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Machine Learning applied to Media Archiving

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In the media industry, there are many tasks that are often recurrent, such as the tasks involved in the preparation, catalogue and archive of the contents. **Artificial Intelligence is a technology based on past experiences, that learns to work by itself. This makes it perfect for the automation of processes and operations** allowing professionals to concentrate on supervising the decision-making of this automated system, becoming more efficient.

Automated learning is a tool that is delivering tangible results in this industry. It is a field of AI that is in charge of executing actions or solving hypotheses based on past experiences. This makes it the perfect choice for an environment that requires working with complex rules and regulations that are impossible to define in many cases. It is better to train an algorithm that learns on its own.

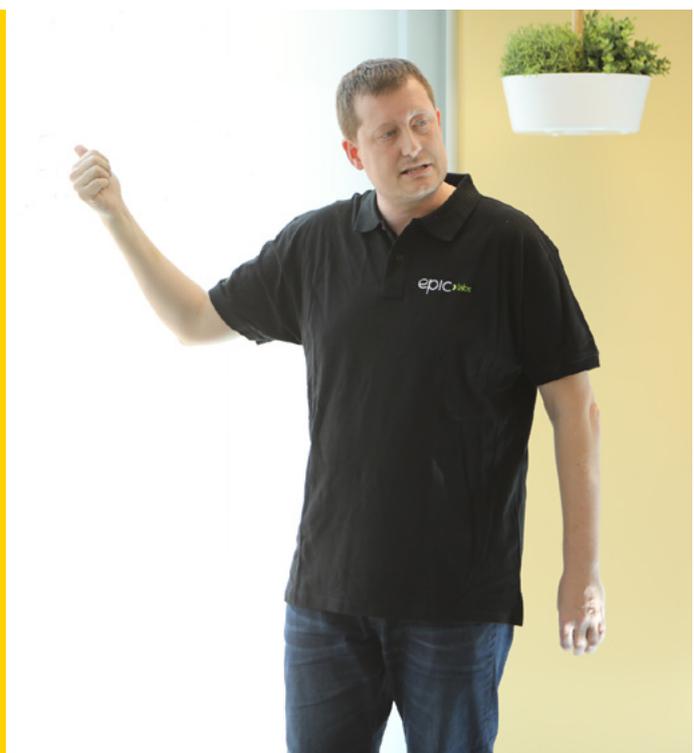
This technology originally attempted to emulate the human brain, but this analogy has been gradually diverging since then, but it is a good way to understand the origin of artificial intelligence. **It is really the case that based on practice, it dismisses mistakes and fine-tunes its achievements in order to make increasingly good choices. That is why it is important to point out the right results to the algorithm.**

Artificial intelligence operates very well in the areas of human instinct. If we want the algorithm to solve a "Fourier Transform", we can see that there are some very concrete rules for this. It is not the right framework for this type of technology. But whether a painting is Impressionist or not, that is where it is applicable, because that is something we intuitively know

Learning and data set: How far can AI go?

We at Epic Labs believe it can reach the same level that a human expert does, maybe it won't exceed it much or it may even remain a bit lower. The main difference is that the trained model will do the job faster and in a much more cost-effective manner. To achieve such a level of precision, it is important to have a large quantity and quality of labeled data, which is known as the dataset.

If we train the model with our own Dataset the results will be much better, it is essential to understand that the strength of artificial intelligence does not lie in the power of the algorithm, what is really important and provides the quality and a distinguishing point is the Dataset quality.



Applications for Media Archiving

There are various media archiving applications, the most common being image classification. This can be taken further than simply identifying whether a content is a sporting one, a film or a documentary, etc... It may provide more data about what is being analyzed and what appears inside the image such as whether it is day or night, whether or not there are buildings, whether or not there are cars. A well-trained algorithm according to your needs can provide a great amount of labeling information.

A bit related to this function is the object detection or segmentation. In this case, **the technology is at the point where it's no longer just a question of recognizing that there is a car, but also of showing where it is and then tracking it.** This is mandatory for automatic driving because it can recognize, in addition to an object, its position anytime.



In this field, we also have face-recognition, which has reached a state of the art, so that it is now possible to train with a single image using the technique known as "one-shot-detection", which can already be applied to many different situations. Face-recognition is especially more efficient than object detection because it is specialized for a particular set of features.

Sentiment analysis is also one of the most interesting functions for archiving. It is not just a matter of determining whether someone is sad or happy, but of being able to understand whether a conversation is negative or positive on something in particular. Or even if there is irony in a speech. **This is particularly helpful for audiovisual archive purposes, above all if we focus on a News environment where we can look for contents that positively speak about a city or a specific person or on the contrary, simplifying and speeding up the content search.** As for captioning, it can go much further than just being able to detect if an image is a beach scene. It describes an image with natural language. For example: "a little girl on a beach with a dog at her side with a kite". This can be made possible through NLP and Deep Learning tools.



AI application models

For the media industry, two models of IA implementation are available, a continuity model and a breakthrough one. It is not a question of choosing either one or the other; the success is really based on the ability to do both.

The first of them is based on continuing with the usual operations in the archiving area ("tagging", video description, cataloging, etc...) using artificial intelligence to automatize processes. Human monitoring is very necessary here, particularly when it is a question of deciding when the algorithm is right or not. **It is important to note that the model will not have a 100% effectiveness rate and the documentarist must validate decisions and supervise. In fact, according to the dataset, it is not strange to begin the work with an accuracy of something like 85%, and then improve this rate over time, due to the self-correction and continuous validation by the documentarist.** As we see, human intervention is essential, but much more could be done and every documentarist could work much more efficiently, which means a significant reduction in costs.

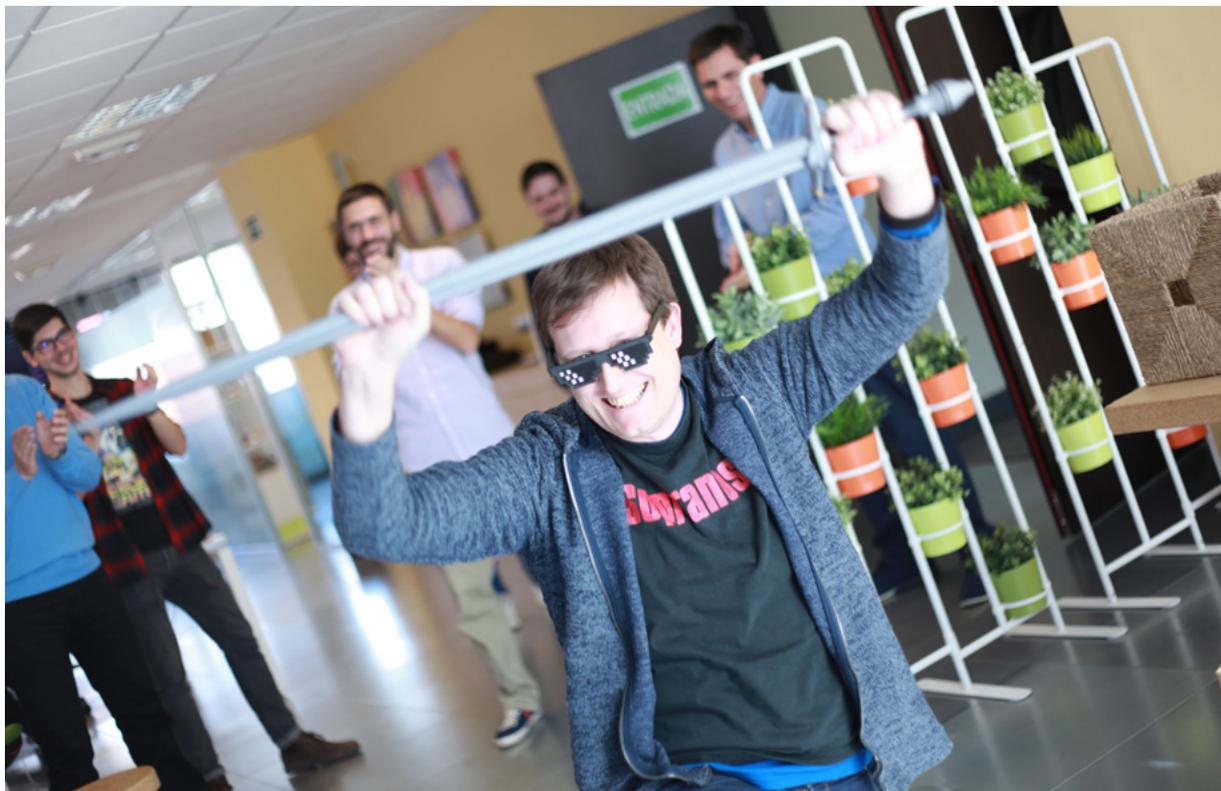
The second implementation model, at Epic Labs we have called it "Business as Unusual", and it is based on building systems by focusing on the long tail. Information about this is available at: <https://www.epiclabs.io/machine-learning-business-unusual/>

Things to do today to work better tomorrow at AI

As a conclusion to this paper we can affirm that artificial intelligence is to be incorporated into the day-to-day work of the media companies in many areas, being one of the most relevant ones, the archiving. For this reason, we have incorporated a set of suggestions to ensure a smoother transition in the future.

For the time being, it is a matter of continuing the work of labelling data with the best granularity possible and the more you can achieve in this regard, the better. It will help to build a model that really allows for more efficient archiving.

It is also significant to consider recording the life cycle of any contents entering the archive from the start. It is important to collect the decisions that are made to make any type of production in your life, including whether or not you are going to remove it, who is doing it and also why. By recording and writing down all these activities for the future we can train some algorithms to make such decisions or to pre-select footage and see what is going on with quality cuts and not. All of this enables us to generate a high-quality dataset to train AI algorithms.





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✓ Software Architect

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Biography

Álvaro González has been in programming since he was 8 years old when he bought his first Amstrad back in 1984. He has studied Computer Engineering at Complutense University and has worked in the world of web development for over 18 years. He has spent most of his career in content management. He joined Epic Labs in 2016 where besides creating software for the Media environment, he decided to learn Machine Learning with Andre Ng's online master's degree from Stanford. From then on he has been promoting and working on several projects combining the world the world of Artificial Intelligence with Media, mainly with Artificial Vision.

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