Riley for Eye on AI

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**SPEAKERS**

CRAIG, RILEY

**CRAIG**

Riley, why don't you start by introducing yourself, tell us how you got to Digimarc what your background is. And then as I said, I have a lot of questions about digital watermarking in the generative AI age.

**RILEY**

Thank you, Craig. My name is Riley McCormack. I am the president and CEO of Digimarc. My route to Digimarc was a little bit different. I've been an investor in technology for the last 25 years. And if you put the last 25 years of technology up against the last 25 years of almost any other industry, the change, the revolution, has been incredible. During my career, I've had operational roles to a certain degree, but nowhere near to the extent that I have here at Digimarc. I came across Digimarc in 2014. A friend of mine talked about this company, and its technology. I'd never heard about digital watermarking. So, I check it out and that began the journey. Digimarc historically was a licensing company. We had a major contract with the central banks, but in 2014, Digimarc was really a licensing company. Fast forward to 2023 and we have productized our technology. In the beginning however, it was really a small community. I was going to GS1 conferences in the basement of hotels in Washington, DC, and became more and more fascinated with the potential of Digimarc’s technology. I truly believe this technology can change the world. So, I joined the board in 2020 and became CEO in 2021.

**CRAIG**

Oh, that's interesting. I didn't realize Yeah, so that all predates? Well, I mean, the transformer algorithms been around since 2017, but really predates the Gold Rush and generative AI. So yeah, I mean, what has captured a lot of people's imaginations in the last three or four months in particular is the idea of digitally watermarking texts outputs from generative AI and I I've had conversations with people about statistical methods. I’m hoping maybe we can talk about that but Digimarc started before that. Are you? Did you want to digital watermarking for images only images and text Um, yeah, maybe explain what your tech does.

**RILEY**

So, let's take a step back. We've been around for almost 30 years doing digital watermarking. Our founder actually was a astrophysicist as well as a photographer, and wanted to find a way to protect his images that he was posting on this “new thing" called the Internet. He wanted a way to claim those images? How could he attribute the photos back to him? How could he show his copyright?

This said, we are pioneers and widely recognized leaders in the science of digital watermarking. Our innovations and inventions in digital watermarking have been deployed at unprecedented scale for nearly 30 years to:

* + Protect movies (BluRay anti-piracy standard and Digital Cinema Initiative)
  + Measure TV and radio audiences as part of both Nielsen’s and Arbitron’s (now Nielsen Audio) audience measurement services
  + Secure the credentials of the majority of Drivers’ Licenses in the US and assorted other secure credentials in countries around the world.
  + We are perhaps best known for our 20+ year relationship working with the world’s central banks to protect the world’s currencies, a contract we recently extended thru the end of the decade
  + And more recently as a solution to help solve the world’s plastic recycling problem, with rollout coming soon on multiple continents. Fortune named us to its 2023 Change the World list.
  + Fun fact: we’ve won an Emmy and earned a Guinness World Record for our work in digital watermarking.

So yes, to answer your question, our digital watermarking technology predates GenAI. Digimarc digital watermarks can be applied to anything that is digital, anything that is made made from something digital, or is digitally processed. So basically, the only thing we can't watermark are things made by Mother Nature.

**CRAIG**

Yeah. And and what I mentioned digitally watermarking text, is that something that you do as well.

**RILEY**

Text is going to be a challenge for the whole world. Our focus right now is images, audio, and video. Amidst all the good GenAI offers, namely fostering creativity and increasing productivity, it has also brought inaccurate information and brazen plagiarism. As with every paradigm shift, technology innovators are eager to find a solution. Every revolutionary technology changes the status quo. And so by changing the status quo, you unlock incredible possibility, but you also open up potential negatives and those negatives, those risks, have to be addressed. Today our technology protects images and audio, and we are working on a solution to protect video and documents. Bottomline, there is no time to waste. I think one of the things that is important for people to understand is that every time you release a digital asset into the world, it's unprotected. That's it, it's gone. So take this podcast. If you were to release it without Digimarc Validate, it's out there, it's going to be copied, it's going to be ingested by GenAI engines. You know there will be multiple copies of the podcast made and your ability to protect it, and control it are gone. So we didn't want to wait for a text capability before we came out with our product. We wanted to get it out there. We feel a real urgency. Every minute matters.

**CRAIG**

Yeah. So So first explain what digital watermarking means. In the context of Digimarc of what you've been doing. And then can you talk about how it's relevant to AI?

**RILEY**

I think it's important not just to talk about what digital watermarking is, but also what it's not, because I think there's a lot of confusion about what digital watermarking is. So let me start off by talking about what digital watermarking is. At a very high level, digital watermarking is the science of hiding information about an item in the item itself. The act of hiding that information is known as embedding the information. And the act of discovering that hidden information is known as detection. A digital watermark is a machine readable and covert identifier that upon embedding becomes part of the item itself. A digital watermark is machine readable and covert as opposed to human-readable and human-visible. And because it becomes part of the item, the identifier is immutable. Once it's been embedded, there are additional benefits. Because it's covert, it can be ubiquitous, which means it covers the totality of the item. So if it's a audio clip, it would run through the whole audio. If it's an image, it covers the whole image. And because of this ubiquity, as well as the way the signal itself is constructed and detected, it's redundant. This means it can survive a lot of damage and still deliver its message. And then finally it's secure. So that's what a digital watermark is.

I'd love to spend a couple of minutes on what’s not a digital watermark. First of all, it’s not simply watermarking an item. Now notice I didn't use the word digital. The process of watermarking is hundreds of years old. And this refers to the literal process of adding water to an item to leave a mark, a water mark.

Now the idea of marking an item to put in a human readable and human visible code has been applied to the digital world. For example, the marks you will see in the images of stock photography vendors. But this is simply a mark applied to a digital item, not a digital watermark. These marks are not covert. They're meant to be read, right. That's why they're there. They're not immutable. In fact, when you pay a stock photography vendor for the right to use that photograph, they'll remove the watermark. They're not ubiquitous, they're not redundant, and they're not secure.

And then recently, and confusingly, some companies have started calling the metadata attached to a digital item, a digital watermark. This just isn't accurate, especially when it comes to proving authenticity, which is one of the benefits digital watermarks contribute in an era of GenAI. It's actually quite dangerous to confuse metadata with digital watermarks.

The metadata attached to a digital item is indeed covert and machine-readable, but the qualifications for metadata equating a digital watermark end there. Think of an image’s metadata as an envelope for the digital item, and this envelope has a bunch of information written on it. It's not ubiquitous, and it's not redundant. There's only one copy of the digital instructions and they can't survive any damage. Moreover, that metadata can and often is severed from the digital item. For example, when an image is posted to a social network or ingested by an editing application, the metadata is stripped from the image. It isn’t stripped for nefarious reasons, it is stripped because the application doesn’t want to store the data.

Perhaps, most dangerous, metadata is not secure. Anyone, at any time, can quite easily change the information found on the envelope or a nefarious actor could change it.

Digimarc has been building massive multinational, multi stakeholder, mission critical systems of trust and authenticity for nearly 30 years. One of the truisms that runs through authenticity, repeatedly, is that false certainty is worse than uncertainty. And so using metadata as a way to give authenticity, but the metadata is easily changeable and not secure gives false certainty and false certainty is worse than uncertainty.

**CRAIG**

Yeah. Well, on the digital watermarking, that you guys do? Yeah. Can you describe, presumably, you introduce some sort of a pattern in the pixels or in in the histogram or, or something that can be read after the fact. But yeah, can you talk about how you do this?

**RILEY**

It depends on the medium. In audio, we're doing something in the audio channel. For images, you're right. It's a modulation of the pixel and chrominance and luminance on a pixel by pixel basis. What we're doing is embedding immutable, covert, machine readable, redundant, ubiquitous and secure identifiers. Different from other digital watermarking technologies is that we can apply digital watermarks to audio, images, video, and documents.

**CRAIG**

Yep. And how was that applied? Is? Yeah, maybe you can take us through the, the two magic of

**RILEY**

It is software. Audio, we can do live, real time. We could be watermarking the audio in this conversation right now. It is just software processing. It's not even that compute, processing, or memory intensive. Same with images, it's just a processing of a digital asset.

**CRAIG**

Right. And it's not having to do with the codec or you know how the data is compressed or something. You're, you're I mean, can you think of an analogy? Yeah, maybe processing a photograph on on a certain medium that's, that's copyrighted. So that that physical photograph is not cannot be separated from the medium on which it's printed? Or is it? Is it the if you try and explain to readers how it's done?

**RILEY**

Specifically on images?

**CRAIG**

Yeah, we can start with images. Yeah, sure. So our software

**RILEY**

I'm probably going to get yelled at by my product and engineering people for misspeaking or oversimplifying. But to simplify, our software will look at an image — no human interaction — and then decide the best way to modulate the individual pixels on both the chrominance and luminance. So both brightness as well as color in the way that will make it the most imperceptible to the human eye but still be, you know, as as clear as black and white to a machine.

**CRAIG**

Yeah. So pixel by pixel, meaning every pixel in in an image is manipulated.

**RILEY**

No, it doesn't need to be, again, this is really smart software that we've spent 30 years developing to make it the most robust, and impactful. So without getting into the magic of all of our software — every pixel in an image doesn’t need to be manipulated. Our technology is covert, machine readable, immutable, ubiquitous, and redundant.

**CRAIG**

Yeah. And how does this relate to registering digital assets on the blockchain?

**RILEY**

Our technology doesn’t require a distributed ledger, but it absolutely could. Again, what we are doing is embedding an identifier into a digital asset via a digital watermark. Our digital watermark is an identifier of that digital asset that can be read by machines. It is immutable, covert, and once the digital watermarks have been added to a digital or physical item the world opens up with myriad possibilities.

Our digital twins can convey authenticity, provenance, and ownership in the cloud. We can also record these interactions in a distributed ledger, and we actually have parts of our business that work with a couple of distributed ledger partners.

So think of it like this, there are different parts of the stack, right? What digital watermarking is doing is identifying something, then it is using that identifier to convey information two ways. One, to get information from the digital twin to deliver to the device being used to identify the item. And two, to convey confirmation the item was just detected.

This information can be recorded in either a non-blockchain database or chiseled in stone on a distributed ledger. It is a matter of choice.

**CRAIG**

Yeah, yeah. I'm thinking this series we're talking. So the blockchain. The advantage is that it's an immutable ledger that demonstrates ownership. Right.

**RILEY**

Absolutely. The answer is yes, but that’s not the only way to do it.

**CRAIG**

Right. But just the NFT craze, for example, you come up with a digital asset, you you register ownership or the purchase of it on the blockchain and until there is another In a transaction involving that digital asset that's registered on the blockchain that represents your title to the asset, right? Yes, as that has nothing to do with watermarking. So it's your taking, if we're referring to the NFT, that same digital asset, and you're processing so that it's watermark, so that if anyone comes across or there's any use of that, of that asset, you can show that it is the asset that you own. And then you can, if you have it registered on the blockchain, you can refer to that, to that ledger.

**RILEY**

It's actually an interesting example. Stay tuned because we’ll be sharing more on this topic in the near future. Everything you're saying is right, except for the fact that while the blockchain records an immutable transaction, or an ownership of that asset, how do you know the NFT that you're linking to it is the actual NFT. It's a huge gap in the NFT business, and it's one that we can address. The blockchain is an immutable ledger of transactions, but how do you make sure the item in the digital world that you are claiming as a transaction or recording on the distributed ledger is the right or real one? It is a real challenge. There is a lot we can do with NFTs.

**CRAIG**

Yeah, it's I mean, it's one of the reasons why I couldn't ever understand the NFT craze.

**RILEY**

I know. I don’t want to wade too deep into this topic now, but I will say that the technology is not as secure as people think. Yeah. It’s not a distributed ledger issue. It's a problem of how do you make sure that the NFT is the actual one being recorded?

**CRAIG**

Right? So I have an image or audio clip, and you watermark it for me, then then what can I do with that information with a watermark?

**RILEY**

Today the immediate solve that we're offering through a product called Digimarc Validate is protection of IP and copyrights. As I'm sure you're aware, and I'm sure your audience is aware, the way these GenAI engines are trained is by ingesting an incredible, unfathomable amount of data. There are a lot of lawsuits, as a result. I want to spend some time discussing the related risks.

In 1997, there was an update to the copyright law called DMCA, the Digital Millennium Copyright Act. And it was a recognition by Congress, that the copyright laws on the books left some gaps when it came to the Internet. The updated DMCA law, in Section 1202B, makes it illegal to alter or remove copyright management information (CMI) in the U.S. There are similar laws in multiple other countries.

Much of the digital content being used to train GenAI models is copyrighted, it’s just not digitally identified as such. Digimarc Validate applies digital watermarks to original digital content before distribution — analogous to adding a machine-readable copyright symbol to those images — providing a clear signal of content ownership and authenticity. Again, under section 1202B of the Digital Millennium Act, the rights of owners of watermarked assets are better protected.

There's actually case law that says digital watermarking is a valid and recognized conveyor of CMI. So that's where we're starting today.

We're a member of C2PA, the Coalition for Content Provenance and Authenticity. C2PA Content Credentials are proliferating rapidly thanks to an open standard led by C2PA. The standard is based on a manifest. A manifest is metadata added to a digital asset. Reflecting on our earlier discussion, this means that you, Craig, could publish a digital asset with a Content Credential thinking the provenance data will protect your ownership of the asset, but as you recall, metadata can be easily stripped from an asset. One potential solution to fix this issue is the addition of a digital watermark which, when combined with a C2PA manifest, creates a robust and bidirectional link between the asset and its manifest. The manifest references the image and through the digital watermark the image references the manifest. In turn your copyright is protected as the content creator and owner.

Most exciting for me is that Digimarc Validate also forms the foundation for something much bigger than copyright protection and monetization — it forms an ecosystem of trust, authenticity, and security in the online world.

**CRAIG**

Yeah, well, for example, with on the generative AI training sets, if you had watermarks, your audio file or your images, and and you wanted to keep them out of or search to see whether they are in the training set or or exclude them from the training set. Does the watermark help in some way?

**RILEY**

So first of all, when you say if we are a Digimarc Validate customer, part of the reason we rushed to get this product out, is because we wanted it for our own use on different types of digital assets. So, we are absolutely a customer.

Digimarc Validate provides immediate digital copyright protection and it is powered by the unique advantages of secure, automated, fair, and efficient (SAFE™) digital watermarks. Beyond content creators and owners, we offer our SAFE™ detection software and services to a growing number of partners including, machine learning systems, ecommerce marketplaces, security software providers, social media platforms, and more. Specific to the GenAI companies, by reading the instructions conveyed by a SAFE™ digital watermark, model training powered by SAFE™ detection software and services makes it easy for GenAI companies to identify content that is owned by others prior to ingestion. This allows GenAI companies to avoid the certainty of costly legal battles over the unauthorized use of copyrighted material. We offer this detection software to GenAI companies for free.

Beyond the legal battles, we can help GenAI company’s avoid exposure to financial damages, injunctions, and forced re-training of models or worse, complete model collapse. This whole conversation points back to ‘fair use’ of digital content and compliance with existing law, DMCA 1202B.

Let me provide an example. I’m a big Family Guy fan. If you’ve ever watched the show you know Stewie has a head shaped like a football. Imagine over time, Stevie’s image is ingested into GenAI models alongside images of humans. Overtime, GenAI models are going to think humans all look like Stewie. Images of humans will start appearing with football shaped heads!

With Digimarc Validate, there are benefits to both the content creators and the GenAI engines. This is a very important element of our mission and commitment to safe, secure, trustworthy AI.

We believe regulation is coming and it will be helpful. The more we can do to make this a win win win for everybody the better off the world will be.

**CRAIG**

Yeah. Just going back to what you said that if a training data set contains a digital watermarked asset. It's in violation. It's explain that again.

**RILEY**

Yeah. So what I really suggest is the audience visits our website Digimarc.com. We’ve got a lot of information on DMCA Section 1202B.

**CRAIG**

Yeah, yeah. Okay. So the, can you give us some some of the big use cases that you guys have handled

**RILEY**

The initial value prop of Digimarc Validate to our customers is immediate copyright protection by availing themselves of the protection available under DMCA 1202B and similar laws. We also offer a web crawler allowing customers to find where their digital assets are on the Internet.

Through partnerships we will continue to add value to our offering. We are actively engaged with partners like, C2PA and in conversations with major media companies, e-commerce providers, device manufacturers, social media companies, and more.

And it's not just the content creators that need copyright protection. We are big believers in the power of GenAI, we think it is going to be the most important productivity tool since the internet. So we are fans of GenAI. But it’s important, whenever there is a change in technology, to equally weight the risks and opportunities. And there is a big risk if copyrights aren’t protected. It goes beyond just the copyright owners themselves, it impacts all of us. We saw this issue highlighted in the recent strikes and lawsuits. If I’m a musician, a copyright owner, and my content is used without my permission or compensation, what is my motivation to continue to create content?

If you were to display a thematic bar chart of all the Sci Fi dystopian horror movies, machines taking over the world would rise to the top. And that's exactly the path we are on when it comes to content creation. If human content creators aren't incentivized to create content, but machines can do it untethered without any human contact, based on exponentially increasing processing and algorithmic power, we're going to see content creation monopolized by a handful of big tech companies, and some state sponsored bad actors. That's the path we’re on right now. I didn't mean to get so dark. I am a wildly optimistic human being. I believe in the power of GenAI, and I think it is going to be a wonderful productivity tool. I just want to be realistic about the risk if it goes unchecked.

Everyone needs to care about how the U.S. and the world ensures the safe and fair development of GenAI — not just artists. GenAI is going to impact us all. We are giving control to a handful of tech companies and state sponsored bad actors unless we protect people's copyrights. Fortunately, there is a solution. What's really cool is that we are having this conversation because of the Internet. How it was invented. In the 1960s, during the Cold War, we needed a bomb proof way to communicate. That was the crisis. Solving that crisis led to the 973 billion ways we use the Internet today that we we couldn't have even dreamt about back then — same thing with GenAI. The crisis today is solving for copyright protection. This crisis is the catalyst for the creation of an an ecosystem of trust, authenticity and security.

**CRAIG**

Yeah, well, that was gonna be my next question. But But before that, if you have this watermark to asset, and it's in a Gen AI training, data set? Does any of the watermarking survive? The the ingestion by the large model? And the reason I ask is, is, I'm sure you're very familiar with this. But if you use a lot of the image generation models, mid journey, or stable diffusion, or these, oftentimes, the output has the artifact of an artist signature in the corner. I mean, it's no longer rendered in is a recognizable signature, but it was in the training data. So does any of the watermarking survive? In in? In a large model?

**RILEY**

The short answer is every engine is different. Every agent is constantly changing. It's impossible to give a universal truth, but I would go back to this, which is if the GenAI engines are altering digital assets that have digital watermarks, it is a violation of DMCA section 1202B.

**CRAIG**

So in effect, the Hang on just a sec here have to answer the getting old, doesn't take

**RILEY**

Wondering who is calling you that for you?

**CRAIG**

As my my wife, the so so the it's not the fact that a digitally watermarked asset is in the training data, that that that that's a breach of law, it's the generation of

**RILEY**

Removal. It's the alteration or removal of CMI copyright management information of which digital watermarking is a legally recognized case. There is precedent.

**CRAIG**

right but I would guess them that that deciding whether or not a generative AI image is is altering or removing is a question for the courts, right?

**RILEY**

They can during removing, altering, removing the CMI?

**CRAIG**

Let's say I have a song that I've digitally watermark or a painting that I've digitally watermark and or to make a more direct piece of digital art that I created, that I've digitally watermark, it's included in the training data for a big generative AI image generator. And then that image generator generates an image that that has been influenced or includes elements Have my original asset, does that constitute a removal or mutation of the CMI?

**RILEY**

Let me try to clarify. It doesn't matter what the output is. A digital watermark is considered copyright management information under DMCA section 1202B meaning if that copyright management information is altered or removed, then it's a violation of the law. So it doesn't matter what the output of the engine is. If that digital watermark is altered or removed — and again, it's impossible to give a universal answer, because there are a ton of engines and the algorithms change almost every day — but it is very hard to imagine the ingestion of a bunch of content with the purpose of creating other content, where our digital watermarks would survive that whole process in totality. The digital watermarks would be altered but still readable. This is one of the wonderful things about our digital watermarks. They are ubiquitous, meaning they cover the totality of the digital asset. They are redundant and can survive a lot of damage and still be read. But that damage — if done by a GenAI machine — is an alteration.

**CRAIG**

Okay, then, on authentication, which is you said is becoming a huge issue. First of all, does this apply to video as well? Can you digitally watermark video?

**RILEY**

We can but we haven't commercialized this offering yet. Stay tuned because video is next. Today we offer image protection, audio protection, coming soon, video protection, and document protection

**CRAIG**

right. So in an ideal world world, from from your point of view, certainly every piece of piece of digital content produced would be processed with a digital watermark. So if if I, you know, gave an interview, or let's say that President Biden gave an interview, and and that audio was digitally watermarked, then you could say that every place you find that audio, that it's authentic, and if that audio is altered, you'd be able to see that it's it's been altered. Is that right?

**RILEY**

The two risks we see from GenAI. And I really want to stress this, because we are big fans. There's a lot of benefits in addition to risks. Before we dive in, let me provide a quick insight to our journey to where we are today.

Our R&D team had been studying and exploring GenAI for multiple years, it was almost a year ago that it became clear that this powerful technology was going to be productized in a way that would indeed transform the world, so we began the internal business analysis to understand what GenAI could mean for Digimarc’s operations. Namely, we analyzed what benefits this incredible engine of productivity could bring us, and what new risks would arise from our adoption.

And it's interesting, and this will answer your question, what we found was that while there are many different and varied ways we could benefit from the adoption of GenAI as a productivity tool, all the risks we faced could be boiled down to two.

One, how do we safeguard our intellectual property, brand equity, and copyrights in a world where our digital content is being used without our consent to train machines capable of creating new content without our knowledge.

And two, how can we communicate the authenticity of our content in a world where content creation is faster, cheaper, and easier and consumer skepticism is higher.

We immediately realized these risks don’t just impact those who adopt GenAI, but also those who might not even know GenAI exists, as quaint as that sounds. Specifically, the two risks I mentioned will impact all content creators and owners, whether the content creator decided to opt-in to the GenAI revolution themselves or not. And second, these risks will impact all consumers of content.

With these realizations, we got to work.

We knew that based on our history of being the pioneer and widely recognized leader in digital watermarking, our technology had a role to play. What's been wonderful, since then, is to see the universal acknowledgement, case law, governments, big tech all realize that digital watermarking has a role to play. So that was been great. The second realization, the reason we got to work with the urgency mentioned earlier, is that every time a new digital asset is distributed or released without protection, it is gone forever.

So, with that backdrop, we dedicated ourselves with the requisite urgency to build and release Digimarc Validate because we not only wanted it for ourselves — we are happy Digimarc Validate customers ourselves — but we knew every day we delayed launch would cause irreparable damage to digital asset creators and owners.

We've talked about the risk of copyright and how it doesn't just impact content producers. It's going to impact all of us in this potentially dystopian “computers take over the creation of content” way. But the other risk is authenticity, which I think is equally as scary. We are spending more and more time in a digital world. I mean, I don't need to tell a podcaster how much time people are spending in the digital world listening to or consuming digital media. If there isn't a way to convey authenticity in this world, we're going to head down one or two paths. Either people are going to believe everything they see which is going to cause companies, news organizations, governments, individuals, and societies, meaningful and irreparable harm because content creation is now fast, cheap and easy. And anybody can do it, and people will do it. And they will continue to do it for nefarious reasons. So that's one path, we're going to believe everything we see. And, and it's going to be really divisive. The other risk I think is equally scary. People are just going to stop believing anything they see. Right? People aren't going to tune into your podcasts because they will constantly be in a mindset where they have to ask, I don't know if this is really Craig and Riley, it could have just been to machine talking so, I don't care. This will be true for all content on the Internet and all digital media. This won’t just disrupt the flow of entertainment, it will disrupt the communication of really important and legitimate information. I don't know which risk is worth worse. These are simply the two paths we're going down.

To be clear, GenAI, didn't create this problem. This was a path we were going down already. What's really cool is that we can solve for the copyright protection issue and we can solve for the authenticity issue. Digimarc Validate is going to make it as difficult to counterfeit people, companies, and news as we've made it to counterfeit the world's currency.

**CRAIG**

Yeah, no, absolutely. Another question. So you watermark your assets, your digital assets. And then you were saying that there's there are ways to scan the Internet, for instance, instances of that asset. And if you find an an approved use of that asset, then you get your lawyers involved, right. And then it you know, there's an infringement case or something like that. Is there a way or or is there technology, technology? Or are you considering this? That nobody can copy a digitally watermarked asset or create a new instance of it without some permission on the owners part? And if they tried to it'll it won't work at all. You know, it's a little bit like those PDFs that you get that are set so you can't block and copy the tax.

**RILEY**

That's a change of Internet Protocol but we can provide a lot of protection along the way. Digimarc Validate is multi layered. What we mean by that is, it's not just about digital watermarks. Digital watermarks are just what people know because governments and big tech have been vocal about the important role digital watermarks play in providing a solution to the risks of AI. One of the advantages we have is our 30 years of experience. We can learn from the past and lean into the future. The industry has caught up with a vision Digimarc cast 30 years ago.

We understand the urgency. Once a digital asset is released out into the wild, for the first time unprotected, it's gone forever. We're starting to see this realization dawn on people. The other realization is the need for a multi-layered system. Digital watermarks are a critical layer but not the only layer. For instance, most people don’t just have one lock on the front door, they have two or three. They likely have a security system, motion lights, etc. It's the same thing here. It's going to be a multi layer, solve. Digimarc Validate is multi layered solution. If you go to our website - Digimarc.com, you will that we are launching a registry in early 2024. That registry maps to what we’re talking about here.

**CRAIG**

Yeah, that's a distributed ledger registry.

**RILEY**

Doesn't have to be a distributed ledger. We can integrate with distributed ledgers but it isn’t necessary. There are other types of registries.

**CRAIG**

Yeah. And so this idea of a mechanism that would prevent the reproduction of a digitally watermark set without some key or some.

**RILEY**

For example, according to the DMCA law we talked about earlier, if there is content management information in an image, and you alter it or remove it, it's illegal. It's not just for the GenAI engines, that's for everybody. That law that was written in 1997 before anyone even knew GenAI would be coming two decades later. And with Digimarc Validate it will be very clear that an image has been altered, or changed. Our technology picks up even the smallest alteration.

Digimarc Validate allows digital asset creators to protect their digital assets, assert copyright ownership, and avail themselves of DMCA Section 1202B and similar laws in other countries, giving them immediate protection against having their valuable digital assets used without their consent or compensation. We want to make it as easy as possible for content owners to protect their assets so we’ve recently launched a subscription-based, easy-to-use, affordable self-serve tool that fights back against theft, unauthorized repurposing, and misappropriation by allowing content creators like you and me, to digitally claim our copyright ownership. Again, content creators receive immediate digital copyright protection through Secure, Automated, Fair, and Efficient (SAFE™) digital watermarks.

**CRAIG**

Right. But in order to other than than having seen the original image and and seeing that it's been altered. You You need this detection system. Digimarc’s detection system, is that right to see whether or not something's been altered,

**RILEY**

Yes. And we're working with C2PA to add digital watermarks the standard. C2PA is a wonderful organization. They came together for this reason, to protect content creators and owners. We’re also talking to other industry and government organizations, and major tech and media companies.

You are correct that there needs to be an accurate and consistent definition of digital watermarking. As shared previously, at a high level, digital watermarking is the science of hiding information about an item in the item itself. The act of hiding that information is known as embedding, the act of discovering it is know as detection. In response to your question, our SAFE™ digital watermarks can be applied to many types of digital content, including images, audio, video, and documents. And, our SAFE™ digital watermark embedding and detection tools are widely available, meaning these tools can be used by others besides just the content creator or image generation company, something that is necessary for a universal ecosystem of trust, authenticity, and security.

Our product provides immediate copyright protection today.

**CRAIG**

Yeah, and that detection software would presumably eventually be embedded if it becomes the standard of Digimarc, where the standard would become embedded in search engines and maybe your your operating system or I don't know, but so that you would immediately see, as you scan digital assets,

**RILEY**

Actually, C2PA would set the standard, not Digimarc. This said we are actively contributing to the C2PA standard. We want an open, safe, authentic ecosystem, and we’ve applied the resources to effect change with urgency. There are real risks and real opportunities created by GenAI.

I have two kids of my own and I’m constantly reminding them that the Internet doesn’t have a fact-checker. So, you are 100% correct, there needs to be ubiquity in detection to convey authenticity of digital content broadly. We are engaging with multiple relevant stakeholders and desire to engage with even more. In addition to C2PA, we are having discussions with government officials and technology partners, in addition to standards setting organizations. It is imperative that we work together to create an ecosystem of trust and authenticity.

**CRAIG**

Yeah. And can you give me we're coming up to an hour, a few of the big use cases that that you've worked on, specifically with digital watermarking.

**RILEY**

Sure. Beyond being the pioneering leader in digital watermarks, for nearly 30 years we have built massive systems of trust and authenticity using digital watermarks, including our work with a consortium of the world’s central banks to protect the world’s currencies. I can’t provide much more detail except that we’ve worked with the banks for 24 years and we just signed a contract extension through the end of the decade.

When we talk about our mission as a company, it is to promote promote a prosperous, safer and more sustainable planet. Trust in global currencies is right up there. Right. And we were talking about spending a lot of time living in a digital world, that is a massive area that we need to help add authenticity. Our currency is foundational. If we lost faith in our currency as a society, all bets are off, right? So we're really, really proud of that work.

We have another product, Digimarc Recycle, that is transforming the recycling and sortation of plastics. We are really excited to be making great progress in the fight to end plastic pollution across multiple geographies. With Digimarc Recycle, we are fulfilling our ‘more sustainable' part of our mission.

Our work securing the credentials of the majority of drivers’ licenses in the U.S. and assorted other secure credentials around the world is a business that we sold — but it is one we are proud to have created.

So for almost 30 years, we've built massive, multistakeholder, multinational mission critical systems of trust and authenticity.

**CRAIG**

Yeah. But but in the digital domain, is there a big use case that you can point to I mean, currency? Presumably, you're you're you're looking at watermarking physical currency. And yeah, are there are there are some use cases in in the digital domain?

**RILEY**

As shared, everything that is old is new again. We are pioneers and widely recognized leaders in the science of digital watermarking. Our innovations and inventions in digital watermarking have been deployed at unprecedented scale for nearly 30 years to:

* + Protect movies (BluRay anti-piracy standard and Digital Cinema Initiative)
  + Measure TV and radio audiences as part of both Nielsen’s and Arbitron’s (now Nielsen Audio) audience measurement services
  + Secure the credentials of the majority of Drivers’ Licenses in the US and assorted other secure credentials in countries around the world.
  + We are perhaps best known for our 20+ year relationship working with the world’s central banks to protect the world’s currencies, a contract we recently extended thru the end of the decade
  + And more recently as a solution to help solve the world’s plastic recycling problem, with rollout coming soon on multiple continents. Fortune named us to its 2023 Change the World list.

A brilliant and wonderful human being named Geoff Rhoades, started Digimarc almost 30 years ago to protect his images. Because he was a photographer, as well as an astrophysicist and looking out and saying, I really want to share my images on this brand new thing called the World Wide Web and how do I do it and keep my attribution? So, Digimarc Validate and the conversation we are having today goes back to our roots — our origin story. Pretty cool.

**CRAIG**

Yeah, well, that's fascinating. And just going back on the standard, the standard, you're sort of standard agnostic. Is that right? I mean, you, you have the process. And I don't, I don't know what the standard would be. But if there was a certain standard for watermarking, and reading or detection of watermark, your texts adapt to that, or you have a proprietary standard that the world has to adapt to an order of your products be useful.

**RILEY**

We're not going to change the world by ourselves. We're not intending to change the world by ourselves, even if we wanted to. We don't think the world has enough time. I was thinking about DMCA and the regulation needed outside of DMCA. DMCA is great. But if you think about when DMCA was written in the late 90s, there is an argument to be made that some of these GenAI engines today have as much processing power as the whole Internet did back then. Right?

I don't think people understand how quickly the world is changing in an era of GenAI. I know you get it. But we don't want to do this alone because we don't think the world has time to wait. The impact - positive and negative - of GenAI is unfathomably large. How quickly things are changing, and how permanently things are changing every day.

This in mind, we are in discussions with government officials. We are proud partners of standard setting organizations such as CTPA. We recognize the need and support the creation of an ecosystem of trust and authenticity. We want to be a tool provider within this ecosystem. We want to educate people on the power of digital watermarks. In fact, it is wonderful seeing industry leaders coalesce around the view that digital watermarks have a real, fundamental, and foundational role to play in addressing the risks of GenAI. Now let's figure out how we can all work together. We're a mission driven company, and our mission is to make the world a prosperous, safer and more sustainable planet. This is a wonderful way to help.

**CRAIG**

Yeah. Okay, I keep on thinking of new questions. So so I'll try and make this the last one. But this applies to PDF documents as well.

**RILEY**

Documents and PDFs will be a part of our next release.

**CRAIG**

Okay. Riley. Well, that's all fascinating. And just finally, how do you price this? And is it affordable?

**RILEY**

Yeah. Well, I I love that question. Because it lets me end with what I wanted to end with. Please visit us at [digimarc.com](http://digimarc.com). You will find pricing for Digimarc Validate on the Digimarc Validate product page. There are many packages available. We also have Enterprise offerings. But there's great starter packs for any of your listeners who are interested in protecting their digital assets today.

**CRAIG**

Okay. Okay, Riley, thanks very much.

**RILEY**

I appreciate it, Craig. This has been great. I look forward to continuing the conversation. Take care.