content Chain

AI/ML in Creating & Producing Content

Employing AI/ML technology in production enables broadcasters to cut staff and thus save money. However, there are still challenges related to the use of AI/ML in a live production environment, the production of special effects and highlights such as super-slow-motion clips shot in 4K (and in 8K), because using AI/ML in these applications is still very expensive and complex.

To address this need, in May 2021, EVS, in collaboration with Fox Sports, released a cloud-based service based on a technique called "Xtramotion," which uses AI technology to transform video content into super slow-motion replays by interpolating between frames of video shot by conventional cameras at normal rates.



Sources: IABM, IBC365, awn.com

AI/ML Deployments by Content Chain

AI/ML in Creating & Producing Content

According to Fox Sports, the Xtramotion technique allowed them to create super slow-motion content using cameras that never before would have sourced super slow-motion footage, such as in-car cameras for Daytona, pylon-cams, and referee cams for football. FOX Sports trialed the solution to produce Super Bowl LIV in 2020 to transform native standard frame rate clips into high frame rate footage. Later, MLB, NFL, NCAA College Basketball, and NASCAR have also used EVS' solution to produce super-slow-motion replays for their events.



Sources: IABM, EVS, Fox



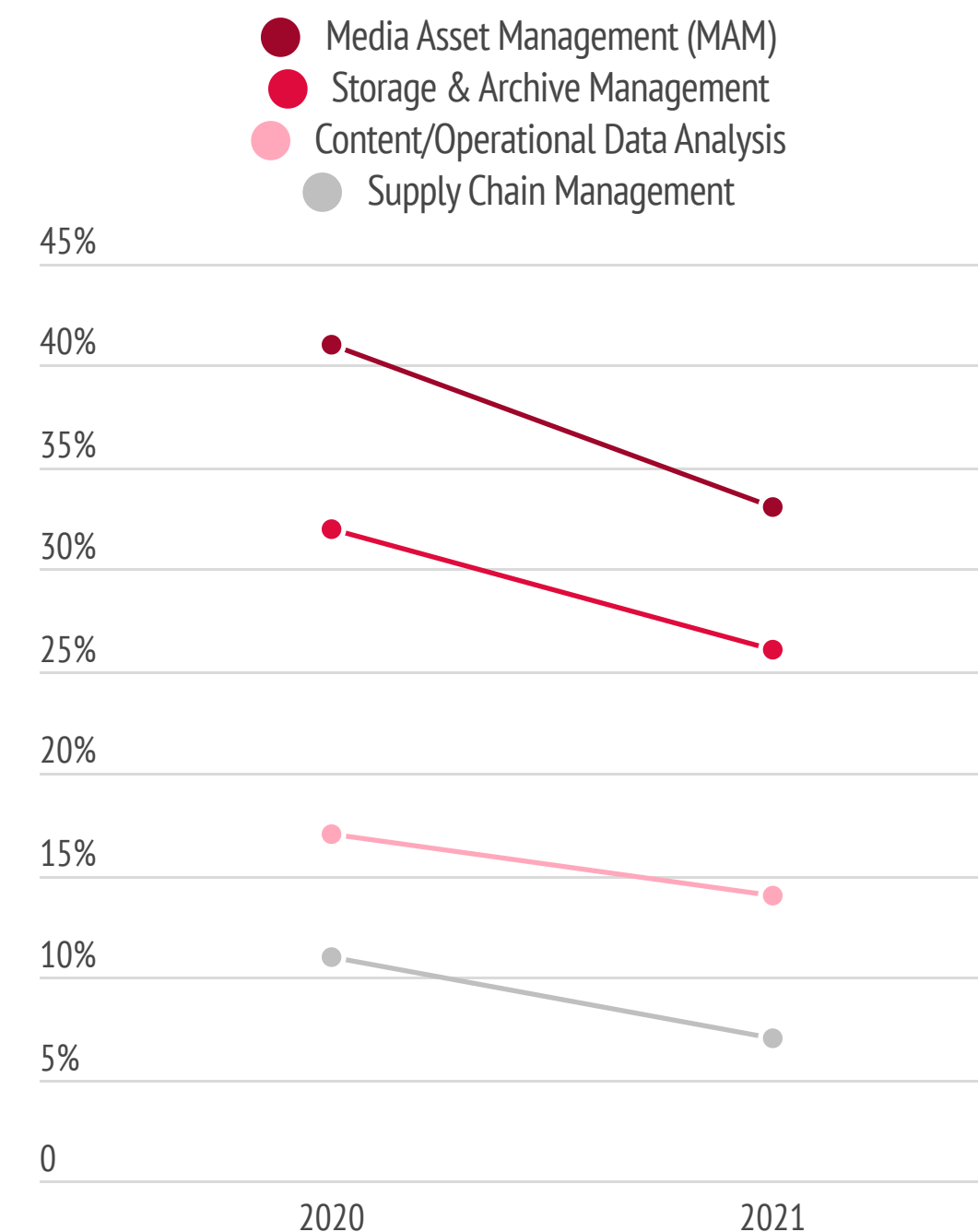
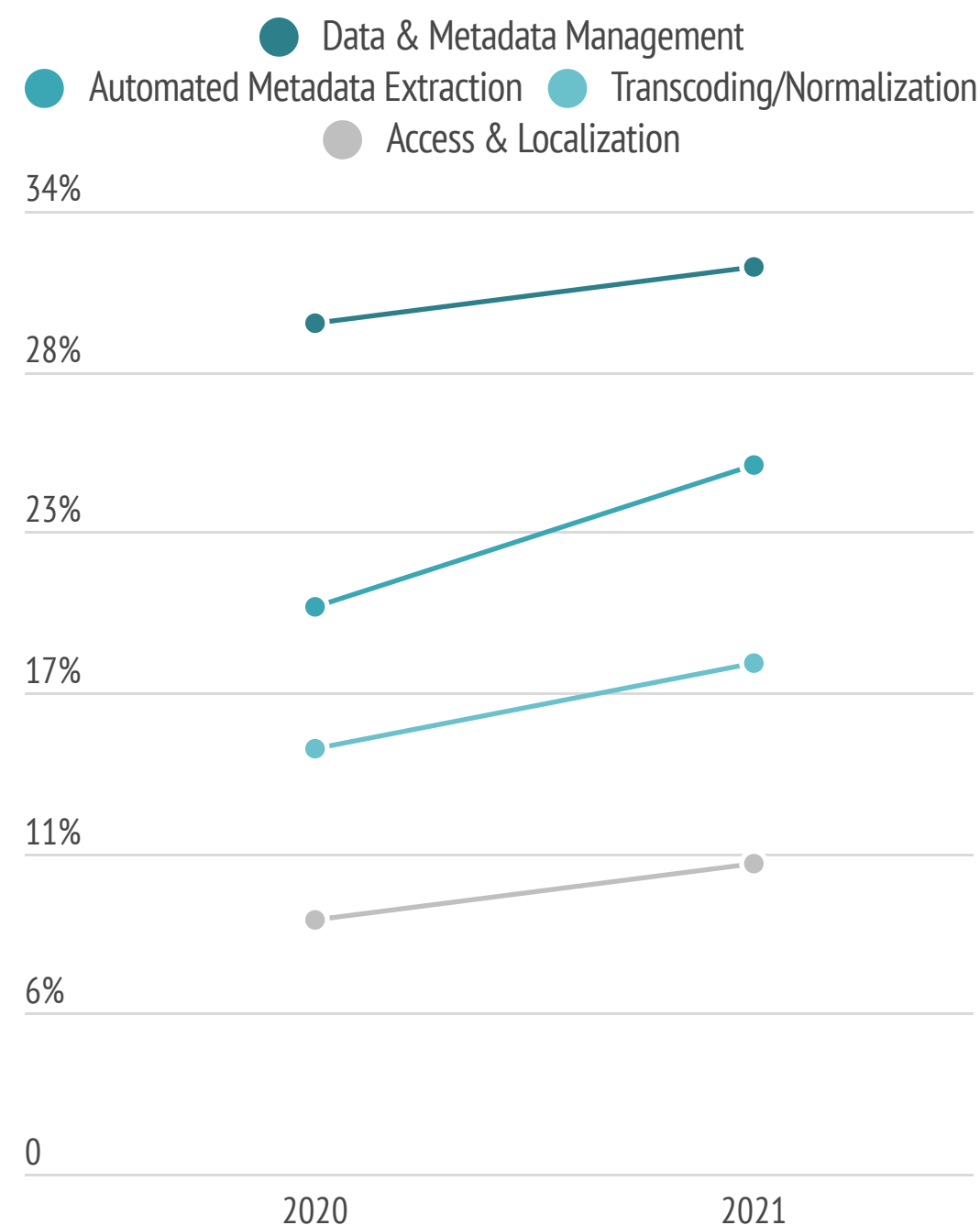
AI/ML Deployments by Content Chain

AI/ML in Managing & Moving Content

Managing Content

Our data shows that the Manage segment of the **BaM Content Chain®** remains the top area of application for AI/ML and cloud. Content management is the key area of application for AI/ML because it helps end-users to automate resource-intensive and expensive activities, such as metadata tagging. As the level of detail of the metadata continues to increase, new, more precise AI-based search on content management systems helps end-users boost monetization. For example, content performance indicators can be leveraged

Manage Investment Outlook



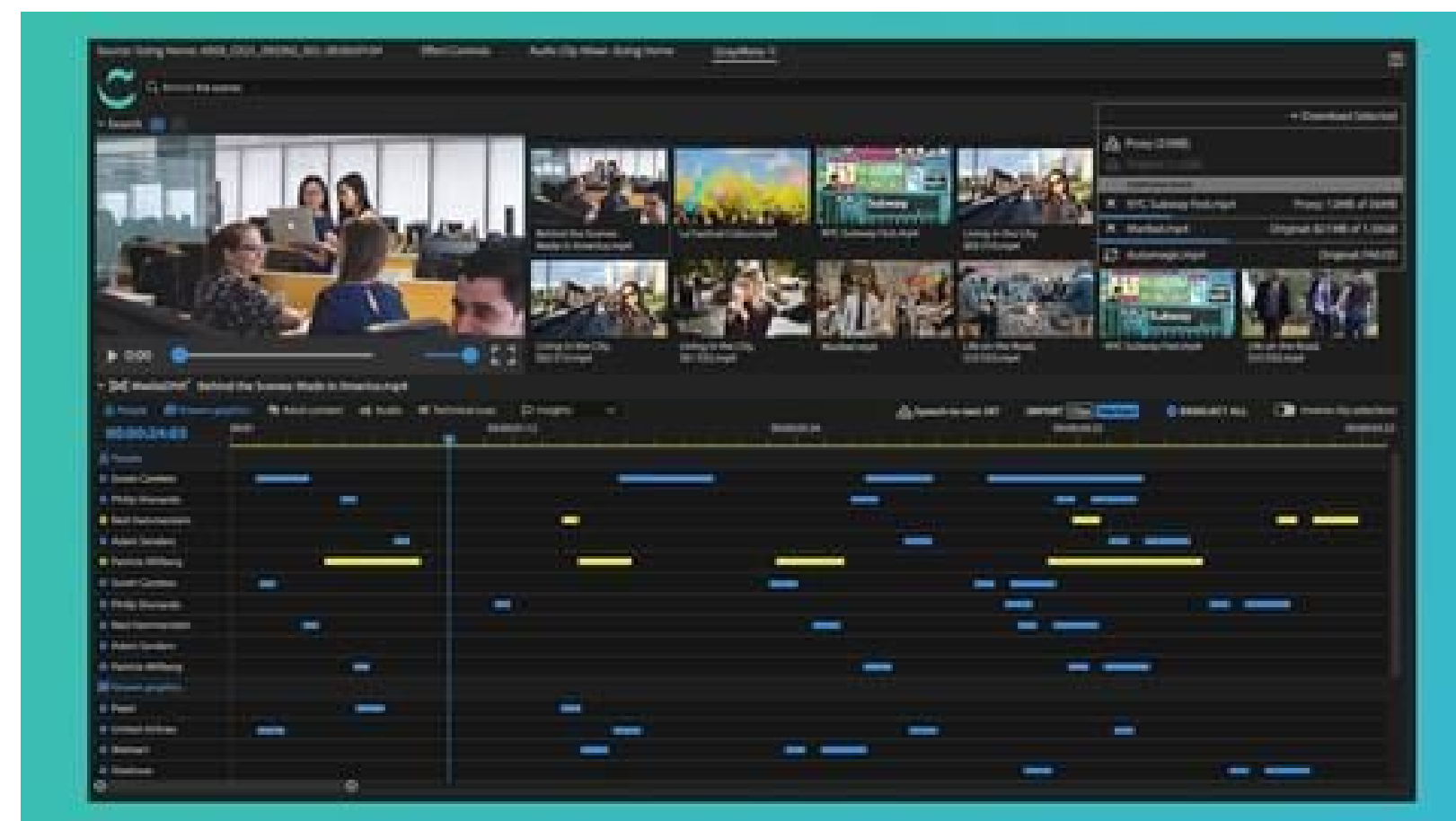
Sources: IABM, IBC365, awn.com



AI/ML Deployments by Content Chain

AI/ML in Managing & Moving Content

COVID-19 has accelerated the need for leveraging archives of unused content as productions struggled with new content creation. For example, in May 2020, during the first wave of COVID-19, Arrow International Media, a content creation and management company with clients such as BBC, Disney+, Discovery, and CNN, among others, collaborated with GrayMeta to make use of their content archives that had never been broadcasted with its AI-based Curio Platform. With this solution, Arrow International Media automatically tagged 70,000 minutes of their unused content and transformed the “dead” archive into searchable and accessible content. The platform analyzes the data without having to move or ingest it, enabling its users to connect to their data through a browser, making it suitable for remote production.



Sources: IABM, IBC365, awn.com



AI/ML Deployments by Content Chain

AI/ML in Managing & Moving Content

While smaller companies, like Arrow International Media, use third-party AI-based solutions for metadata tagging, bigger media companies, such as Disney, develop AI/ML technologies in-house. According to IABM's latest data, the percentage of media technology insourced has increased from 39% in the second half of 2020 to 50% in the first half of 2021, making 41% on average over the last year. The share of media/production companies saying that investment in internal technology is going to increase over the next few years increased from 46% in 2020 to 55% in 2021. The possibility to customize technology solutions developed in-house is the main driver for insourcing. This was the case of Disney, which introduced an internally developed AI platform to automate search and discovery of its animated content archive. Content Genome (CG) specializes in animation and uses facial recognition and AI-powered deep learning that Disney calls the "first automated tagging pipeline." ○



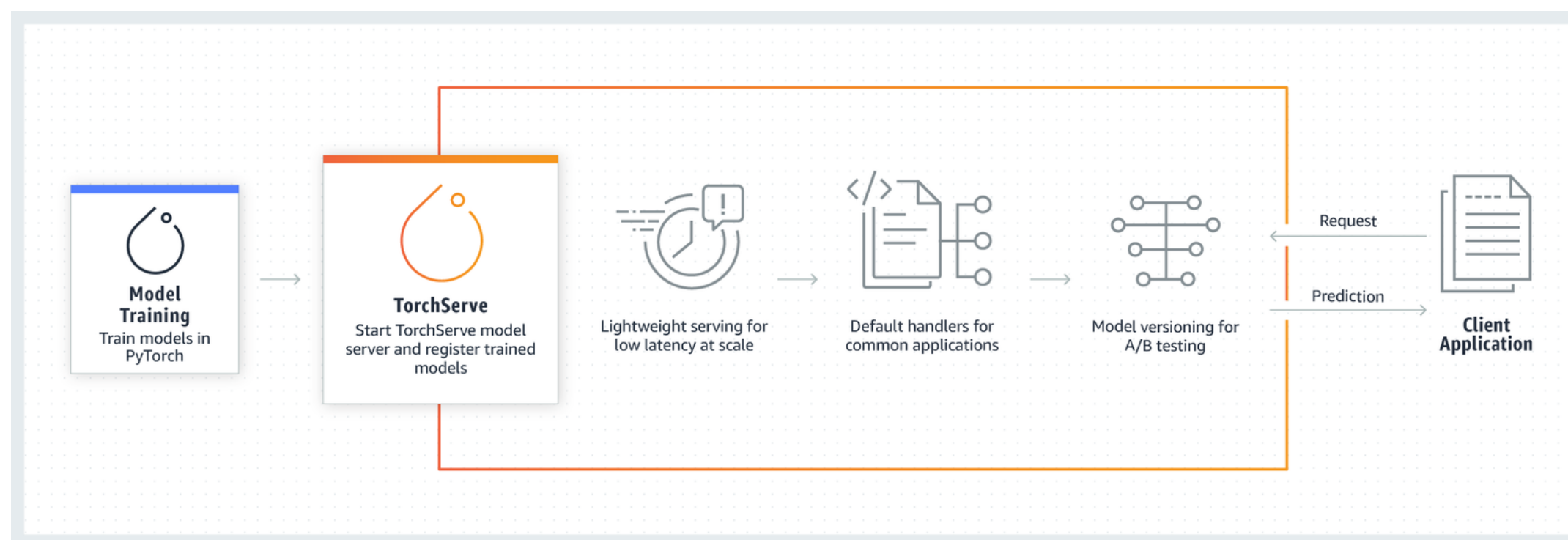
Sources: IABM

AI/ML Deployments by Content Chain

AI/ML in Managing & Moving Content

Given the fact that teaching AI to detect animated faces is much more complicated than spotting a human's face, Disney had to apply deep learning and train it to learn the abstract concept of a "face." As deep learning training data sets are very large in size, Disney had to employ an existing and trained architecture (i.e., Faster-RCNN Object Detection architecture) using third-party datasets instead of training a completely new architecture using its own content. For this purpose, Disney adopted PyTorch open-source ML software library developed by Facebook and maintained by AWS to run neural net architectures, speeding up their video analysis pipeline.

How AWS-based PyTorch works



Source: IABM



AI/ML Deployments by Content Chain

AI/ML in Managing & Moving Content

According to our data, end-users are increasingly leveraging cloud service providers' functionalities for AI/ML deployment. For example, the collaboration between AWS and FOX aims at improving FOX's monetization workflows; the broadcaster will leverage AWS analytics services, including Amazon Kinesis and machine learning services such as Amazon SageMaker, to enhance live video streams and enable real-time data capabilities to deliver better programming.



Source: IABM

AI/ML Deployments by Content Chain

AI/ML in Managing & Moving Content

AI/ML specialists often offer their tools on the public cloud because this provides users with the flexibility to scale up and down as needed by the quantity of information that requires processing by AI/ML engines. Over the past few years, major cloud service providers like AWS, Google, and Microsoft have invested heavily in media-specific capabilities, including AI/ML tools specifically designed for video-related workflows.

Media-Specific Capabilities of Major Cloud Service Providers

	CREATE	PRODUCE		MANAGE	PUBLISH	MONETIZE	CONSUME
AWS Elemental Media Services	<div>AWS Kinesis Video Streams</div> <div>Streaming video from connected devices to AWS for analytics/processing</div>	<div>AWS MediaLive</div> <div>Ingesting, cloud editing, implementation of popular video features</div>	<div>AWS MediaPackage</div>	<div>AWS MediaConvert</div> <div>File-based video transcoding, format/compressing of VOD content</div>	<div>AWS MediaPackage</div> <div>Packaging of incoming live/VOD video streams, encoding, DRM, delivery to output devices</div>	<div>AWS MediaTailor</div> <div>Dynamic ad insertion (DAI), targeted ads, viewer behavior analytics (AI/ML)</div>	<div>AWS Kinesis Video Streams</div> <div>Computer vision, video recognition, UX&UI optimization</div>
Google Cloud Platform (GCP)		<div>GCP Anvato</div> <div>Ingesting, cloud editing, automatic clips from live streams, integration with GrassValley/Avid</div>	<div>GCP Anvato</div> <div>Live transcoding, archiving in the cloud</div>	<div>GCP Anvato Live to VOD Bridge</div> <div>Broadcast integration, syndication, content delivery</div>	<div>GCP Anvato Real-Time Analytics</div> <div>DAI, ad transcoding, ad sponsorships, hyper-personalization (AI/ML)</div>	<div>GCP Anvato</div> <div>Close captioning, 360 degree video, adaptive bitrate technology for smooth playback, recommendations</div>	
Microsoft Azure Media Services		<div>Azure Live Broadcast / Premium On-Demand</div> <div>Ingesting, cloud editing, implementation of popular video features</div>	<div>Azure Video Indexer</div> <div>Automatic extraction of metadata, close captioning, recommendations, automatic creation of clips, topic inferencing, acoustic events, speaker statistics, translations</div>	<div>Azure Media Player</div> <div>Live encoding/converting digital video/audio files, dynamic packaging</div>	<div>Azure Media Player Analytics</div> <div>Video recognition, motion/emotion detection, (linear) ad insertion</div>	<div>Azure Media Analytics</div> <div>Video recognition, motion/emotion detection, content moderation, video summarization</div>	



Source: IABM



AI/ML Deployments by Content Chain

AI/ML in Managing & Moving Content

AI/ML specialists often offer their tools on the public cloud because this provides users with the flexibility to scale up and down as needed by the quantity of information that requires processing by AI engines. Over the past few years, major cloud service providers like AWS, Google, and Microsoft have invested heavily in media-specific capabilities, including AI tools specifically designed for video-related workflows.

TF1 Group adopts AWS Media Intelligence (AWS MI) solution from Synchronized to automate editorial tasks

In 2021, TF1 Group adopted an AI-powered solution from Synchronized, an AWS MI Technology Partner, to improve and automate its content search and discovery capabilities. Launched in March 2021 by Amazon Web Services, AWS Media Intelligence solutions – a combination of AI-based services specifically designed for media content workflows – are powered by AWS AI services that include, for example, image and video analysis, audio transcription, and language translation. TF1's collaboration with AWS MI Partner Synchronized enables the company to apply AI in automating several editorial tasks such as the creation of thumbnails as well as enhancing premium content. According to Nicolas Lemaitre, Digital Director at TF1 Group, the continuously increasing size of the MYTF1 catalog means that manual delivery of certain tasks has become non-scalable.

Sources: sportsvideo.org, AWS, SVG Europe



AI/ML Deployments by Content Chain

AI/ML in Managing & Moving Content

Several broadcasters and production houses like the BBC and Deutsche Welle have recently adopted an AI-driven transcription, subtitling, and editing platform, Simon Says. It provides both cloud and on-premise tools to automatically generate transcripts for TV productions and films in about 100 languages.

Simon Says Assemble, the company's cloud-based editing and collaboration software, enables users to assemble a rough edit of video by choosing the relevant text from its transcripts – automating one of the most time-consuming and costly parts of a video project. Relying on timecode, Simon Says Assemble links the video frame to those words that the company's AI tools have extracted from on-screen dialogs. For example, certain quotes of a transcript can be first stacked in a separate web document and then imported into the editing software for automated assembly.



The on-premise version of Simon Says uses AI to generate transcripts for film and TV productions – locally and on air-gapped computers. The on-prem software enables video teams to transcribe interviews, choose relevant parts of their recordings, create accessible captioned videos and then subtitle their edits. Simon Says claims to address cloud security concerns by offering the on-prem version of the solution.

Sources: IABM, Forbes, Simon Says

AI/ML Deployments by Content Chain

AI/ML in Managing & Moving Content

Subtitling is not an exception for the insourcing trend. In line with this trend for large media companies, in 2020, Netflix AI engineers internally developed an AI solution to improve the translations and the accuracy of subtitles. Netflix calls its new AI-powered approach “Automatic Pre-Processing (APP)”, a method using automatic pre-processing to simplify sentences. This means “back-translating” the ground human translation to the source language, which often is different in meaning when it comes to idioms, complex multiword expressions, and phrases. After having mapped the source sentences to their simplified versions, they can be learned by training a sequence-to-sequence AI model. Even though Netflix’s AI solution has so far mainly focused on simplifying English-based subtitles, the model is universal and can thus be applied to other languages.



Sources: IABM, Netflix

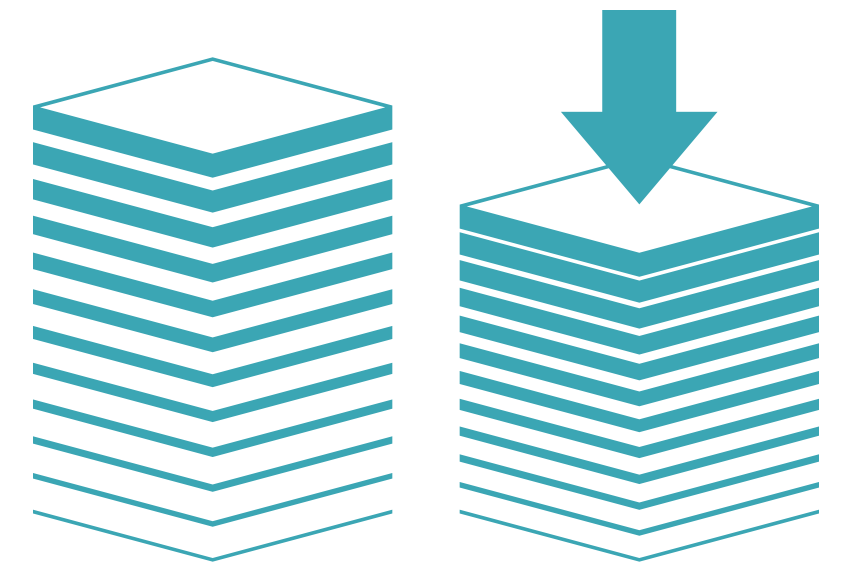
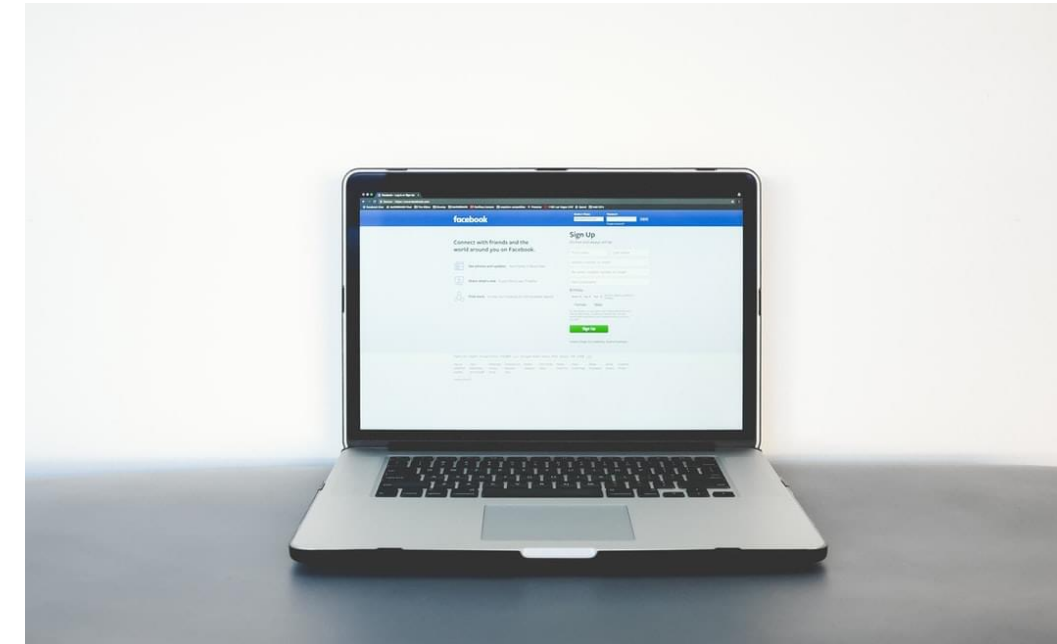


AI/ML Deployments by Content Chain

AI/ML in Managing & Moving Content

Given the increasingly crucial role of social media platforms as production, distribution, and publication channels for (short-form) content, also those technology giants who do not offer their public cloud services are ramping up their data analytics capabilities specifically designed for media workflows. For example, Facebook has developed an open-source Torch-based machine learning Python software library enabling media companies to perform tensor calculations, which are necessary for deep learning.

AI/ML can be used to optimize network performance and power other critical activities such as compression. Machine learning algorithms can predict the future location of an object in a sequence of frames; therefore, more frames can be removed and re-produced when decoding the video, leading to a higher compression rate. Within the frame, AI can identify areas of focus and recreate those areas of importance with higher fidelity than areas of lower attention like backgrounds. In the case of the limited bandwidth, the only other alternative to AI is the pixilation of the entire frame.

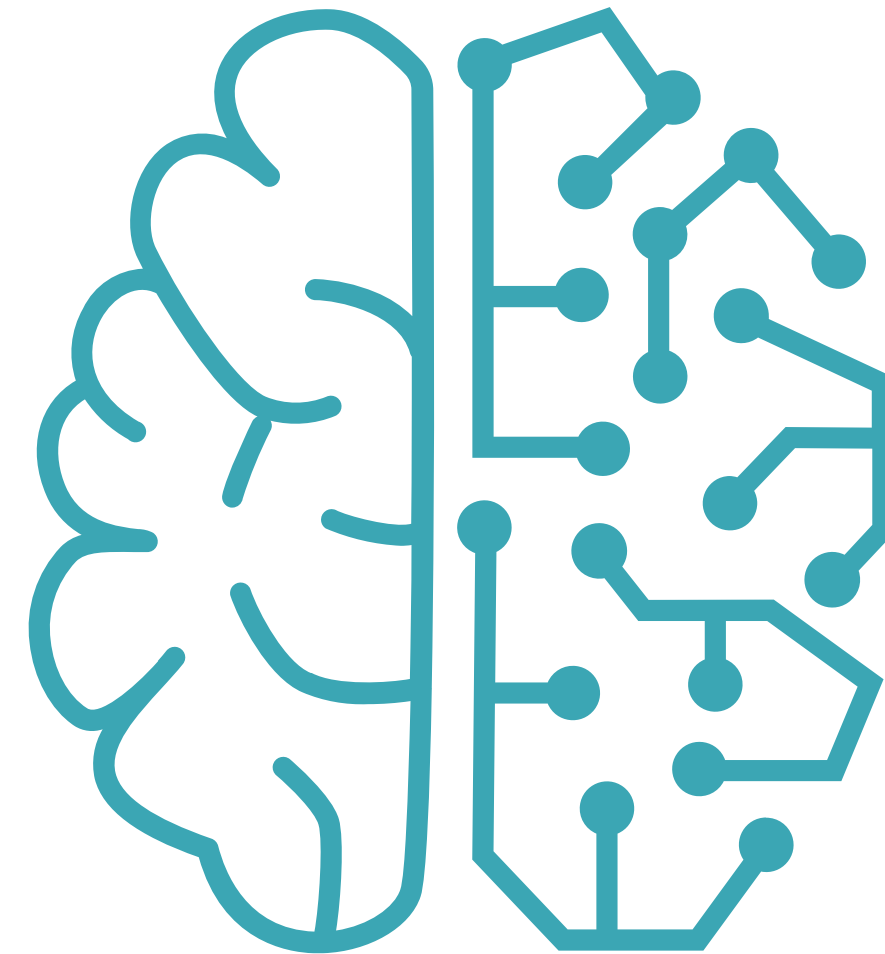


Sources: IABM, Netflix

AI/ML Deployments by Content Chain

AI/ML in Managing & Moving Content

In terms of compression, Netflix has developed a method called Dynamic Optimizer to improve streaming quality in regions that have internet bandwidth issues. Another major benefit of using AI/ML for video compression is development savings from fine-tuning and developing video codecs, which typically require a significant amount of time to develop due to their complexity. Through data processing and face detection, AI/ML can make algorithms converge faster. Some examples of technology suppliers in this field include Bitmovin, V-Nova, and iSIZE.





AI/ML Deployments by Content Chain

AI/ML in Managing & Moving Content

Moving and Storing Content

AI/ML can act as an optimizer of storage infrastructure as well as an additional driver of demand for storage capacity. AI/ML algorithms can produce significant (and actionable) results only if they are fed with large datasets. This imposes an additional burden on storage systems that often can be met only through cloud provisioning of resources. As Thomas Burns, CTO, Media & Entertainment at Dell Technologies, noted at an IABM BaM Live!™ panel,

”

Certainly, the cost of moving content in and out of any place, whether it be the public hyper-scaler or another facility or another part in your globally collaborative production pipeline, those data management costs are much more important than the actual infrastructure costs.

Thomas Burns, CTO, Media & Entertainment at Dell Technologies

Sources: IABM



AI/ML Deployments by Content Chain

AI/ML in Managing & Moving Content

This is another example of how AI/ML deployments are often accompanied by cloud-based resource provisioning.

Broadcasters adopting Object Matrix's MatrixStore, including the Sense analytics, statistics, and monitoring

In **2019**, as a part of its MatrixStore solution, Object Matrix introduced Sense, an analytics tool compiling all statistics and monitoring into a single framework allowing the users to view and analyze data across storage platforms. Many media companies such as The BBC Studios, BT TV, and Virgin Media are using MatrixStore object storage solutions, which integrates with AI solutions – and enables AI-backed metadata tagging.

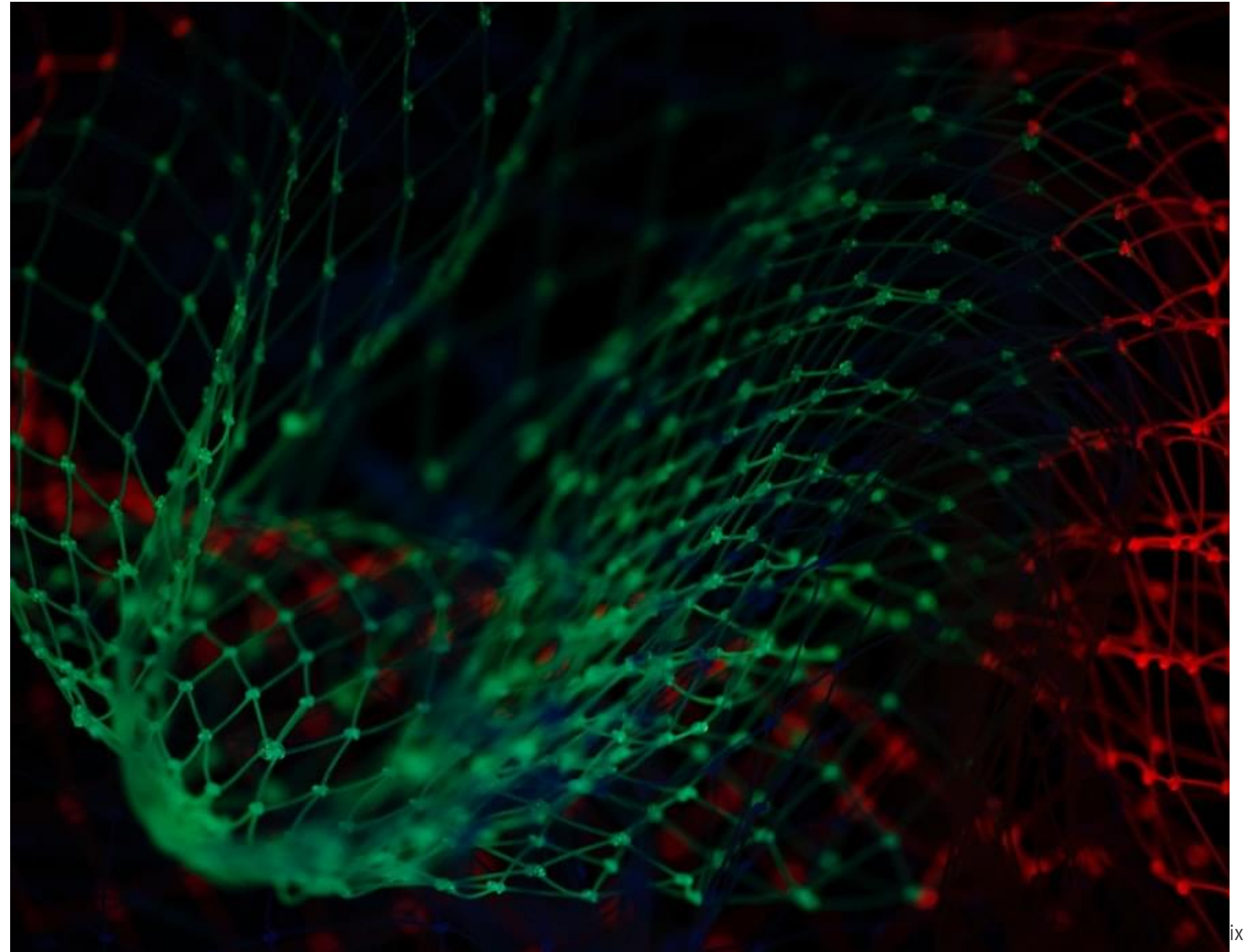
In April **2021**, BBC Cymru Wales – the national broadcaster of Wales – announced a further five-year hybrid cloud partnership with Object Matrix to upgrade its existing on-premises MatrixStore storage to MatrixStore Hybrid. The need for hybrid storage with AI-backed solutions was driven by the move to remote workflows. After having moved to its new headquarters at Central Square in Cardiff, BBC Cymru Wales has increased its studio productions as well as remote teams on-site, who need to have seamless access to content. With the upgrade, remote team members can self-serve content from MatrixStore Cloud by using the Vision browser, a web-based media management application providing automated metadata extraction and advanced search options.

Sources: IABM, The BBC, Object Matrix

AI/ML Deployments by Content Chain

AI/ML in Managing & Moving Content

AI/ML can also augment current support solutions (e.g., network monitoring), liberating resources of broadcasters. For example, in 2019, Skyline announced its new DataMiner NMS/OSS platform, AI-powered network management, and OSS solution, which uses AI to augment operations with intelligent fault detection, trend forecasting, and incident analysis. Broadcasters can monitor their whole operational chain through a single, user-definable user interface (UI). Moreover, AI/ML can be used as a threat detection tool to augment cybersecurity capabilities in an efficient way.



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AI/ML Deployments by Content Chain

AI/ML in Distributing & Monetizing Content

Publishing Content

As video delivery networks move to the cloud to leverage their greater elasticity and scalability, AI/ML technology is increasingly being used to predict increases in resource requirements to reduce delays in delivery. For example, in live sports events or launches of new TV series, AI/ML is already learning to predict the resulting increased strain on a video delivery network, and thus it can automatically scale up resources available to all of the video pipeline – and significantly increase overall efficiency.

Many production/post-production companies and broadcasters are investing substantially in subtitling and closed captioning (CC) of their content to improve its accessibility. As closed captioning (CC) is imposed by law, AI-enabled captioning can support compliance efforts by drafting instant and accurate captions that reflect exactly what is happening on screen. Big internet companies such as Facebook are already using AI-powered smart captioning to enrich the stream of videos on social media.

In 2021, an IBM survey found that consumers are more likely to choose services from a company that offers transparency and an ethical framework on how their AI/ML algorithms are built, managed, and used. To address this consumer demand, IBM Watson introduced new capabilities into its tools.

Sources: IABM, The BBC, Object Matrix



AI/ML Deployments by Content Chain

AI/ML in Distributing & Monetizing Content

Content delivery networks (CDNs) are playing a crucial role in the rise of OTT and thus are increasingly the focus of distributors of linear and non-linear content. AI/ML tools can predict usage and automatically scale resources up or down in a cloud-based CDN environment such as Amazon Cloudfront. This is useful for minimizing delay and better budgeting for costs. For example, Netflix uses AI/ML tools to optimize the performance of its CDN, Open Connect. Content delivery networks (CDNs) typically cache and store data across a network of data centers globally to deliver the requested content from the edge server (instead of the origin server) to the viewer; they must continuously make decisions about to which edge server the CDN should direct the content request – generating huge data sets stored in server log files. As the amount of high-quality content on VOD and OTT platforms continues to skyrocket, the routing decision(s) made by the CDN becomes very complex. In these circumstances, AI/ML can be used to make the routing decisions more efficient and intelligent by proactively identifying network traffic patterns and traffic demand (e.g., network bottlenecks) and then communicating them to the network operators. To minimize latency, AI/ML technology can also re-route traffic to an edge server that the AI/ML engine has identified as the most optimal for storing or caching the data. Hence, end-users are increasingly interested in AI-backed CDNs, as they can notably augment the performance of content delivery systems – and eventually UX – at an affordable cost.

Sources: IABM



AI/ML Deployments by Content Chain

AI/ML in Distributing & Monetizing Content

Monetizing Content

AI/ML can be used for augmenting rights management, content planning/scheduling, subscriptions, and data analytics to support advertising – the key revenue source for the majority of broadcasters and media companies. For example, as media companies continue to diversify their revenue sources to subscriptions and digital advertising, they are increasingly interested in AI-based subscription management tools to predict viewer turnover. AI/ML can also be used to analyze viewers' renewal histories and provide platform operators with insights on how to personalize renewal process practices for each viewer.

Paywizard has developed two different AI-backed subscription management platforms: Paywizard Singula and Paywizard Agile.

The former – built on the Microsoft Azure AI platform – is targeted at Pay-TV operators and OTT providers, who can optimize their monetization plans based on real-time subscriber insights. The latter is a subscription, billing, and CRM solution, which analyzes viewers' behavior to aid the acquisition of new viewers.



Sources: IABM, The BBC, Object Matrix



AI/ML Deployments by Content Chain

AI/ML in Distributing & Monetizing Content

Today, basic AI-driven advertising applications include search, programmatic advertising, predictive re-targeting, and speech/text recognition. These AI- enrichment tools provide real-time analysis of their online media usage and enable end-users to better monetize their content archives and learn from their viewers' feedback when creating new original content. Broadcasters like Turner and Channel 4 were early adopters of AI-based ad apps. For example, Channel 4 - when launching its VOD service - invested in open-source technologies (e.g., Hive) and leveraged AWS for on-demand big data processing.

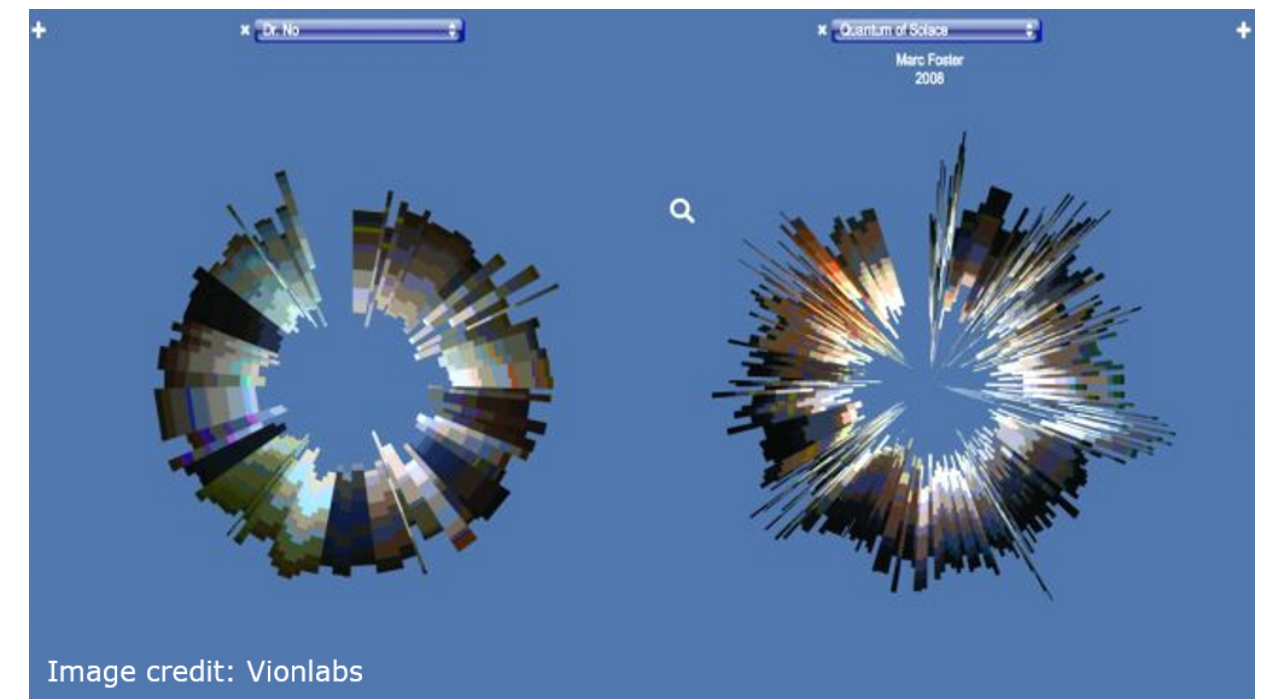
A growing number of end-users have started to explore AI/ML tools related to image recognition/machine vision and Automatic Content Recognition (ACR). AI-driven video recognition helps media companies to improve ad placement through automatic content segmentation (involving emotional targeting) and to use dynamic ad insertion (DAI) techniques. For example, Media Distillery has developed an AI-solution called Deep Content Understanding platform, which generates metadata by accurately tagging categories within a piece of content and then contextually matching relevant ads to the shows and programs aired by an end-user.

Source: IABM

AI/ML Deployments by Content Chain

AI/ML in Distributing & Monetizing Content

In 2020, Topic – a streaming service of First Look Media – became the first U.S. customer to deploy Vionlab’s “Emotional Fingerprint API,” an AI/ML-enabled Content Discovery Platform that provides broadcasters and media companies with a deeper understanding of programs’ appeal to viewers by using computer vision and ML to generate sentiment data. Measuring thousands of factors, such as colors, pace, audio, and object recognition, it can produce an AI-derived “emotional fingerprint”, frame by frame. The cloud-based solution can be integrated with existing workflows throughout the video acquisition, production, and distribution chain. In August 2021, Google partnered with Parrot Analytics to use its AI-based capabilities to analyze audience demand data to inform content decisions for its services YouTube and Google TV.



Source: IABM



AI/ML Deployments by Content Chain

AI/ML in Distributing & Monetizing Content

Consuming Content

Personalization is at the center of identity and access management (IAM), which involves a wide range of intelligent tools needed to build up a profile of viewer preferences. Pay-TV operators and broadcasters are investing in these AI/ML tools to improve relationships with their customers to reduce churn. These are some recent examples of such tools:

In 2020, StarzPlay, an SVOD service of Starz, was made available as the StarzPlay app in the UK through Amazon Prime Video and Virgin TV. Currently dominating the MENA region, with more subscribers than Netflix there, the platform recently enhanced its recommendation engine and added another 30 features improving viewers' engagement and content discoverability. Every user is being recommended some content based on their consumption (viewing habits, preferences, and search keywords) and third-hand metadata that is available on open-source platforms.

In 2021, content distribution platform Tata Sky introduced Tata Sky Binge – an OTT aggregator that relies on ThinkAnalytics' Think360 algorithms for cloud-based content discovery. The recommendation system operates in the AWS Cloud and supports content for more than 30 languages.

Source: IABM



AI/ML Deployments by Content Chain

AI/ML in Distributing & Monetizing Content

The evolution of more sophisticated analytical platforms that measure and predict how popular particular characters and themes in stories are going to be will revolutionize the broadcast and media industry.



Source: IABM