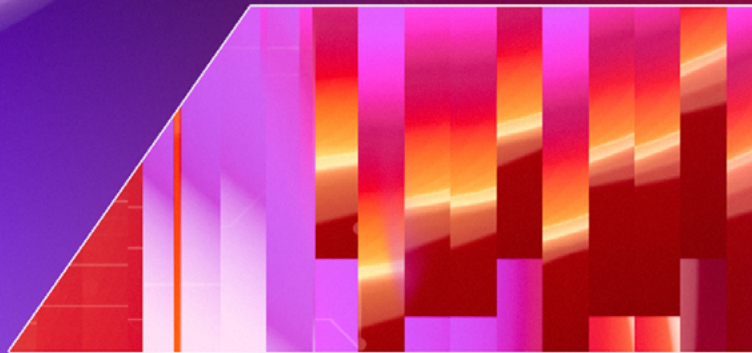
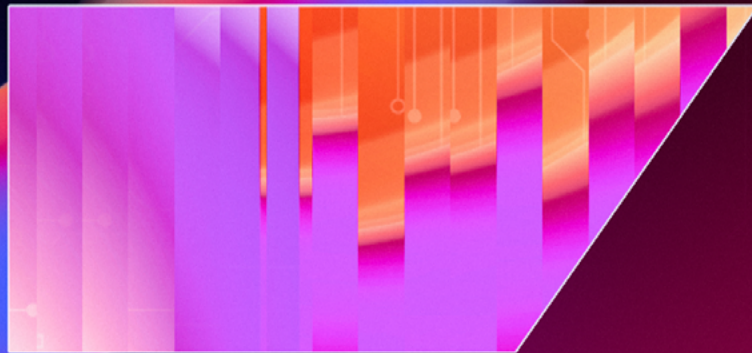


Beyond the AI Revolution:

THE FUTURE OF MEDIA LOCALISATION



October 2025



INTRODUCTION

In 2024, ZOO Digital Group published “**Will Robots Take Over the World of Localisation?**”—a first-of-its-kind white paper examining how artificial intelligence was beginning to transform the media localisation industry. That paper sparked global conversations about the opportunities and challenges of AI in subtitling, dubbing and translation. Now, in our new white paper, “**Beyond the AI Revolution: The Future of Media Localisation**”, we build on that foundation.

This second edition looks further ahead, exploring how next-generation technologies, shifting consumer habits and new business models are reshaping the future of localisation. We go beyond hype to reveal practical insights for studios, platforms and vendors navigating this rapidly evolving landscape.

About ZOO Digital Group

ZOO Digital Group is a leading provider of cloud-based media localisation and digital distribution services to the global entertainment industry. Working with major Hollywood studios, streaming platforms and content owners worldwide, ZOO combines cutting-edge technology with a global network of creative talent to deliver subtitling, dubbing, metadata and media services in over 80 languages. With a track record of innovation and a commitment to quality, ZOO helps clients reach audiences everywhere with culturally authentic, high-impact content.

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CONTENTS

04	Executive Summary
05	The AI Revolution: Or Is It?
08	Artificial Intelligence: Friend or Foe?
13	The Scope of End-to-End Services
15	AI and the Art of Localisation
23	AI, the Next Generation in Automation
25	Will AI Steal Your Job?
27	Innovation and Creativity
29	Generative AI and Content Creation
32	AI in the World of Entertainment
34	AI and the 'Last Mile' Problem
36	Robots vs. Hollywood Artists
39	AI and the Entertainment Industry's Moral Dilemma
41	AI and the Law
44	Harnessing the Power of AI at ZOO Digital
51	What's Next: The Future of AI at ZOO
53	Impact of AI on ZOO's Business

EXECUTIVE SUMMARY

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

- **AI is best deployed as Artificial Assistance:** AI delivers greatest value in media localisation when enhancing traditional practices rather than replacing them. New technologies are accelerating subtitling, dubbing and transcription, yet premium entertainment still depends on human creativity to ensure cultural authenticity, emotional impact and creative nuance.
- **Industry use cases are expanding:** Applications of AI for media localisation, from transcription to machine translation, are already offering significant productivity benefits and enhancing the end product. However, fully automated subtitling and dubbing are only useful for lower-value user-generated content or factual and literal content without conversational dialogue. Other use cases such as synthetic voices and picture manipulation come with careful ethical considerations.
- **Innovation creates new opportunities:** Workflow efficiencies are rapidly accelerating turnaround times, making it possible to localise new and growing forms of content. This is aligned with the strategy of streaming companies to expand into live and near-live content where localisation was not previously feasible.
- **Ethics and regulations make responsible adoption essential:** With the EU AI Act now in force and SAG-AFTRA securing consent-based protections for performers, transparency, consent and governance are essential to responsible AI adoption. The legal framework now emerging favours responsible actors with strong ethical standards and robust governance processes.
- **Innovation supports growing market demand:** The global language services industry is projected to reach \$75.7 billion in 2025, with media localisation accounting for \$5 billion. Studios, platforms and vendors are seeking faster, more scalable solutions that meet rising consumer demand while safeguarding creative integrity.

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 game-changer as AI gained widespread commercial and consumer 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 beyond 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 the Hollywood strikes of 2023, nowhere has this been truer than in TV and movie entertainment, including media

localisation. So, what is it about AI that's been causing such a stir?

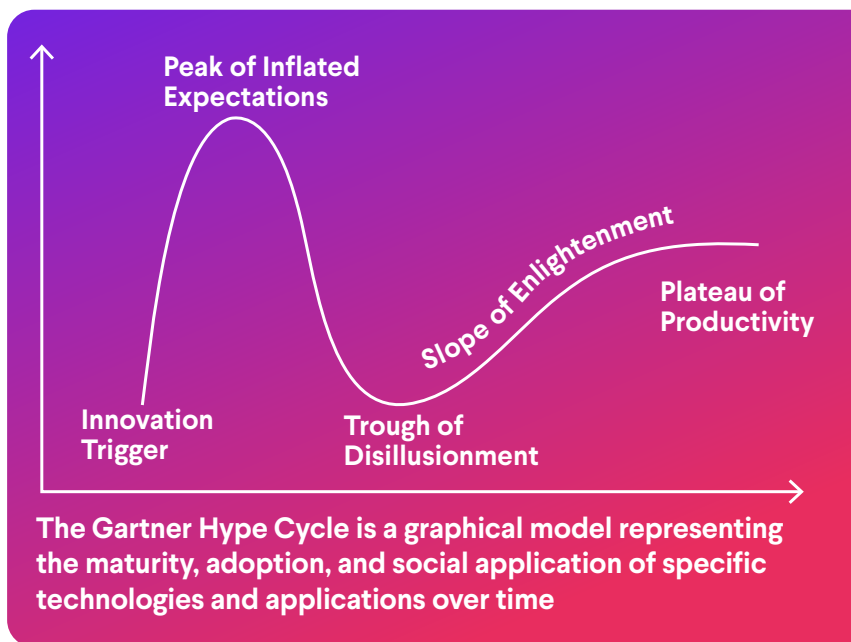
“Generative AI is right in the peak of inflated expectations,”

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 processing 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 Meta use large language models (LLM) to learn human language patterns and create text that sounds – well... just like us.

In 1995 market research firm Gartner first introduced its "Hype Cycle" model. This was developed to illustrate the typical progression of emerging technologies – from the early "Technology Trigger" stage through the "Peak of Inflated Expectations," down into the "Trough of Disillusionment," and eventually (for some technologies) up the "Slope of Enlightenment" to the "Plateau of Productivity."



In 2024, despite ethical and societal concerns, Gartner's Hype Cycle for AI highlighted Generative AI as a potentially transformational technology with profound business impacts, stating that it had reached the 'Peak of Inflated Expectations'. In 2025, Gartner suggests that Generative AI has entered the 'Trough of Disillusionment' as organisations face practical implementation challenges,

costs, and ROI questions.¹ The firm's research indicates that AI leaders continue to face challenges when it comes to proving Generative AI's value to their businesses. Despite an average spend of \$1.9 million on Generative AI initiatives in 2024, less than 30% of AI leaders report their CEOs are happy with AI investment return. Low-maturity organisations have trouble identifying suitable use cases and exhibit unrealistic expectations for initiatives. Mature organizations, meanwhile, struggle to find skilled professionals and instil Generative AI literacy.

Over the past year there have been significant developments with AI systems that can make realistic videos from text instructions – potentially changing how films and TV shows are made. In 2025 there have been several short films made with AI where elements like the script, visuals, or even the directing and acting are generated or assisted by AI tools, rather than being created entirely by humans. Examples include *The Frost*, a 12-minute film with every shot generated by AI,² and *AI Has No Soul*, where an AI script was used and the creator even had the AI generate dialogue and sound effects.

Reactions to AI-made short films are divided, with enthusiasm for speed and cost-efficiency from filmmakers and producers clashing with criticism of quality and ethical concerns from industry workers. Critics note issues like repetitive plot devices, character types, themes and images, jarring cuts, and uncanny distortions, while creators celebrate AI as a tool to amplify human creativity and reduce production times. The debate also encompasses unresolved copyright issues and fears of job displacement, with some arguing AI should be a collaborative tool, not a replacement for human artists.

However, the British Film Institute's 2025 research³ reveals a fundamental challenge: AI models have been trained on over 130,000 film and TV scripts without permission, creating what the BFI calls "a direct threat to the economic foundations of the UK screen sector." This unauthorised training enables AI systems to replicate creative structures at a fraction of the cost of original works, potentially undermining the industry's economic viability.

Similarly, in media localisation, there are now several applications of AI that create the impression that traditional practices will soon be replaced by automation, from fully automated subtitle creation and script adaptation to synthetic voices and perfect lip synchronisation.

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.



ARTIFICIAL INTELLIGENCE: FRIEND OR FOE?

Since its launch in 2022, Generative AI has taken the world by storm. Bill Gates, founder of Microsoft, declared it as the most significant technological advance in decades. According to OpenAI, at the end of 2024 92% of Fortune 500 companies were using its products,⁴ and research by Deloitte indicates that 94% of business executives believe that AI is a key to success in the future.

According to research by Indeed,⁶ roughly a quarter of work skills (28.5%) could possibly be replaced by GenAI in the future if businesses change some practices and the tools improve. Key industries with the highest potential include banking, insurance, energy and capital markets. On first reading this could point to growing levels of unemployment, and indeed, research by the World Economic Forum⁷ suggests that the technology might make 92 million jobs obsolete by 2030. However, the same research points to the creation of as many as 170 million jobs in the same period, resulting in net job creation of 78 million roles.

Due to the accessibility of Generative AI platforms—a free tier is available from the leading providers including OpenAI, Microsoft and Meta—it is being used very widely. OpenAI

announced in early August 2025 that ChatGPT was approaching 700 million weekly active users.⁸ Nearly 40% of U.S. adults aged 18–64 have used Generative AI, and 27% of Americans say they interact with these technologies "almost constantly" or several times a day.

The ready availability of the technology for anyone to try and use leads many of us to form opinions about its capabilities, informed by our personal experiences. The most popular prompts for ChatGPT cover how-to instructions, writing assistance, and coding, with users asking for help with daily tasks like writing resignation letters and vegan banana bread recipes, using it as a "writing pal" for covering letters and CVs, and employing it for programming to generate or debug code in languages like Python and JavaScript.

Other common applications include education, career development, and exploring general industry or AI-related trends. Over half of users (55% in the U.S., 62% in the UK) prefer generative AI (like ChatGPT or Gemini) over traditional search engines for tasks such as email drafting, planning, or product comparisons—citing speed, personalized answers, and cleaner interfaces.⁹

Around 59% of consumers report a generally positive impression of generative AI, with younger generations (like Gen Z) being the most enthusiastic.¹⁰ Having had a positive first-hand experience of using the software, it is tempting to extrapolate and assume that the benefits it can bring are universal. Indeed, research suggests that 70% believe the benefits of AI outweigh the risks—particularly in areas like education, mental health, cybersecurity, and personalized customer experiences—despite that half of users report biased responses, and 38% have seen inaccurate outputs when using generative AI.

So how can we evaluate where and how AI can be beneficial for business, particularly in the field of media localisation?

Undoubtedly there are several types of work where AI can be particularly useful and replace human endeavour, but using AI well requires a full understanding of its conflicting characteristics: it can be transformative yet must be approached with scepticism, powerful yet prone to subtle failures, essential for some tasks yet actively harmful for others. When it comes to evaluating the suitability of AI for a business application it is helpful to answer the following six questions:

1. Which is more important – quality or quantity?

AI works well with applications that require quantity, for example using it to ‘brainstorm’ ideas on a topic where having many options can help to provide a framework for evaluating the relative merits of each. Because of the way Generative AI works, inaccuracies and bias are highly likely, and therefore if quality is more important, AI should be used with caution.

2. To what extent can errors be tolerated?

Errors generated by Generative AI, referred to as ‘hallucinations’, take the form of incorrect or misleading results that AI models generate. These can be caused by a variety of factors, including insufficient training data, incorrect assumptions made by the model, or biases in the data used to train the model. A risk is that these hallucinations can often seem very plausible and can be difficult to spot. Research by Harvard Business School¹¹ has shown that as reliance on and quality of AI increases, users have a tendency to ‘fall asleep at the wheel’ and allow errors to pass through. However, many tasks in the real world are tolerant of error – humans make mistakes, too – and it may be that AI is less error-prone than humans in certain cases. Therefore, even with human oversight, AI should be used cautiously if the application has low tolerance to errors.

3. Are experts available to evaluate whether AI is good or bad?

If the output of AI is subject matter that falls within the expertise available to the user, then AI can be a helpful assistant, otherwise the user will likely be ignorant of any errors that may appear in the output that might jeopardise the application.



4. Could a failure of AI result in a worse outcome than doing it without?

Certain applications of AI can enable the user to exercise skills that they do not possess or are not proficient, for example, image generation systems can enable anyone to create output that resembles art. AI can be a good solution if its output is at least as good as the best result the user could achieve without its use.

5. Are there legal, regulatory or compliance considerations?

Users may take false comfort from commercial AI products, assuming that their output is free of copyright. However, all AI systems are trained on data, and the developers of such systems may have used copyrighted material. Consequently, the output, which is a derivative of the training data, could potentially infringe the intellectual property rights of third parties. If the intended use of the output is for private purposes, then this may be of no concern, but if the output is to be used commercially then this could pose unquantifiable levels of risk. In certain markets, such as regulated industries, there may be other factors that could constrain the use of AI.

6. Is there a requirement for new original ideas or information?

Generative AI, which is trained on pre-existing data, is fundamentally limited by its reliance on known patterns and information. This limitation means that while AI can replicate and remix past creative works effectively, it lacks the ability to develop truly new ideas that break free from historical constraints. If genuine originality is necessary, then AI may not be suitable.

The following answers these six questions for media localisation.

Which is more important – quality or quantity?

This depends on the source material and its intended use. For catalogue content distributed on Advertising Video on Demand platforms, and for creator content on YouTube, high quality is desirable but not essential. This is because in these cases the content is perceived to be low value and/or low cost to acquire, and localisation is a strategy used in these cases to create incremental viewers that will lead to greater advertising revenue. In contrast, for scripted entertainment content that is expensive to produce, global exploitation is likely to be necessary to justify this cost, and so appeal to discerning audiences is paramount, hence, quality is critical. Also, the incremental cost of localisation is small, estimated to be 1-3% of the content budget.

To what extent can errors be tolerated?

The occurrence of errors will reduce audience appeal. For premium entertainment, major streaming companies insist on very low defect rates and, indeed, the reputation of vendors depends on maintaining excellent quality performance metrics. This is because the breadth and quality of the content (and its localisation) are inseparable from the distributor's brand. Therefore, for such content, tolerance of errors is low, so AI must be used with caution.

Are experts able to evaluate whether AI is good or bad?

For any localisation, validation requires review by a competent and usually native speaker of the target language. This means, for example, that if accuracy is important, it is not feasible for businesses to insource localisation unless they have access to experts for review and post-editors to remedy errors. Consequently, the established practice of outsourcing media localisation to specialists is expected to continue.

Could a failure of AI result in a worse outcome than doing it without?

In localisation of text, post-editing of automated translations is a popular approach. The tendency of humans to accept output that superficially looks right, and therefore allow errors to pass through, can lead to inauthentic adaptations of dialogue in entertainment. For example, the subtleties of word play in the source language, if translated literally, might lead to the essence of the dialogue being lost in the target language output. The qualities that elevate entertainment are authenticity, the capacity to evoke emotions and to create a deep connection with the audience. Content producers understand that to maximise the appeal of programmes in different cultures and languages it is essential to preserve those elements in the adapted content.

Are there legal, regulatory or compliance considerations?

Due to the high potential financial value of successful entertainment products, distributors take steps to ensure that no aspect of the content could be at risk of infringing third party copyright. This is particularly pertinent in relation to synthetic speech. In entertainment, trade unions that represent various trades, including actors and writers, have negotiated collective bargaining agreements to protect their members from exploitation through use of AI. A person's face, voice and likeness are protected sensitive personal data, and most jurisdictions afford protections against collecting and processing such data.

Is there a requirement for new original ideas or information?

When adapting dialogue for different languages and culture, the requirement is less about originality, but more about preserving the context of the original to produce output for each audience that will evoke the equivalent emotional response. If a character speaks figuratively using archaic language, then each adaptation should similarly preserve this trait. AI systems are vulnerable due to the lack of context and prone to delivering output that is overly literal.

THE SCOPE OF END-TO-END SERVICES

ZOO Digital is one of a select few vendors in the media 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.

In 2025, ZOO's strategic approach was validated by Nimdzi's industry rankings, which recognised the company as a "strong performer" in the challenging entertainment sector.¹² This recognition reflects ZOO's successful navigation of AI integration while maintaining quality standards demanded by major studios.

“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



As Dr. Stuart Green, CEO of ZOO Digital, explains: “We’re primarily focused on serving large media companies that typically have spent a lot of money making their content and for whom the authenticity of that content is quite key. When these companies look to commercialise their content into other regions of the world, **it’s important that they can preserve the authenticity of the original programming in the localised assets that deliver to those communities.**”

ZOO's focus on authenticity drives every decision about AI adoption. "When you go about localising media content, it may or may not be viable to use AI in the process, **but you do need to be sure that you're not compromising authenticity otherwise you will turn off that audience,**"

Dr. Green continues. "For example, launching a TV show in France is not typically 'nothing ventured, nothing gained'. Having made great content, streamers need to exploit it globally as effectively as they can. They need to amortise their cost of

production across a very big audience irrespective of whether they monetise it through subscription fees or advertising.

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.

In 2025 YouTube introduced an automatic dubbing feature that provides a real-world example of these limitations. Despite rolling out to millions of creators, YouTube acknowledges that their AI dubbing "might contain errors due to mispronunciations, accents, dialects, or background noise" and that "tone and emotion of the original audio are not transferred." The platform admits the technology "works better on content that does not rely on expressiveness," highlighting the gap between AI capability and entertainment content requirements. Many creators have reacted angrily to the feature.¹³

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.

According to 2025 industry data, for written text, Machine Translation Post-Editing (MTPE) has become the dominant production mode, with 87.93% of generalist freelance translators now engaging with MTPE workflows. However, this shift brings pricing pressures, with many translators reporting 10-30% discount expectations for MTPE work compared to traditional translation.¹⁴

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.¹⁵

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, 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 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.

When supplied with a first draft translation created by AI, if it looks plausible (i.e. it doesn't include any obvious errors), then there is a real risk that a post editor might allow inauthentic adaptations to pass through. Ironically, the better the perceived quality of the translation, the more likely a post editor is to accept it without question, thereby allowing errors to creep into the output.

Generative AI is designed to produce results that look right, even though they may not necessarily be correct.

“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

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 despite concerns about widespread job losses, AI adoption is expected to have only a modest and relatively temporary impact on employment levels. Recent Goldman Sachs Research¹⁷ estimates that unemployment will increase by half a percentage point during the AI transition period as displaced workers seek new positions. Innovation related to AI could displace 6-7% of the US workforce if AI is widely adopted, but the impact is likely to be transitory as new job opportunities created by the technology ultimately put people to work in other capacities, according to Goldman Sachs Research.

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.



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“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.

PwC’s 2025 Global AI Jobs Barometer¹⁷ reveals that AI can make people more valuable, not less – even in the most highly automatable jobs. PwC analysed close to a billion job ads from six continents to uncover AI’s global impact on jobs, skills, wages, and productivity, and the

findings are encouraging: Industries more exposed to AI have three times higher growth in revenue per employee. AI can make workers more productive and enable them to create more value. Since 2022 when awareness of AI’s power surged, revenue growth in industries best positioned to adopt AI has nearly quadrupled. This suggests that investments in AI are paying off.

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.

The 2025 language services industry data validates this prediction. The global market reached \$71.7 billion in 2024 and is projected to hit \$75.7 billion in 2025.¹² While compound annual growth rates have adjusted from 7.0% to 5.0% reflecting AI efficiency gains, the industry continues expanding, with media localisation emerging as a key growth vertical within the broader \$31.7 billion language transformation market.

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 actually it's 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, there are now many successful generative AI products that 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 recognise 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 buying a camera doesn't turn the owner into a professional photographer, creating compelling art with AI will require an artist's skill. For professional artists, the software can be a valuable tool

“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

for generating ideas, expanding the 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.¹⁹ This is increasingly a more cost-effective way to create captions, although the human touch is always necessary to ensure accuracy. Similar developments

have continued through 2025, with more studios exploring AI-assisted workflows for specific content types.

However, audiences wouldn't tolerate the kind of transcription errors that are common in automated YouTube captions 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 have embraced the benefits the technology has to offer.

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 learned the hard way by top accountancy firm Deloitte which, in October 2025, was forced to refund part of its AU\$440,000 fee after delivering a report to the Australian Government littered with imaginary statistics, invented references, and misquoted legal cases. The

‘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 Analyst²⁰

management consultancy had turned to **Azure OpenAI GPT-4o** to help produce an independent review of the system governing Australia's welfare compliance. Australian senator Deborah O'Neill commented by saying, "Deloitte doesn't have an AI problem, it has a human intelligence problem."

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 available previously, albeit at an enormous cost – the cost of training the ChatGPT-5 model could range from \$1.7 to \$2.5 billion, according to HSBC.

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 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 shortcomings mean that it must be used with caution for complex tasks.

However, there are certain tasks, even in the art of filmmaking, 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.²¹ 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 backgrounds.

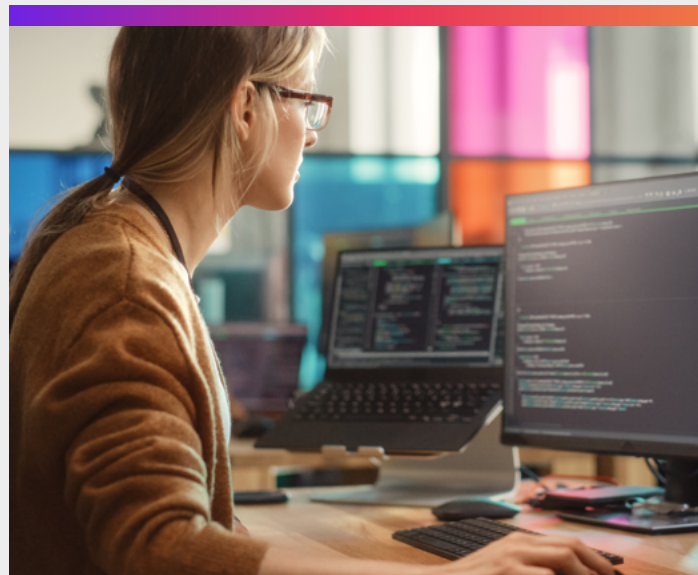
AI might be able to process information on a debate, but it's going to struggle when it comes to identifying the strength or credibility of each side. That's why ZOO's strategy is to embrace AI in a way that helps and supports its users, allowing them to continue to do what they do best.

“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 Sachs¹⁷**

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, including 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 is increasingly used for film and TV production for tasks such as 3D background scene generation, compositing and visual effects.²² AI is also being used to develop scripts and 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, highlighting the necessity for human oversight.

“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 studio departments are 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 across the wider internet. 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

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 the key elements faithfully.

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

In the case of subtitling entertainment content, machine translation works well for a straightforward narrative, but context-heavy dialogue is much more challenging. 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 often it's not just about tweaking it – the editor needs to consider the whole content, its storyline, the character backstories, the norms of the era in which it is set, and so on. It's like an amateur artist naively painting a picture and then asking a pro to refine it to make it better. The result might be okay, but it's unlikely to produce a masterpiece, and skilled artists may be reluctant 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 may be challenging. Consequently, post-editing of machine translated subtitles might work for some content but not all. That's why at ZOO, AI is used to support the work of subtitlers and adapters rather than replacing them.

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 writing multi-season TV scripts that require intricate world-building and character arcs. Generative AI struggles to maintain narrative coherence across complex, long-form storylines.
- 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.

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 was how AI could change Hollywood and undermine creative 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 created principles that have since been adopted across 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.



In 2025, the entertainment industry achieved another historic milestone with **SAG-AFTRA's ratification of comprehensive AI protections** for video game performers following a **320-day strike**. The agreement establishes the first consent-based regulatory framework for AI voice synthesis in interactive entertainment, requiring explicit performer consent for all digital replica usage and setting compensation minimum rates for real-time AI generation.

Duncan Crabtree-Ireland, SAG-AFTRA's Chief Negotiator, emphasized the stakes:

"Video game actors deserve and demand the same fundamental protections as performers in film, television, streaming and music: fair compensation and the right of informed consent for the AI use of their faces, voices and bodies."

The agreement's transparency mandates require companies to disclose AI usage, while strike protection provisions allow performers to suspend digital replica consent during labour disputes.

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, for the use of actors in the advertising industry. California legislation that became effective in January 2025 covers the use of AI 'replicas' and requires that rights are explicitly bargained for to prevent situations where an actor might end up competing against their own likeness for work.

These initiatives aim to set out what is acceptable in each place and will shape how AI is used in specific territories and markets.

The arrangements 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.

ZOO's approach to voice modification demonstrates this ethical commitment in practice.

"We have tweaked dubs using AI but always in consultation with the voice artist, obtaining their explicit consent first,"

confirms Dr. Stuart Green, CEO of ZOO Digital.

This consent-based approach ensures that artists maintain control over their performances while benefiting from technological enhancements.

At least for now, the contributions of actors and writers are being acknowledged, and compensation arrangements are in place, meaning that the level of cost savings possible using AI technologies may be limited. 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

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.

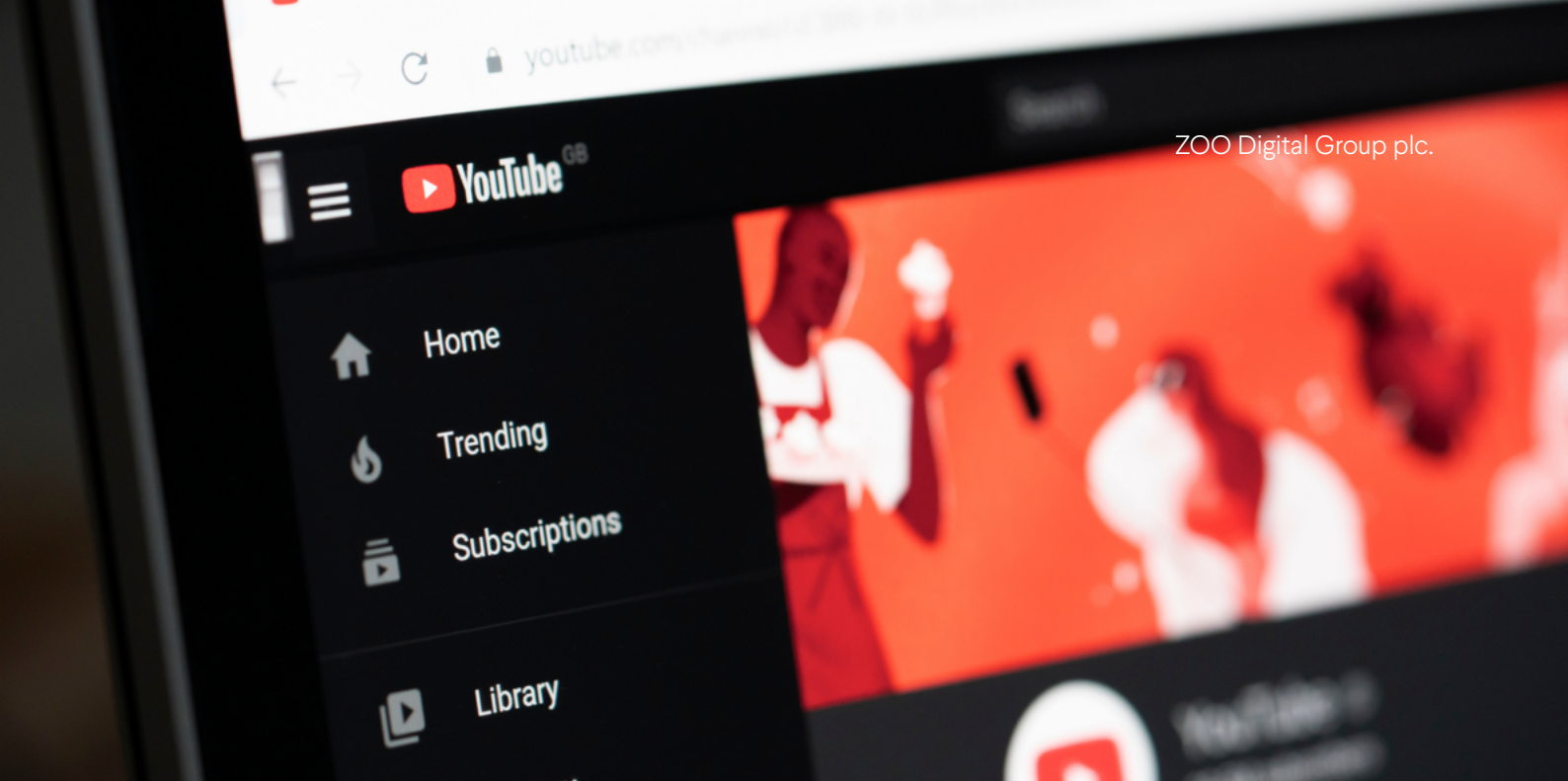


"Generative AI has unlocked exciting possibilities in the realms of images and videos. Its manipulation and transformative capabilities offer new avenues for artistic expression, content creation, and immersive storytelling. As this technology continues to evolve, it is essential to leverage its power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



Mohith Agadi, Author and Social Media Influencer for the UN

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, particularly copyright and performers' rights. In September 2025, AI firm Anthropic agreed to pay \$1.5bn to settle a class action lawsuit filed by authors who said the company stole their work to train its AI models.²³ The settlement came as other big tech companies including ChatGPT-maker OpenAI, Microsoft, and Instagram-parent Meta are facing lawsuits over similar alleged copyright violations."



The scale of this issue became clear in 2025 when the British Film Institute revealed that over 130,000 film and TV scripts have been used to train AI models without permission.³ This unauthorised training creates what the BFI calls "a direct threat to the economic foundations of the UK screen sector," as AI systems can now replicate creative structures at a fraction of the cost of original works.

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, for example? Without disclosure, audiences might see AI dubbing as inauthentic, risking trust and engagement.

YouTube's 2025 automatic dubbing expansion highlights this challenge. Despite deploying the feature to millions of creators as default-on, user backlash revealed significant concerns about transparency and control. Multilingual viewers expressed frustration over the lack of an opt-out.¹³

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, most others have taken a different view, including high-profile Hollywood actors such as Scarlett Johansson considering lawsuits against OpenAI for ripping off her voice. This echoes 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. Hence, it's vital to consider the legal issues in any planning around using AI in the entertainment localisation industry.

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 entertainment 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.

Client Concerns and IP Protection

The legal complexities of AI in entertainment localisation are front of mind for ZOO's clients. As Dr. Stuart Green explains: "Clients are concerned about the risk to them and their exposure to intellectual property infringement when enquiring about AI dubbing services. It's a legal minefield and our customers realise that and what they don't want is to pay us to do a job for them, for us to use AI to do that job, and then they subsequently learn that the output that we've provided to them infringes someone else's intellectual property rights, resulting in them facing a lawsuit for damages."

This has led to strict protocols: "As a result, our customers are very explicit about the use of AI whereby we can use it only with their explicit consent, and with full transparency on how it is used, the systems used, and what the training data has been," Dr. Green continues. "We need to be absolutely certain that we understand the provenance of any IP in the work that we do, and that we have the commercial right to be able to use it."

In August 2024, the European Union implemented its AI Act, becoming the world's first comprehensive law regulating AI. Rules for general-purpose AI systems like ChatGPT began to apply from June 2025. The full set of regulations will be enforced by August 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, however, the quest to secure global leadership in AI technology has led to differences in approach by other countries. In January 2025, U.S. President Trump revoked certain policies and directives that were put into law in 2023 by former President Biden in his executive order relating to Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence. This follows legislation in September 2024 by the Governor of California who signed two bills regulating the use of performances generated by AI in a move that was welcomed by Hollywood unions.

With AI regulation accelerating globally, ZOO is committed to staying ahead of the curve. In the EU, the AI Act sets new standards for transparency and compliance. It requires AI systems to demonstrate legal use of training data and ensure safety

"We're committed to developing AI responsibly—not just within legal and ethical guidelines, but with complete transparency to our suppliers and clients."

for high-risk applications, including those in media and entertainment. ZOO fully supports these frameworks and integrates consent, transparency and ethical governance into every AI application we use.



Gordon Doran, President, ZOO Digital

HARNESSING THE POWER OF AI AT ZOO DIGITAL

Drawing on its technology expertise, ZOO has been integrating new AI applications over the last two years where it can improve its services and offer added value as an end-to-end vendor.

"It's our clients' needs that drive our focus on 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."



Gordon Doran, President, ZOO Digital

Rather than removing human talent such as specialist media translators, actors, and directors, ZOO aims to use AI to enhance traditional processes. This approach is aligned with the principles of Human-Centred AI (HCAI) – a discipline intent on creating AI systems that amplify and augment rather 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.

Its cloud-based systems mean that ZOO has an AI-ready architecture and infrastructure and can incorporate AI technologies seamlessly, allowing for testing and improvement while maintaining a reliable workflow. Within ZOO's end-to-end offering, the AI revolution presents an opportunity for ZOO to expand its capabilities and solidify its leadership position in the industry.

Currently ZOO deploys AI wherever it can be applied responsibly to speed up processes and make its 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

PROGRESS SINCE 2024: AI IN ACTION AT ZOO

Since the publication of our original whitepaper, ZOO has moved from theory to practice, implementing AI solutions that demonstrate our commitment to enhancing rather than replacing human expertise.

AI Transcriptions: Now Standard Across All Projects - We've successfully rolled out AI-powered transcriptions for all projects, with particularly impressive results in near-live scenarios. Projects that previously took days now complete in hours, without compromising the quality our clients expect. Our two-pass human quality control process ensures accuracy while capitalising on AI's speed.

Machine Translation with Human Excellence - Our AI-assisted machine translation system has proven its worth through multiple successful proof of concepts with major studios. One landmark project involved delivering content in over 20 languages simultaneously, with our expert linguists providing quality control that ensured cultural authenticity and narrative integrity.

Synthetic Voices: Opening New Possibilities - We've successfully deployed AI voices for audio description and audiobooks in trials with major studios. This technology is particularly valuable for making content more accessible while maintaining cost efficiency for projects where synthetic voices are appropriate.

The Fast Track Revolution - Perhaps our most innovative development is Fast Track, which leverages AI to accelerate the entire localisation workflow. By incorporating human-in-the-loop quality control for transcription, projects can move into translation much earlier in the process, dramatically reducing overall turnaround times.



As Chris Oakley, Chief Technology Officer at ZOO Digital, explains:

"Our in-house developed AI systems, built on cutting-edge models, are transforming the way we work. They're enabling us to achieve more in less time, streamlining workflows and pushing the boundaries of what's possible in the localisation industry. We're not just keeping up with change, we're leading it."

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 in the past 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. AI technology is improving in this area but can be time consuming to edit when the software does not give the right result first time, such as by mispronouncing a word or using inappropriate intonation. 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 due to imperfections in lip synchronisation.

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 will strengthen ZOO's proposition rather than replace it.

ZOO is seeing evolution in how AI can be appropriately deployed across different content tiers. As Dr. Stuart Green notes: "For our customers and the content that we work on, authenticity is still absolutely critical. However, we're seeing some softening of customer requirements for certain types of content — typically lower value content such as very old catalogue titles. For example, our customers may have secured a deal to license multiple titles to an AVOD or free-to-view service in Asia, and therefore the cost justification of producing perfect localised materials doesn't stack up as it would if you were taking that kind of premium content elsewhere."

This tiered approach is opening new possibilities:

"So there are cases where customers have asked us to work with them to evaluate AI localisation solutions for either specific content genres or for content with specific licensing arrangements," Dr. Green explains. "Deciding on whether AI may be appropriate or not depends more on the commerciality of the content and the route to market than on individual languages."

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 the use of voiceover dubbing. AI advancements now allow for automated separation of dialogue and non-dialogue in soundtracks. ZOO can use this technology to improve dubbing quality without requiring a new M&E track, which in time could potentially increase demand for dubbing due to cost savings.

Conforming audio and subtitles

Matching up audio and text 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.

WHAT'S NEXT: THE FUTURE OF AI AT ZOO

Looking ahead, ZOO's AI roadmap focuses on continuous innovation while maintaining our commitment to quality and human expertise:

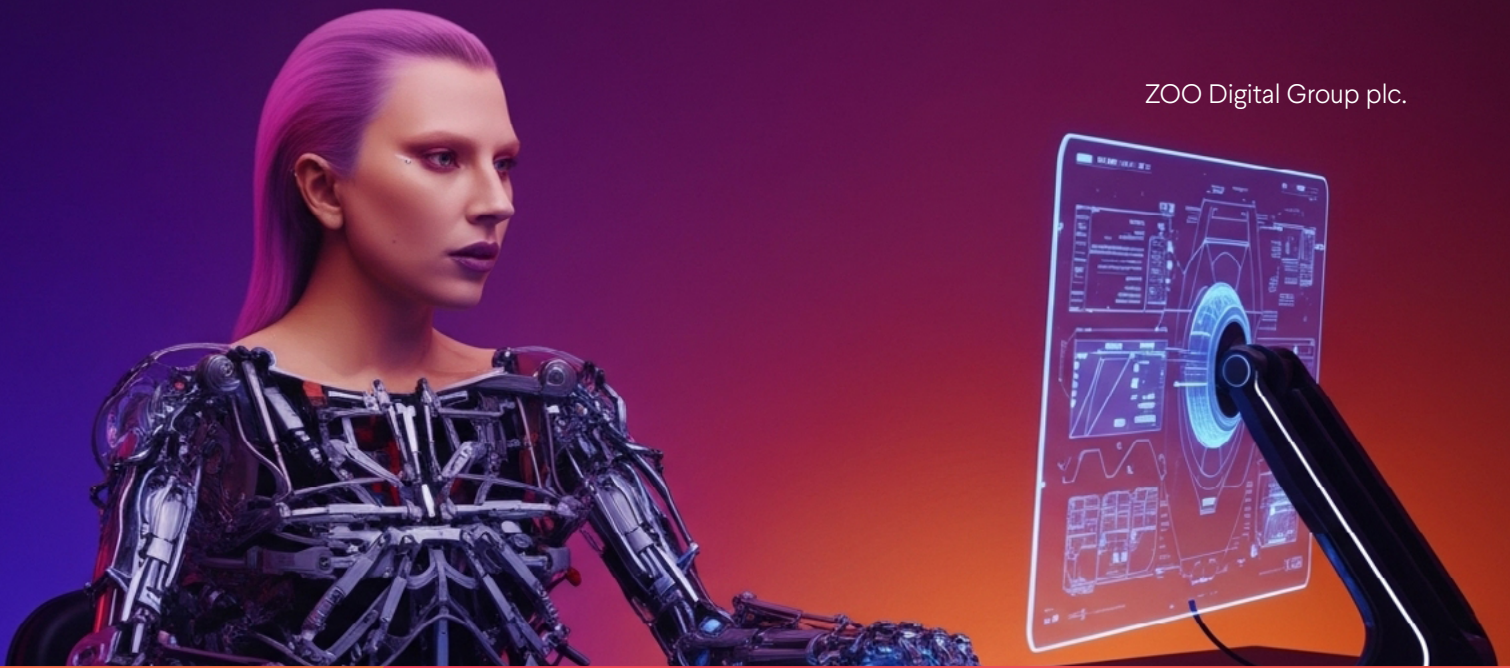
Immediate Priorities

Expanded Machine Translation: Rolling out MT capabilities to a significant number of additional languages, always with human quality control

AI Voices for Dubbing and Audio Description: Developing ethical frameworks for synthetic voice deployment in appropriate contexts

Optimised Workflows: Using AI to do more with less, without compromising quality

AI-Powered Quality Control: Implementing intelligent systems to catch errors earlier in the production process



Our vision for AI

As a company, we're committed to continuous refinement of our AI capabilities to drive even greater efficiency and quality across our workflows. We're platform- and model-agnostic, empowering our research team to evaluate and integrate the best technologies available.

ZOO's technology leadership philosophy is clear. As Dr. Stuart Green articulates:

"As technologists we can objectively evaluate tech-enabled solutions to determine the strengths and weaknesses of AI, understand the ethical and legal implications, the technical and quality capabilities, and embrace those which are appropriate for our clients."

He continues:

"Our intention is to be on the front foot of technology innovation to be able to deploy technology where it makes sense and to incorporate that as an integral part of workflows with human experts who play a vital role in ensuring the output is high-quality and authentic."

Our focus is on leveraging AI not just as a tool, but as a core part of how we operate—optimising processes, reducing turnaround times, and enabling new possibilities in localisation and beyond. The future for us is about smarter systems, seamless integration, and relentless innovation to strengthen our position as the natural partner for the media industry.

IMPACT OF AI ON ZOO'S BUSINESS

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

The demand for premium entertainment content is only set to grow, and AI is an opportunity for Team ZOO to extend its competitive advantage.

ZOO prefers to call it artificial assistance - using AI-enabled technology to complement its workflows, streamline its 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.

The language services industry data supports this approach. With the global market reaching \$71.7 billion in 2024 and projected to hit \$75.7 billion in 2025, media localisation represents a key growth vertical. ZOO's recognition by Nimdzi as a "strong performer" validates our strategic approach of combining AI efficiency with human expertise.

“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

Some roles may change or disappear as software takes over more repetitive, laborious or manual tasks. However, AI can lack **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.

The **2025 SAG-AFTRA agreement** and the **British Film Institute's research** confirm this trajectory. While AI poses challenges through unauthorised training on creative works, the regulatory framework now emerging—requiring consent, transparency, and fair compensation—creates opportunities for companies like ZOO that prioritise **ethical AI implementation**.

Moving forward, as an **innovator** in its field, 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. ZOO is the only **end-to-end provider** in this market to combine a tech-first approach with the proven expertise in media production to meet the industry's evolving needs.

The past year has validated our approach. By treating AI as **artificial assistance**, we've successfully enhanced our capabilities while preserving the **human expertise** that defines quality in entertainment localisation. Our investments in AI have resulted in faster turnaround times, expanded service offerings, and maintained quality standards, proving that the future of localisation lies not in replacing humans, but in empowering them with better tools.

In short, when it comes to AI, ZOO's expertise and end-to-end model is creating a better service for clients – more content at higher quality and faster speeds.

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