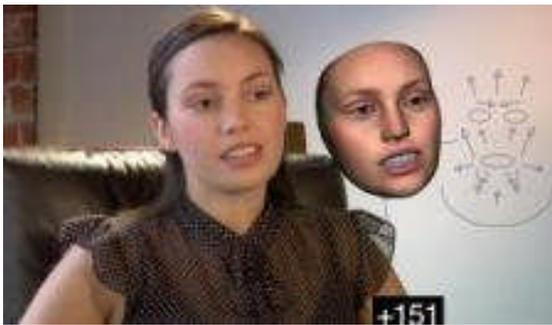


## Bringing Virtual Humans to Life

*In this article we look at the State of the Art of Human Animation in the worlds of Film and Video games. We then explore the implications of endowing truly life like Virtual Human Avatars with Artificial Intelligence. 'Project Emily' by **Image Metrics Inc**, provides a powerful introduction to the State of the Art of Human Facial Animation. It demonstrates amazing quality 3D Photorealistic Human Facial Animation in action.*



You can watch the above Video on our Evil Limited Internet Show Case at location:

[www.evilm.com/evilsolutions/virtualhumananimation.html](http://www.evilm.com/evilsolutions/virtualhumananimation.html)

With their ability to create Virtual Humans that cannot easily be distinguished from the real person Image Metrics has opened up some interesting possibilities in the worlds of film, video games and on-line worlds.

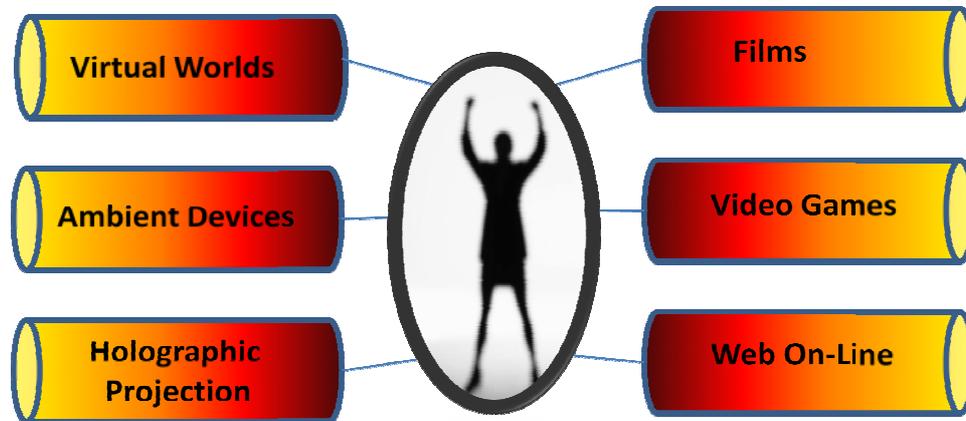
The Image Metrics character animation experience includes everything from photorealistic creatures and humans, to cartoon-style animals from worlds both real and imaginary. Translating actors' exact performances onto digital characters in games, film and television. Using no markers or makeup, Image Metrics captures facial performances using standard or high-definition video.

Its computer vision technology then analyzes that captured performance pixel-by-pixel, including subtle eye and mouth movements, and applies that information to a 3D model. They have provided facial animation for over 30 Video Games including Grand Theft Auto and feature films such as Harry Potter.

The picture on the next page helps put this in the wider context by illustrating the many environments, which can be populated by Virtual Humans.

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## Virtual Human Environments



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**Figure 1 – Virtual Human Environment.**

Image Metrics enables much more life-like Avatars to be introduced into these environments and also opens up some interesting opportunities

Once an Actors Digital Avatar is captured by the Image Metrics process it can be driven by other Actors even if the original actor has died. A film could for example still be completed using this technology even if the star has died half way through production.

Imagine the opportunities for celebrities to franchise their Digital Avatar to many different clients. The ability to use low cost third party actors to drive a Digital Avatar of a well known celebrity equates to a wider market for that celebrity. For example a well known news anchor might agree for his Virtual Human Avatar to appear on a number of channels that he or she would not otherwise have the time to prepare for in person.

If that same news anchor decides to retire and sell the rights to his Virtual Human Avatar to a Business Entity then you have the interesting possibility of replacing real Human presenters with a famous Virtual Human Avatar. Real people behind the scenes are still driving this Avatar, although there may be different people depending on the channel or even the country in which it is being broadcast.

Actors and Actresses who are now in their youth or in their prime could store their Virtual Human persona using this technology. In their later years they could then still play youthful roles simply by driving their stored youthful Virtual Human persona - forever young! We predict Image Metrics Inc may find this a very popular application.

The potential for on-line appearances as Celebrity Virtual Human Avatars extends beyond film to premium web sites, on-line Virtual Worlds and more.

Looking to the future and other environments, the potential for Holographic projections of Virtual Humans onto say a stage becomes a fascinating prospect. Already leading companies like Cisco have launched capabilities that can project holographic 3D images of real humans onto a stage with dramatic effect. We are referring here to Cisco's On-Stage Tele-Presence Experience this was created by integrating Musion 3D Holographic Projection Technology with Cisco Tele-presence. It won't be long then before we see Virtual Humans projected as 3D Holograms to stage performances.

Let us move on now and consider removing the human factor further by combining photo realistic Virtual Human Avatars with Artificial Intelligence to create **Electronic Virtual Intelligent Life!**

### **Combining Virtual Human Avatars with Artificial Intelligence**

There are already many Avatars on the web that present a basic Human appearance, indeed on the Evil Avatar page of this web site you can talk to our very own [Ms. LOUISE CYPHER](#) an Avatar powered by Artificial intelligence. However these Avatars are clearly not the photo realistic Virtual Humans produced by companies such as Image Metrics Inc.

Many of today's Avatars use cartoon like preprocessed Flash images which are controlled by artificial Intelligence engines such as AIML. These interpret questions and conversational input from Humans, typically using Text to Speech. When it answers the Humans questions, the Artificial Intelligence software typically uses a natural voice engine to reply while at the same time commanding the Avatar to move its lips in sync with the speech. Basic stuff, but pretty effective.

The ability to create a library of animated pre processed photo realistic Virtual Human facial images and expressions opens up the possibility of driving these images by Artificial Intelligence software. This will have a huge impact on the quality of the user experience when interacting with such Virtual Humans. For example such an Avatar could easily be programmed to express emotional states when required, simply by invoking the library clip for say laughter, or anger at appropriate points during the conversation.

Today's Artificial Intelligence Engines already have the ability to simulate emotional states. Take the case of Ms. Louise Cypher, if you tell her to 'shut up', she will sulk and not talk back to you constructively until you say sorry! A photo realistic Avatar could of course augment this with a corresponding set of sulk expressions invoked from the video clip library. This would make the Emotional State of the Avatar much more realistic and enable what we term Emotional Empathy.

The exciting aspect of this from the Business perspective includes the potential to improve Customer Relationship management and interaction on web sites by exploiting the 'Emotional Empathy' that can be generated by such Virtual Humans. The Avatar can use its emotional states and expressions to get a much more life- like and thus more powerful interaction / bond with the customer. The Avatar could augment its own conversation by deploying the appropriate Facial and body language e.g. to help placate an angry customer. Emotional Empathy could also clearly be exploited to great effect in e-learning applications.

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Leaving aside the fun money making opportunities, there are many applications here that could have a social benefit. Consider the potential for such Virtual Humans to act as companions for people that have learning difficulties or simply are on their own for prolonged periods.

Such cyber companionship services become much more effective when the Avatar has the Emotional Empathy capabilities that we have described.

The next few years will see in our view the realization of a number of these Virtual Human scenarios. The prospect of talking to an Emotionally Empathic 3D photo realistic Virtual Human driven by Artificial intelligence in a Virtual World or even projected Holographically into the real world is closer than you might think!

### **Image Metrics Inc.**

We would very much like to thank Image Metrics Inc for their permission for us to include the Emily Project Video in this Show Case Article. The Image Metrics web site is located at <http://www.image-metrics.com>

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