



WILL ROBOTS TAKE OVER THE WORLD OF LOCALISATION?

A whitepaper on Artificial Intelligence in
Media Localisation by ZOO Digital

October 2024

EXECUTIVE SUMMARY

ZOO Digital's white paper gives an insight into how AI is transforming media localisation. To summarise:

- AI already plays a role in the localisation of premium entertainment content. For now, its greatest value is in assisting traditional practices rather than replacing them. Localisation encompasses not just the linguistic but the cultural, social and regulatory aspects of adapting TV and film content, which AI can't currently address. AI is also unable to pick-up on contextual detail vital to understanding the nuances of the narrative.
- Some applications of AI for media localisation already offer productivity benefits. For example, ZOO takes advantage of software to create a first pass transcription of dialogue, a key step in the localisation workflow and for creating captions in the same language for the deaf and hard-of-hearing. Skilled editors must be in the loop to ensure the quality that premium entertainment companies require.
- Current machine translation software could be used to automate subtitling into other languages, however this is only useful for lower value user-generated content or factual and literal content without conversational dialogue such as some documentaries. For premium entertainment content, these capabilities at present fall significantly short. A human expert is needed to make sure adaptations in different languages are localised appropriately for specific markets and in a way that is faithful to the impact of the original. From speaker background to mood and body language, AI cannot understand context or read between the lines.
- For premium entertainment content AI is currently unsuited to creating localised dubbing scripts for the same reasons: context, which is inadequately captured in the dialogue alone, is critical in order to localise authentically for specific cultures and markets.

- However, when deployed in the right way, ZOO has found that AI can be effective to assist and support skilled media translators, rather than displace them, helping to drive quality and reduce turn time which are demanded by major customers.
- From creating synthetic voices to changing and synchronising speakers' lip movements, technologies are emerging to automate dubbing. However, ethical considerations are crucial. Further, where creativity is needed, such as for writing a script or for capturing the subtleties of an acting performance, current technologies fall short of the quality and authenticity that audiences expect of premium entertainment content.
- Quality is the crux of localisation for premium media and entertainment. Most AI applications mentioned require a skilled human in the loop. For example, specialised linguists must check translated subtitles; editors review captions according to technical requirements and style guides; directors modify synthetic speech to ensure fluency. This means that practical applications of AI will necessarily require specialist skillsets found in vendors of media localisation services that employ teams of these skilled creatives.
- Increasingly the industry is seeking innovative approaches to deliver high quality and authentically localised versions of premium quality services with a faster time to market. Any approach must be framed within ethical and regulatory best practice. Several potential applications of AI have emerged that are potential candidates, but key to their adoption by localisation vendors is full disclosure to trusted suppliers and clients.
- As the complex and contentious path of AI develops further, media companies will need to work with like-minded partners that embrace innovation and change.

THE AI REVOLUTION: OR IS IT?

Artificial intelligence (AI) has been around since the 1950s, yet it wasn't until 2023 that AI took off commercially. The year was a gamechanger as AI gained widespread commercial adoption, marked by significant technological advancements in the field and public awareness.

Generative AI tools like OpenAI's ChatGPT were the catalyst for a surge of interest in the technology. Now, as AI moves out of its development phase, there is hardly a business across the globe that hasn't had to consider the impact of AI in its industry. Following a year marked by Hollywood strikes, nowhere has this been truer than in TV and movie media localisation. So, what is it about AI that's been causing such a stir?

“Generative AI is right in the peak of inflated expectations,” Gartner analyst Dave Micko said in November 2023. **“There are massive claims by vendors and producers of generative AI around its capabilities, and its ability to deliver those capabilities”.**

AI is about computer systems performing tasks that usually require human intelligence, such as learning, problem-solving and understanding language. It uses techniques like machine learning, deep learning, and natural language processing to analyse data, learn from experience or ‘train’ to act in what seems like an intelligent way. ChatGPT and

other systems developed by Microsoft, Google, and Apple use large language models (LLM) to learn human language patterns and create text that sounds – well... just like us.

Indeed, with widespread adoption by these major brands, the latest generative AI trend is at peak hype, according to the market research firm Gartner. The authors state that this begins with high expectations, followed by a “trough of disillusionment” before returning to reality.

AI is also making waves with models like Runway, Sora from OpenAI and Movie Gen from Meta which can make realistic scenes from text instructions - potentially changing how films and TV shows are made. Similarly, in media localisation there are several applications of AI that create the impression that traditional practices will soon be replaced by automation.

So, what is the AI hype all about? What does it mean for the talent, the linguists and the wealth of people involved in taking Hollywood's most prized export in TV and film to audiences around the world? Read on to gain an insight into how AI is changing media localisation and ZOO Digital's position as an industry innovator.

Over the past two years there have emerged many commercial applications that utilise AI to perform creative tasks.



THE SCOPE OF END-TO-END SERVICES

ZOO Digital is one of a select few vendors in the localisation industry that offer end-to-end (E2E) services. i.e., an all-in-one solution for streaming companies and media producers. This encompasses all the technology-enabled services the entertainment industry needs to adapt films and TV shows for streaming platforms in multiple languages.

Increasingly the biggest names in entertainment favour this model as it simplifies vendor relationship management, while making the whole process more streamlined, consistent and far less demanding of their internal teams.

Thanks to a dedicated in-house R&D team, ZOO leverages technology to deliver ultra-streamlined premium services, using its own proprietary systems alongside best-in-class, third-party software. It's an innovative

approach which has seen ZOO become a leading E2E provider in the industry, offering clients guidance on AI applications and a wealth of technology-enabled services to make localisation smarter, easier and better. Crucially to the company's business model, it also removes the need for heavy investment in physical assets.

“By looking at the bigger picture of end-to-end localisation – across multiple services, projects and territories – we identify where processes can work smarter, easier and better. Our end-to-end service offering encompasses all the services and languages our clients need. It's a unified, consistent and streamlined approach. Importantly for our clients it means less overheads, less handholding and less headache because we've designed our systems to take the strain.”

Gordon Doran, President, ZOO Digital

Rooted in a background of world-class technology innovation, ZOO's expertise lies in media localisation and technical media services. Media localisation involves adapting content linguistically and culturally - what's more it's a highly creative skill. For non-native speakers this includes subtitling and dubbing, which are the most in-demand services and require accurate transcriptions of the original dialogue. It also includes captions and subtitles for the deaf and hard-of-hearing; audio description for the sight impaired; the translation of artwork and metadata such as the imagery and text that features in electronic programming guides and the creation of legal agreements for assignment of rights for all contributors.

Media services focus on the technical aspects of adapting digital media for streaming platforms, ensuring compatibility for each streaming service with high-quality audio and visual playback. Each streaming platform also has its own requirements, which means that platform-specific packages must be created.

Services in this category include:

- **mastering** (adjusting the resolution, colours, definition and technical formats)
- **digital packaging** (assembling video elements, audio tracks, subtitle streams and other components into a composite package that meets the delivery specifications of each platform)
- **conforming** (ensuring correct synchronisation of elements)
- creating graphical elements
- performing quality control
- and editing materials to comply with any cultural and age-restriction requirements of the target audience and market.



AI AND THE ART OF LOCALISATION

“What you get with one of our translators on the job translating the latest Disney movie or a Netflix hit show, is the ability to tap into their own creativity as well as a deep understanding of culture and language. It’s that innate ability to read between the lines, so that every inference and nuance packs the same punch in the target language. AI can’t do that, it lacks soul.

Human creative talent is still crucial for delivering world-class content.”

Raul Aldana, VP Dubbing, ZOO Digital

Understanding the ZOO business means understanding firstly the difference between translation and localisation, and secondly recognising how the requirements for media, which deal with the spoken word, are very different from other sectors that deal primarily with the written word. Translation is just one aspect of localisation, focusing on adapting a message, while localisation involves tailoring content to the nuances of a particular language and culture.

Translation mainly deals with text and using AI this tends to be literal and often misses the context. Localisation takes a more holistic approach, encompassing not only linguistic factors but also cultural, social, and regulatory elements. Translation is a key aspect of localisation, however achieving authentic and locally accepted content, especially in entertainment, requires much more.

Look at the translated text below. Using ChatGPT it's been translated into the target language and then translated back into the original language to compare it against the original text. Look at these instructions:

Most websites' or services' login pages can be accessed by clicking a Log In or Sign In link somewhere on the home page (usually in the upper-right corner).

Translating this into Japanese using ChatGPT gives:

ほとんどのウェブサイトやサービスのログインページは、ホームページのどこかにある「ログイン」または「サインイン」のリンクをクリックしてアクセスできます(通常は右上隅にあります)。

Feeding this translation into ChatGPT and requesting English as the output language results in:

Most websites' or services' login pages can be accessed by clicking a 'Log In' or 'Sign In' link somewhere on the home page (usually in the upper-right corner).

This is almost identical to the original, showing the Japanese version is highly accurate. The Korean version turns out the same. ChatGPT does well here as the input text is clear English and doesn't require much context for translation. For instance, knowing the previous sentences won't really improve the output.

Consider the following line spoken by Hannibal Lecter in 'Silence of the Lambs':

I'm having an old friend for dinner.

This is a seemingly harmless comment, its sinister subtlety is only clear when you know that the speaker is a cannibal.

Using the approach for Japanese gives

I'm inviting an old friend for dinner.

And for Korean:

I am inviting an old friend for dinner.



For both languages, the subtle, ambiguous wordplay has been lost. The example highlights the crucial role that context plays in creating a faithful adaptation in a different culture.

Localisation is about ensuring that products are well-received in other languages and cultures, including consumer products marketed internationally. Similarly, media localisation for entertainment involves adapting audio-visual content for viewers in a different country, making it locally suitable and authentic for the target audience.

However, only a few localisation service providers specialise in entertainment content, not least

because it involves the spoken rather than the written word. Authentic speech is more spontaneous and littered with repetitions, interruptions, and incomplete sentences. It often incorporates slang, colloquialisms, idioms, and contractions rarely found in written communication.

“As streaming services reach more and more global audiences, it’s in the interests of producers and distributors to make sure that their content resonates with each audience, so the quality and authenticity of localised entertainment is more important than ever. Basic translation just won’t cut it. It takes specialist localisation to avoid cultural insensitivity, misinterpretation, or any kind of reduced audience experience that might risk affecting the impact of a movie or TV series in a new market.”

Raul Aldana, VP Dubbing, ZOO Digital

Consider the following dialogue, which is a famous line from the 1954 feature film 'On the Waterfront', starring Marlon Brando:

I coulda had class. I coulda been a contender. I coulda been somebody, instead of a bum, which is what I am, let's face it.

While this means “I regret that I have not achieved more”, the words Brando speaks and the way they are delivered are also authentic to his character, social standing and emotions as he is filled with regret at not fulfilling his ambitions. The statement is rich with context and to convey a localised version in other cultures demands more than can be conveyed through a literal, isolated translation.

Translating it with ChatGPT into Japanese and then back into English gives:

I might have had class. I might have become a contender. I might have become somebody, instead of being homeless, that's my real face, let's be honest.

For Korean the result is:

I could have become mentally stronger. I could have become a competitor. I could have become somebody instead of a nihilist. But the truth is, that's who I am. Let's face it.

This illustrates the challenge in using AI to adapt dialogue. While a literal approach may work for some content, the need for nuanced and contextual dialogue in entertainment content means that an automated translation just won't work. Media translation aims to evoke the same emotional response from viewers in different cultures as in the home market, making the job complex and reliant on more than the script's words.

Media localisation does, however, have some similarity to literary translation. Both involve adapting written fiction for different cultures; however, media localisation also involves dealing with visuals. The challenge lies in capturing all the information and context in the visuals to do the localisation justice. For instance, a joke's humour might rely on something you see on screen, not just what's been said. It also involves dealing with tone and pitch, whereas written translation simply needs writing and reading skills. All these factors make media localisation a niche service provided by specialist companies who collaborate with experts in the field.

Translation has benefited from software automation for decades, with tools like ‘Translation Memory’ remembering previously used words for consistency. Today, the feature is used in media localisation to maintain name and phrase consistency across all episodes of a TV series.

Using digital computers for translating natural languages was first suggested in 1947, yet it wasn’t until the early 1990s with the development of statistical algorithms that it became mainstream. Machine translation has come a long way since then, but it still isn’t perfect. Each language has its own quirks when it comes to sentence structure – for example, in French, pronouns have genders, while Japanese often skips them altogether. This can make finding the right translation method tricky, as it varies from language to language.

Despite these challenges, translation software has improved considerably and is now widely available with tools like Google Translate, making cross-cultural communication easier and more affordable despite its flaws. Context is key, which machine translation can easily miss – for example, when translating a sentence like “Look at the crane,” which could mean either a bird or a construction machine. Getting it right depends on understanding the context, which isn’t always clear in the text.

When you’re working with the written word, a post-edited machine translation can be the best and most cost-effective method. An automated first pass can then be edited by an expert, which is usually vital to guarantee high linguistic quality. In the example of the crane, a post editor would be able to work out which meaning makes most sense in the context of the document being translated.

While its translation ability has improved over the years, machine translation software still struggles not just with interpreting the context in a text but also with translating idiomatic expressions, colloquialisms, wordplay, and cultural references.

Using LLMs, **ChatGPT** has taken machine translation a step further. Unlike translation tools such as **Google Translate**, it uses generative algorithms to recognise and generate text based on large amounts of data it’s learned from. When you ask it to translate something, it doesn’t just do a direct translation. It looks at the patterns in the words and the context to come up with a response that is consistent with responses seen previously in similar sentences. Sometimes it can pick up on idioms, such as turning “he’s under the weather” into “he’s not feeling well” in Japanese, yet it still struggles with more complex or nuanced language.

Hence ChatGPT is able to give more natural-sounding, conversational translations than older translation systems. Plus, because it's been trained on a wide range of Internet text, it's better at handling informal language, slang, and idioms in translation.

Many studies have compared ChatGPT with other machine translation systems, and while ChatGPT can produce a fluent result, there's no outright winner yet when it comes to accuracy. As the software continues to be developed, if accuracy and authenticity are a priority, having the human touch in the mix will be key for the foreseeable future. Indeed, according to CSA Research, specialists in the language services markets in their report 'Market Landscape for Language Services', humans will stay central to language service success.

It's worth noting that machine translation and ChatGPT work with written text as the input. When it comes to media localisation, it's a different ball game. You need to understand not just the words being said, but how they're said, the speaker's background, mood, body language and a wealth of factors that a system focusing exclusively on the words would miss. Take the previous example of the crane – the right translation might be obvious from the visual on screen, whereas the words alone may be ambiguous.

Increasingly AI can be used in media localisation, particularly when it comes to creating subtitles and dubbing scripts in different languages. For content such as some documentaries where the meaning of the dialogue is literal, using machine translation and post-editing is viable. Similarly for low-value, user-generated content such as YouTube videos where the quality doesn't

“At ZOO we prefer it to call it artificial assistance rather than artificial intelligence. We view AI as a technology to assist with handling the translation of source materials using our own cloud-based tech. It's about giving our global network of creative talent the tools that can help them be more productive, accurate and fulfilled in their roles rather than taking their jobs away.

“We come back to one key principle – when you're dealing with a hit TV series or the latest blockbuster film, our clients value quality above all else. So, our team of talent from subtitlers to script writers, continue to be lynch pins in our localisation process.”

Gordon Doran, President, ZOO Digital

have to be perfect, a few mistakes in the translation might not be a big deal for the viewers. However, when it comes to premium entertainment content, the localisation must be spot on to keep the audience engaged. If a show doesn't resonate with viewers in a certain country because of a poor translation, there's a high price to pay.

AI, THE NEXT GENERATION IN AUTOMATION

AI is a powerful tool for streamlining tasks that a person might otherwise perform. While it has the capacity to push the boundaries of automation, it's important to understand the significance of non-AI automation to see where AI can bring added value. Automation is worth considering for any company as a strategy to make processes which involve its people more efficient and to minimise time and costs. This offers three key benefits:

01. Firstly, reduced costs can be achieved by substituting skilled human labour with more cost-effective technological solutions, as technology can scale in ways that human labour cannot. For instance, in the context of managing localisation projects, automation software like ZOO's workflow management systems can double work throughput with a minimal increase in headcount compared to the traditional approach of doubling human resources. This demonstrates how automation can effectively scale a business.

02. Secondly, in scenarios where people perform highly repetitive yet crucial tasks, such as verifying the technical aspects of translated subtitles, the risk of human errors impacting the company financially or reputationally is significant. Rules-based automation, like the quality control processes integrated into ZOO's subtitling software, can eliminate the potential for minor technical errors, ensuring a more reliable outcome.

03. The most compelling benefit is when automation frees up people from mundane tasks, so that they can focus on more important, higher value functions. This is not just about saving money - it can boost profits and help with employee growth and retention. For example, project managers can spend more time building relationships with clients and suppliers. Similarly, with cloud-based dubbing tools, actors can improve their performances without needing to travel, while directors can handle multiple projects at once.

Automation can be split into two types: ‘substitutive’ and ‘disruptive’. In ‘substitutive’ automation, software replicates human actions, enabling business as usual. This technology is straightforward for organisations to adopt as it doesn’t require major changes to workflows, and often leads to a rapid payback. For example, automating quality control for subtitles as mentioned earlier, replaces a human task while keeping the workflow intact.

‘Disruptive’ automation is about automating specific tasks without the need to keep existing workflows, such as ZOO’s cloud-based dubbing software

mentioned earlier. It allows for the reimagining of entire business processes in a digital context, streamlining tasks and potentially removing the need for human intervention.

“Automation isn’t new to ZOO. We’ve been pioneering automation in media localisation for over a decade. ZOO Digital Labs, our R&D team develops workflow and translation management systems with the aim of making our processes ultra-streamlined. This includes the industry’s first cloud-based subtitling and dubbing platforms.

We exploit technology wherever we can and it’s a key pillar of our strategy, thanks to our in-house proprietary systems as well as third-party products. They power the end-to-end services we now offer our clients in Hollywood.”

Dr Stuart Green, CEO, ZOO Digital

AI takes automation a step further by handling more complex tasks that ordinarily need judgement beyond simple rules. The ability to replicate human expertise, previously acquired over years, is now achievable through data and advanced machine-learning techniques. In media localisation, AI can assist in tasks like transcription, translation, and voice acting. We’ll explore AI’s applications at ZOO, detailing its capabilities, integration with traditional approaches and future roadmap.

WILL AI STEAL YOUR JOB?

It's easy to assume that AI will lead to the disappearance of many jobs and businesses, but recent data paints a different picture. A 2023 survey by AuthorityHacker predicts AI will cut 85 million jobs by 2025 but create 97 million new ones, resulting in a net gain of 12 million.

While AI will prompt change in industrial production and replace some jobs, this is not unlike past industrial and information revolutions. For instance, the rise of telecommunication technology led to job shifts from telephonists to new roles like social media managers and app developers. History shows that while technology may render some jobs obsolete, it also sparks economic growth and new employment opportunities, especially in knowledge-intensive fields. Just as millions of people work today in areas that didn't exist 50 years ago, the ongoing AI revolution is expected to follow this pattern, creating new job prospects as it transforms existing ones.

“Leading organisations will be those embracing tech to enhance, not replace, human skills. ZOO foresees AI expanding the market by making localisation more cost-effective, opening new opportunities such as reaching untapped language markets. With a track record of innovation and early tech adoption, we're well-positioned to leverage AI's potential.”

Dr Stuart Green, CEO, ZOO Digital

Indeed, innovation can have surprising effects on employment. Economist James Bessen studied the impact of Automated Teller Machines (ATMs) on bank tellers. In 1985, the US had 60,000 ATMs and 485,000 bank tellers. By 2002, the number of ATMs rose to 352,000, yet the number of bank tellers increased to 527,000. The convenience of ATMs led to more banking transactions, prompting banks to improve customer service with more employees handling complex tasks. This shows that innovation doesn't always mean job loss; technology can complement work. Automation's cost savings can boost demand and evolve job roles. To stay competitive and successful, organisations must embrace new tech and innovate. Denying tech advances, like Blockbuster did with video on demand, can lead to failure. Embracing innovation opens doors to new opportunities.

In the context of localisation, it is the soaring global demand for premium film and TV content, which will drive the need for high-quality media localisation matching the original material. AI and other tech will help streamline the production of localised content and boost sector output.

INNOVATION AND CREATIVITY

There's a difference between innovations that speed up manual tasks, like Henry Ford's assembly line for manufacturing cars, and those that involve creativity, like designing vehicles. Printing didn't replace literature, just as photography didn't replace painting. Some worry that AI will replace human creativity, but it's actually a tool that enhances human capabilities rather than replaces them. By working with AI, creators can explore new creative possibilities while maintaining human emotion and depth. For instance, generative AI systems now allow users to create images based on text prompts, opening art creation to a wider audience.

While such technology may put some artists out of work, the role of the artist won't become obsolete. Professional users often report that the software doesn't produce a satisfactory image on the first attempt, rather it becomes an

iterative process. Learning how to effectively prompt the software takes time and research, much like learning the language of human creatives. Just as simply owning a camera doesn't turn just anyone into a professional photographer, creating compelling art with AI will require an artist's skill. The software can be a valuable tool for generating ideas, expanding the

“AI will change the nature of creativity, so it's important that we develop new ways to interact with these machines.”

Yves Béhar, Industrial Designer and Entrepreneur

range of options and driving up the perceived quality of their work. Hence, an artist's role can naturally evolve as they learn to use the new technology to enhance their creative practices.





Similarly, in the entertainment industry, AI is not set to replace content creation because creativity is unique to humans. AI can mimic human emotions in some applications, but it lacks a human creator's depth of understanding and empathy.

There are specific use cases where AI may be acceptable. For example, the creation of captions for dialogue in YouTube videos uses automated speech-to-text technology. While the resulting captions are error-prone, they are generally accepted for user-generated content due to their low production cost.

In September 2024 Warner Bros. Discovery announced their use of AI technology from Google to perform automated transcription to produce captions for some unscripted content. This is increasingly a more cost effective way to create captions, although the human

touch is always necessary to ensure accuracy¹.

However, audiences wouldn't tolerate such errors for the latest blockbuster film or TV series. Therefore, AI tools won't spell disaster for the creative sector; rather, they will transform the type of work that continues to be done by humans and those aspects that can be automated using new technology.

History has shown similar inflection points, such as the advent of home video in the 1970s and digital piracy in the early 2000s, both of which led to new opportunities and revenue streams. AI will play a role in creativity, but the finest examples will continue to be driven by people and organisations that are specialists in the field and are willing to embrace the benefits the technology has to offer.

¹ <https://www.cnn.com/2024/09/24/warner-bros-discovery-google-partner-on-ai-generated-captions-on-max.html>

GENERATIVE AI AND CONTENT CREATION

The surge in interest in AI in 2023 was mainly due to the availability of generative AI. This branch of AI, which includes algorithms used by popular tools like ChatGPT, uses extensive training datasets and computing resources to create new content such as text, images and music.

When ChatGPT is presented with the question “What is generative AI?” its answer begins: “Generative AI refers to a class of artificial intelligence systems designed to generate new content, whether it be text, images, music, or other forms of data, that is original and often indistinguishable from content created

“Generative models are a key enabler of machine creativity, allowing machines to go beyond what they’ve seen before and create something new.”

Ian Goodfellow, former Director of Machine Learning at Apple

by humans. Unlike traditional AI systems that perform specific tasks based on predefined rules or patterns, generative AI models are trained on large datasets to understand and mimic the patterns and structures present in the data.”

It’s hard to tell whether the response was produced by a machine rather than a

human and it’s easy to assume that the software has a level of understanding of the subject matter. The output gives the impression that the software is synthesising information in a critical way by paraphrasing and summarising content from multiple sources to build an argument.

However, this is not the way these algorithms work. The software is using statistical patterns in the training data, like a predictive text feature on a mobile phone, to produce an answer that looks like other answers it has seen to similar questions.

This means Generative AI doesn’t understand the content it generates and is limited by its reliance on the data it’s trained on. It can recognise patterns and trends quickly, but it can’t understand context or make decisions in complex situations. It also lacks the ability to come up with novel ideas, recognise abstract concepts, or understand humour and irony. Consequently, its answers are fluent and sound plausible, but there’s a risk that they are actually nonsense.

The dangers of this were highlighted last year when two US lawyers were fined for submitting fake court citations from ChatGPT².

What helps the software to appear so convincing is the enormous volume of data on which it has been trained, which is substantially greater than anything

‘The very speed with which ChatGPT went from a science project to 100m users might have been a trap (a little as NLP was for Alexa). LLMs look like they work, and they look generalised, and they look like a product - the science of them delivers a chatbot and a chatbot looks like a product. You type something in and you get magic back! But the magic might not be useful, in that form, and it might be wrong. It looks like product, but it isn’t.’

Benedict Evans, Independent TMT Analyst¹

influenced by the availability of training materials, and it performs better on extensively covered subjects and less effectively on niche topics.

Generative AI may seem convincing, but it falls short in critical thinking, developing evidence-based arguments, and generating truly creative ideas. Such short-comings restrict its value for complex tasks.

However, there are certain tasks, even in the art of film making, where AI can lend a helpful hand. For example, in September 2024 Lionsgate, the film and television producer and distributor, revealed a partnership with an AI company to develop a custom video generation approach that involves the creation and training of a new model that will be customised using Lionsgate’s proprietary catalogue. This will be used to help Lionsgate Studios, its filmmakers, directors and other creative talent augment their work through enhancing and supplementing traditional operations in the areas that include storyboarding and creating backgrounds⁴.

available previously, albeit at an enormous cost – OpenAI disclosed that the cost of training GPT-4 in March 2023 was \$100 million.

Generated content also comes with a health warning – it may have biases from the training data and can produce nonsensical or inaccurate outputs, a phenomenon known as “hallucination.” The effectiveness of generative AI is also

¹ <https://www.ben-evans.com/benedictevans/2024/7/9/the-ai-summer>

² <https://www.theguardian.com/technology/2023/jun/23/two-us-lawyers-fined-submitting-fake-court-citations-chatgpt>

³ <https://www.goldmansachs.com/intelligence/pages/gs-research/gen-ai-too-much-spend-too-little-benefit/report.pdf>

⁴ <https://siliconangle.com/2024/09/18/lionsgate-partners-runway-ai-develop-custom-video-generation-model/>

AI might be able to process information on a debate, but it's going to struggle when it comes to identifying the strength or credibility of each side. That's why ZOO's strategy is to embrace AI in a way that helps and supports its users, allowing them to continue to do what they do best.

“In ZOO’s world, the world of localisation, we’ve found that AI tends to overlook the subtleties in a TV script or the emotional undercurrent in an actor’s voice. It just can’t read between the lines like we can.

“So yes, generative AI has the potential to transform content creation, but its limitations highlight just how important it is to have real creative expertise overseeing and refining its output.”

Chris Oakley, Chief Technology Officer, ZOO Digital



“AI technology is exceptionally expensive, and to justify those costs, the technology must be able to solve complex problems, which it isn’t designed to do.”

Jim Covello, Head of Global Equity Research at Goldman Sachs³

AI IN THE WORLD OF ENTERTAINMENT

Many commercial applications are proving successful, and the entertainment industry is no exception in its interest in AI's potential.

This comes as no surprise given that generative AI can create many of the outputs the industry needs i.e. text in the form of stories, scripts, advertising copy, and reviews; marketing campaigns; sound and dialogue; and moving and static images. Parts of the industry face huge economic pressures with increasing demand for cost-effective ways to create more and more content.

A recent Wall Street Journal article noted that widely available AI tools can suggest storylines, character arcs, and dialogue. Indeed, Generative AI was used for producing some of the visual effects in the 2022 film 'Everything Everywhere All at Once,' which went on to win seven Academy Awards. Generative AI has also been used to create film and TV backdrop images, and there are already generative AI systems that can create videos, although now they are short and relatively basic. AI is also being used to provide data-driven predictions about how unusual storylines will land with viewers. Given that a high percentage of current entertainment is based on earlier works, such as film sequels, it may also be suited to generative technologies that are trained on past content.

However, predictability is already a challenge for the entertainment industry and Generative AI risks making content even more formulaic.

“The biggest problem in the movies is too many formulas. There is a lack of originality, and that’s why the industry isn’t performing... Entertainment relies on new ideas, and this technology can’t produce them.”

Jonathan Taplin, Director Emeritus at the Annenberg Innovation Lab at University of Southern California.



Yves Bergquist, Director of the AI & Neuroscience in Media project at the University of Southern California's Entertainment Technology Center, states that there are studio departments already embracing generative AI. "Some groups within the studios are highly technologically savvy, such as the chief technology officers, visual effects artists and technicians. They are very sophisticated and are already working with generative AI companies. The studios do a lot of the postproduction work in films – particularly in animation – and there is a lot of pressure to bring costs down. The postproduction companies have a software development culture, so they will embrace generative AI."

Bergquist said he expects that tools offering virtual actors and voice synthesis will be most aggressively adopted by short-form creators who distribute their work on TikTok or YouTube and by video game producers. "Streaming channels, digital ads, games – that's what kids watch these days," he noted. "The media industry no longer has a monopoly on entertainment."

The business side of traditional film studios is sometimes more reluctant to embrace AI, Bergquist observed, simply because they don't have the same kind of culture of data or software. "It's being bolted onto organisations and people who aren't ready," he said, noting that even the new streaming studios, like Netflix and Prime Video, have experienced growing pains in their AI journeys.

Bergquist said that before the WGA strike started in May 2023, many screenwriters told him that they view the likes of ChatGPT as a "great creative assistant tool" but not something that will replace human writers.

"ChatGPT is good at brainstorming ideas, but it will output only average content...It's **nowhere near capable** of the symbolic abstraction necessary for script development, and it can't output a script with narrative structure and character arcs."

Yves Bergquist, Director of the AI & Neuroscience in Media, Entertainment Technology Center, University of Southern California



AI AND THE 'LAST MILE' PROBLEM

The term "last mile" in telecommunications refers to the connection of twisted copper cable from a consumer's house to the local exchange, limiting internet bandwidth despite advancements in fibre-optic technology. AI also faces a last mile problem, as it can't generate meaningful content at scale from data without a human expert being involved.

In the entertainment industry, humans are needed for quality and accuracy. What's more, for AI to become a content producer, it takes a trusted expert

with the know-how and judgement to evaluate and refine the AI output.

“At ZOO, we use AI to create enhanced computer-aided translation tools to help subtitlers and dubbing script adapters make their work more efficient and consistent. High-quality language adaptation is what matters to our Hollywood clients. While cost-effectiveness is important too, they understand only too well that cutting corners risks poor results, so it's a false economy.

Even if machine translation gets 90% of the way there, there's a whole 10% that's missing and in this game metrics like that simply aren't good enough.”

Raul Aldana, VP Dubbing, ZOO Digital

The practicality and economic feasibility of this human-in-the-loop approach hinge on considerations such as the time and cost of the expert's participation plus the cost of running the AI software versus the cost of carrying out the whole task manually.

For tasks like pattern recognition, combining automated AI software with human review can enhance efficiency

and accuracy, leveraging the strengths of both AI technology and human expertise. For example, it can look through a TV episode to find all appearances by a particular actor to enable a content search feature.

However, in the production of a short synopsis of a script, AI can assist but an expert is needed to make sure that this has captured all of the key elements faithfully.

Human-in-the-loop procedures are effective when there are a manageable number of decisions to be made in a reasonable timeframe and experts are available. However, there are situations where this approach doesn't work so well:

- **When many decisions need to be made quickly, making it impractical to involve a human in the loop. For instance, real-time captioning and subtitling of dialogue doesn't allow for human editing and approval of everything said while delivering text in real time. So a situation demanding high accuracy or cultural sensitivity, such as adapting humorous dialogue in a live stand-up comedy performance, may not be suitable, whereas others like news and sports coverage may be acceptable.**
- **When the costs of employing an expert, training, and running an AI system exceed the expenses of the original method, for example creating a film review. To train an AI system to do this you'd need a vast amount of data, but the need is niche since there's not widespread demand for writing critical reviews, and therefore the economics of this are unlikely to stack up.**
- **When there is a limited supply of qualified experts, so the approach is hard to scale. Using a dialect coach as an example. This is a role that helps actors perfect accents and dialects for their roles. It requires very specific linguistics, phonetics and teaching skills, and those skills are particular to a language or region. So there are not many experts and there is limited demand, therefore it is difficult to scale.**

In the case of subtitling entertainment content, machine translation works well for a straightforward narrative but struggles with context-heavy dialogue. To see why, let's look at the human's role in both scenarios.

AI works well for the literal translation of written text. The person involved is normally a native speaker of the target language who understands the source language well. Their job is to edit and refine machine-translated text for accuracy, fluency, naturalness, and contextual relevance. They are usually easy to recruit for popular language pairs.

When it comes to subtitling, machine translation often misses the emotion and other nuances in dialogue due to the importance of context. Editing the AI-generated text has its own challenges as it's not just about tweaking it – the editor needs to consider the whole content and its story. It's like an amateur artist painting a picture and then asking a pro to refine it. It's unlikely to result in a masterpiece, and even skilled artists may not want to take on such work.

Indeed, creating culturally sensitive and authentic subtitles is an art form. Improving poor machine-translated subtitles is a different skill to creating original ones. However, finding experts willing to do this task is challenging. Consequently, post-editing of machine translated subtitles is not currently economically viable. That's why at ZOO, AI is used to support the work of subtitlers and adapters rather than replacing them.

ROBOTS VS HOLLYWOOD ARTISTS

One of Hollywood's longest labour strikes ended in November 2023 after the Writers Guild of America (WGA) and SAG-AFTRA actors' union agreed to new deals with the Alliance of Motion Picture and Television Producers. This historic "double strike", which involved both writers and actors picketing, brought the industry to a standstill for several months.

A major factor in the dispute is how AI could change Hollywood and undermine their roles, pitting artists against robots in a battle over human creativity. For now, these agreements offer temporary solutions to AI challenges and the dispute has the potential to set a precedent for the wider global entertainment industry, not just Hollywood.

The agreements include protections for writers and actors to ensure fair treatment and recognition for their creative work in films and TV shows. The contracts don't ban AI outright but establish guidelines to keep control of intellectual property rights in the hands of creative contributors. Writers can choose to use AI tools like ChatGPT, but they cannot be forced to. Companies must also disclose when AI-generated material is given to writers.

Concerns about AI and provisions negotiated in the latest contracts affect dubbing artists just like they do screen actors. The industry is unionised with agreements in place to cover the pay and conditions of actors in several countries.

Now that US actors' terms are agreed, unions in other countries and for other sectors have been actively seeking similar protections. For example, an agreement has been reached for actors in videogames that requires producers to notify and obtain consent from performers before using AI to replicate their voices, movements or likenesses. A similar arrangement has been agreed for the use of actors in the advertising industry. A forthcoming bill in California will cover AI 'replicas' and require that rights are explicitly bargained for to prevent situations where an actor might end up competing against their own likeness for work. These agreements each aim to set out what is acceptable in each place and will shape how AI is used in specific territories and markets. The deals also cover adapting scripts for different languages and making dubbed soundtracks to ensure that the technology benefits everyone fairly and sustainably.

As an example, members of SAG-AFTRA in the US voted to ratify a new agreement that includes the first "animation voiceover contract with artificial intelligence protections and gains." The Television Animation Agreements are three-year contracts that now state "the term 'voice actors' includes only humans and acknowledges the importance of human voice acting."

When it comes to artificially dubbed voice-overs, there are concerns about cloning voices and star talent. The agreement says voice actors will receive residual payments based on the foreign version distribution. In addition, consent is required for any prompting of a generative AI system using a performer name or names.

Consequently, at least for the time being, the contributions of actors and writers is acknowledged, and compensation arrangements are in place, meaning that AI technologies may offer at best modest levels of cost savings. Further, the unionised approach to dubbing in certain countries means that for now, the languages that AI could be deployed in aren't those that are in the highest demand by ZOO's clients.



AI AND THE ENTERTAINMENT INDUSTRY'S MORAL DILEMMA

“Generative AI has unlocked exciting possibilities in the realms of images and videos. Its manipulation and transformative capabilities offer new avenues for artistic expression, content creation, and immersive storytelling. As this technology continues to evolve, it is essential to leverage its power responsibly and ensure its positive impact on society.”

Mohith Agadi, Author and Social Media Influencer for the UN

ChatGPT’s response to the question “What is generative AI?” highlights:

Generative AI has shown remarkable progress in recent years, enabling the creation of highly realistic content across multiple domains. However, it also raises ethical concerns, particularly regarding the potential misuse of generated content for malicious purposes, such as misinformation or manipulation. As the field continues to advance, researchers and practitioners are exploring ways to ensure the responsible and ethical development and deployment of generative AI technologies.

In the entertainment industry, the ethical issues revolve around two main aspects. Firstly, AI systems using large amounts of data raise worries about intellectual property rights, such as copyright. There are currently several test cases where copyright owners, such as authors and musicians, are taking legal action against AI systems trained on their copyrighted materials without consent. Indeed, last year more than 8,000 authors including some of the world’s most celebrated writers, such as Margaret Atwood, Dan Brown and Philip Pullman requested payment from tech companies for the use of their copyrighted works in training artificial intelligence tools.

Protecting intellectual property is a crucial ethical aspect in AI development and use. Further, AI and automation have the potential to impact the job market, including creative roles in entertainment. This raises worries about economic inequality and social upheaval. It's crucial to think about how AI could impact jobs and support workers through any changes.

Another consideration is transparency – should viewers know if AI voices are being used? Without disclosure, audiences might see AI dubbing as inauthentic, risking trust and engagement.

AI AND THE LAW

In response to learning that his collective works were used to train AI, acclaimed horror author, Stephen King regards AI as inevitable in content creation. However, with high-profile Hollywood actors such as Scarlett Johansson considering lawsuits against OpenAI for ripping off her voice, in echoes of the 1988 case Midler vs. Ford Motor Co. brought by the celebrity Bette Midler which established that intentionally imitating a celebrity's voice for commercial purposes is tortious misappropriation, it's vital to consider the legal issues in any planning around using AI in the entertainment localisation industry:

“Creativity can’t happen without sentience, and there are now arguments that some AIs are indeed sentient, if that is true now or in the future, then creativity might be possible. I view this possibility with a certain dreadful fascination. Would I forbid the teaching (if that is the word) of my stories to computers? Not even if I could. I might as well be King Canute, forbidding the tide to come in. Or a Luddite trying to stop industrial progress by hammering a steam loom to pieces.”

Stephen King, US author and King of Horror

Data Privacy: AI systems typically depend on extensive data for training models and decision-making. It's crucial to comply with data protection laws to safeguard individuals' privacy rights. This encompasses regulations such as the General Data Protection Regulation (GDPR) in Europe and the California Consumer Privacy Act (CCPA) in the United States, where the human voice is considered biometric information and falls under the classification of personal data.

Intellectual Property: AI-generated content, inventions, and innovations raise questions about ownership and intellectual property rights. Determining the ownership of AI-generated outputs, which are essentially derived from existing works, is a fundamental legal aspect to consider in many entertainment applications of AI.

Regulatory Compliance: The rapid progress of AI technologies has surpassed the pace of regulatory frameworks, resulting in uncertainty and regulatory gaps. It is crucial to establish and enforce regulations tailored to AI, including ethical guidelines, to guarantee compliance and mitigate risks.

Security and Cybersecurity: AI systems can be at risk from cyber threats like data breaches, malicious attacks, and adversarial manipulation. It's vital to put strong security measures in place and follow cybersecurity rules to protect sensitive data and stop unauthorised access to AI systems.

Employment and Labour Law: The rise of AI and automation tech may have implications for employment and labour law, such as job loss, retraining and worker rights. Addressing these issues means everyone – from policymakers to employers to unions – needs to work together to make sure the transition is smooth and workers are protected. It's a hot topic, especially after the industry strikes in 2023, and a highly sensitive area for creative roles such as writers and actors.

Sorting out these legal matters calls for a multifaceted approach involving policymakers, legal pros, industry players, and community groups to come up with rules, guidelines, and ethical standards for using AI responsibly. These will likely set the rules for how AI can be used in the entertainment industry.

In March 2024, the European Union passed the world's first comprehensive law regulating AI. The AI Act became law in June 2024, following formal approval from EU member countries, with provisions starting to take effect six months later. Rules for general-purpose AI systems like ChatGPT will begin to apply from June 2025. The full set of regulations is anticipated to be enforced by mid-2026. According to these laws, all general-purpose AI systems will be required to create a policy demonstrating that the content used to train their models complies with European copyright law.

The EU's AI Act aims to set the standard for global legislation. Similar laws are in progress in countries ranging from Brazil to Japan. In October 2023, U.S. President Joe Biden signed a far-reaching executive order on AI, expected to be supported by legislation and international agreements. In September 2024 the Governor of California signed two bills regulating the use of performances generated by AI in a move that was welcomed by Hollywood unions.



HARNESSING THE POWER OF AI AT ZOO DIGITAL

Over the past two years, ZOO has been actively exploring new technologies to improve its services and offer added value as an end-to-end vendor.

“It’s our clients’ needs that drive our focus in innovation and the challenges they face in getting a hit show to market. Two things matter to clients like Disney+ and Netflix - quality and on-time delivery - these are at the forefront of every scrum of ZOO Digital Labs when we’re developing AI-enabled services.

And we’re committed to developing AI responsibly, not just within legal and ethical guidelines, but also with full transparency and disclosure to our suppliers as well as our clients.”

Gordon Doran, President, ZOO Digital

than displace human abilities. HCAI seeks to preserve human control in a way that ensures artificial intelligence meets our needs while also operating transparently, delivering equitable outcomes, and respecting privacy.

Cloud-based systems mean that ZOO has an AI-ready architecture and infrastructure and is able to incorporate AI technologies seamlessly, allowing for testing and improvement while maintaining a reliable workflow. Consequently, the AI revolution presents an opportunity for ZOO to expand its capabilities and solidify its leadership position in the industry.

Currently ZOO will deploy AI wherever it is appropriate as a technology that can facilitate in its pipeline and processes to make services more efficient:

- **Speech to text (Transcription)**
- **Text to speech (speech synthesis)**
- **Speech to speech (voice cloning)**
- **Picture manipulation**
- **Translation**
- **Separating dialogue from music and effects**
- **Conforming audio and subtitles**
- **Quality Control**
- **Workflow management**
- **Asset management**

Speech to text (Transcription)

Media localisation starts with an accurate transcription of the original content in its native language, known as the 'template.' This template is crucial for all subsequent language adaptations, as any errors could impact all subtitles and dubbing scripts. While Automated Speech Recognition (ASR) software has been used in other industries, challenges like regional languages, music, and overlapping speakers have hindered accuracy in entertainment content. Recent advancements in speech models have improved accuracy in this field. ZOO has integrated ASR into its production systems, tailored to its needs and enhanced with internal training data. This has streamlined transcription workflows, leading to quicker project completion. Following an automated step, a two-pass human quality control process ensures the output meets the premium standards ZOO's clients demand.

Text to speech (speech synthesis)

Text to speech (TTS) technology converts written text into spoken words, used in various applications like accessibility tools, language learning apps, virtual assistants, and navigation systems. TTS systems aim to create natural-sounding synthesised speech so that users can listen to content rather than reading it. While TTS has been applied in entertainment for audio descriptions and potential voice-over dubbing in documentaries, creating character voices for scripted content remains challenging due to the need for expressive and authentically human performances. It is also crucial to obtain consent and compensate voice owners when using TTS commercially. ZOO will always be transparent in its use of TTS technology use and will collaborate with industry groups to follow ethical guidelines.

Speech to speech (voice cloning)

Voice cloning is the process of creating a digital replica of someone's voice by analysing their voice recordings for pitch, tone, and pronunciation. Once trained, the system can generate new speech that sounds like the original speaker, even if they did not say those exact words. This technology can be used to recreate voices in situations where the original speaker is unavailable. While voice cloning has benefits, it also raises ethical concerns like privacy, consent and misuse. Responsible use and regulation are crucial.

Picture manipulation

Traditional lip-synchronised dubbing involves voice artists matching their lines to the lip movements of actors speaking a different language. This requires carefully synchronised script adaptations. Writing dubbing scripts and voice acting are skilled jobs due to the way speech rhythms and patterns differ between languages.

AI-based software now automates this process by aligning dialogue with lip movements in videos, potentially making it faster and more efficient. While this technology can work well if someone is speaking to camera such as a newsreader, challenges arise with free head movements and occlusions in general entertainment. Legal considerations include obtaining consent and compensation from actors affected by the technology.

Provided that there is a legal and ethical framework in place and support from unions and acting guilds, ZOO aims to partner with software providers to offer these services, to augment its dubbing proposition. Picture manipulation still requires creative talent for script adaptation, voice acting, and surround-sound mixing, to meet the standards required in ZOO's market, so the technology can only be used to facilitate dubbing production rather than replace it.

This innovation could be particularly valuable in non-traditional dubbing markets like the UK and USA, to help overcome consumer reluctance to watch dubbed content.

Translation

With advancements in LLMs like ChatGPT, AI technologies are becoming more prominent in the entertainment industry. As quality and accuracy are the priority for ZOO's clients, it is this that will drive the focus of its workflow platforms, automation, and processes. Integrating machine translation into workflows can enhance efficiency and cost-effectiveness, particularly for specific content genres. ZOO remains committed to evaluating and incorporating new technologies to improve its services by reducing errors and turnaround times. Consequently, machine translation has the potential to strengthen ZOO's proposition rather than replace it.

Separating dialogue from music and effects

In traditional lip-sync dubbing, a production company provides separate audio tracks for dialogue and music and effects (M&E). For foreign language dubs, new voice recordings are combined with the M&E track. However, older or low-budget content may not have a separate M&E track, leading to voiceover dubbing. AI advancements now allow for automated separation of dialogue and non-dialogue in soundtracks. ZOO will use this technology to improve dubbing quality without requiring a new M&E track, potentially increasing demand for dubbing due to cost savings.

Conforming audio and subtitles

Matching up audio and subtitles is crucial when creating subtitles. ZOO's production systems have for some time included a feature that automatically works out precise timing for each line, making sure audio and subtitles sync up correctly in all languages.

Quality Control

Quality control is a standalone service as well as a key part of what ZOO does for its clients across all services. ZOO's systems are designed to catch any issues early on, improving efficiency and reducing errors. By using AI, ZOO can automate more processes, detect errors, and enhance content quality. AI algorithms can analyse media content including images, videos, and audio files to spot issues like compression artifacts or audio distortion. This helps catch problems early, boosting productivity and maintaining high quality. AI-based solutions can adjust parameters for optimal video quality and efficient compression, saving bandwidth and storage space. AI can also improve audio and video quality by reducing noise, enhancing clarity, and boosting resolution. Additionally, it can automatically enhance media assets by adjusting brightness, contrast, and colour balance.

Workflow management

For over a decade ZOO has been developing and refining its workflow management systems, gathering valuable data on project performance across services and languages etc. It uses this data to train machine learning systems to predict outcomes, anticipate issues and enhance working practices. AI analyses historical data to forecast workflow trends, aiding in resource planning and scheduling. By optimising resource allocation based on workload and skills, ZOO boosts productivity and maximises its team efficiency.

Asset management

Asset management is a key part of ZOO's work in handling entertainment media. The Company deals with large volumes of digital assets each year, so managing them efficiently is crucial. AI can significantly enhance how ZOO handles these assets by automating tasks, organising and searching for content, and providing advanced analytics. ZOO offers metadata generation, including content tagging, using AI algorithms like computer vision and natural language processing to analyse media files and create descriptive metadata.

Its platforms already use advanced methods to identify duplicate assets and ensure content integrity. Additionally, AI can help automate content moderation tasks, such as flagging sensitive content like violence or nudity, to meet cultural and legal requirements.

IMPACT OF AI ON ZOO'S BUSINESS

In summary, AI is set to revolutionise the Media and Entertainment industry, including how ZOO delivers its end-to-end services.

The demand for premium entertainment content services is only set to grow and AI presents an opportunity for Team ZOO rather than a threat. It offers efficiencies and an economically viable way to enhance the way ZOO operates that cannot be ignored.

ZOO prefers to call it artificial assistance rather than intelligence - where AI-enabled technology is used to complement its workflows, streamline its

“Given the focus and architecture of generative AI technology today... truly transformative changes won't happen quickly and few—if any—will likely occur within the next 10 years.”

Daron Acemoglu, Institute Professor at MIT⁵

processes and facilitate the work of its expert localisation teams. Testing, ideation and quality checking are just some of the opportunities for developing and integrating AI technologies effectively in various aspects of its subtitling and dubbing processes.

Some roles may change or disappear as software takes over more repetitive, laborious or manual tasks. However, AI still lacks soul and the creative skill to read between the lines, let alone the capability of a wholesale takeover of subtitling or dubbing. ZOO's global creative talent pool continues to be key to achieving the quality and accuracy demanded by Hollywood. This means that whatever the impact of AI in the workplace, an AI revolution of any sort will not happen overnight.

Moving forward, as an innovator in entertainment localisation, ZOO is strongly positioned to lead the way in developing AI for media localisation - driven by its clients' priorities and the careful balancing between quality and efficiency. Leading the way means acting responsibly, ethically and with full disclosure to its suppliers as well as its clients.

In short, when it comes to AI, ZOO continues with business as usual – the pioneering best practice that has enabled it to become one of the select few end-to-end vendors in global entertainment localisation.

⁵ <https://www.goldmansachs.com/intelligence/pages/gs-research/gen-ai-too-much-spend-too-little-benefit/report.pdf>



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