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Hi, my name is Codie Shannon and today I will be discussing Google's Deep Dream Artificial Intelligence Project and its impact on the AI Industry.

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What is Google's Deep Dream Project?

Who Were the key entities involved in the deep dream project?

Google's deep dream project is a computer vision program developed by Google Engineer Alexander Mordvintsev in May of 2015.

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https://www.youtube.com/watch?v=OnTgbN3uXvw&ab_channel=NVIDIA

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What is Google's Deep Dream Project?

How Does Google's Deep Dream Project Function?

The AI-based application is an algorithm in which computer systems may analyze patterns within pictures or photographs with the help of a convolutional neural network. We may draw a comparison between a child who looks at the clouds and profusely attempts to recreate them utilizing random shapes, a phenomenon known as pareidolia. Likewise, the Deep Dream project over exaggerates interpretation and magnifies the compositions whenever it encounters an image.

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What results can be expected from Google's Deep Dream Project?

Images generated utilizing Google's deep dream project may differ greatly depending on the layer utilized to make the modification from slight differences such as increased pattern density on lower layers to immense changes such as automobiles, bridges, towers, and fantasy creatures resembling dogs, cats, and other familiar creatures on higher layers.

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The Origins of Google's Deep Dream Project

The origins of Google's deep dream project are quite modest. A night, in May of 2015, Google engineer Alexander Mordvintsev made an amazing discovery when he had been having trouble sleeping. A moment past midnight, he awoke with a jerk. He was sure he had heard a noise in the Zurich apartment where he lived with his wife and first-born child.

In a worrisome haste, he ran out of the bedroom to check if there was an intruder coming in from the terrace. All was splendid, the terrace door was locked, and there was no intruder. However, as he was standing in his living room, suddenly he was hit with an idea, and saw what everyone else had missed.

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Up until that moment in 2015, artificial neural networks, developed to imitate the brain and recognize patterns had been our servants, executing the tasks developers created them to perform. Alexander's exceptional idea was to let them off the rein, giving them a little freedom and allowing them to dream a little. He let loose the AI's inner workings and tapped into the hidden layers. Who would have guessed that they would throw up wild images not a million miles away from Van Gogh's Starry Night.

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A summary of the deep learning algorithm

How was the deep learning algorithm utilized and structured?

Google's Deep Dream project utilizes a convolutional neural network to facilitate its functionality. The convolutional neural network operates by foremost obtaining an image from the user, before utilizing its initial layer of the hidden network to differentiate the low-level features such as edges. Ensuing this, the succeeding layer of the network will attempt to expose the top-level features of the picture such as automobiles, trees, faces, and creatures. Before concluding by executing the excess layers which will attempt to accumulate all these features and complete the interpretation so that the picture may be altered and returned to the user accordingly.

In convolutional neural networks, separate layers perform different tasks. However, in relation to the Deep Dream algorithm, we may take any distinct feature, be it high or low level, and inflate its activation so that it may have an elevated impact on the image.

For example, if the user utilized a distinguished layer to identify dog faces while the user has provided an image of outer space as the input image then, the deep dream algorithm will scrupulously convert the image and begin to develop dog faces on the dark abyss of space.

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What were the weaknesses of this approach?

Google's deep dream approach to convolutional neural networks may cause multiple problems such as overfitting, the need for a large dataset, and resource consumption.

Overfitting is an undesirable machine learning behavior that can occur when a machine learning model gives accurate predictions for training data but not for new data. This behavior may occur when a machine learning model cannot generalize to all types of data within its domain. In relation to the deep dream approach, this conduct may take place if the algorithm is trained for too long on a single sample set of data or the model complexity is too high, so it needs to learn the noise within the training data to give accurate results for training data.

In addition, the deep dream algorithm requires a massive dataset of images to be trained on. This means that the machine learning model is only as adequate as the dataset on which it has been trained on.

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In conjunction with these factors, the deep dream approach may cause resource consumption to be tremendous as generating high quality deep dream images requires a considerable amount of computational power. As a result, this may lead to limited practical usage on low-end devices.

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Ethical issues

What is the biggest ethical issue plaguing the Deepdream project?

The primary ethical issue surrounding the deep dream algorithm is whether it has ownership over what it produces and how the copyright should be handled.

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What can be done about it?

The deep dream algorithm was created by Google Engineer Alexander Mordvintsev, as such I will be discussing the copyright law pertaining to the US.

As it stands, artificial intelligence in the United States may not be designated copyright for a product which it has created. The present policy of the United State's copyright office is to throw away claims made for artistic works not authored by humans, however, unfortunately the policy is poorly codified. In the words of Annemarie Bridy, affiliate scholar at Standford University's Center for Internet and Society, and professor of law at the University of Idaho, there is no requirement for human authorship in the US Copyright Act. Nonetheless, courts have always made the assumption that authorship is a human phenomenon.

Eran Kahana, an intellectual-property lawyer at Maslon LLP and student at Stanford Law School, does not believe we should award authorship to AIs. The reason IP laws exist is to prevent others from using it and enabling the owner to generate a benefit. An AI does not hold these same needs.

Google's Deepdream AI also raises some worrisome issues by potentially infringing on the IP rights of the base image's artist / photographer. If the input (the base image) on which a creation is based, is made by someone else, shouldn't the base image's owner have ownership over whatever the AI has developed? Unfortunately, I do not have the answer to this question, however, I will leave it up to you to decide whether they should or shouldn't.

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The Algorithms Future

What are some practical applications this algorithm could lead to?

Instead of psychedelic drawings in the same vein as Van Gogh's starry night, the deep dream project may lead or has led to machine learning algorithms such as:

Image segmentation – locating objects and boundaries within an image.

Greyscale to Colour – converting greyscale images into colour.

Forgery Detection – detecting falsified characteristics of a famous artist's piece of art.

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Accessibility

What are some methods to access the Deepdream algorithm?

Unfortunately, no API exists for the deep dream algorithm. However, the algorithm can be recreated in TensorFlow, Python, and PyTorch to name a few. However, if an individual would like to examine the way in which the algorithm operates, there are numerous websites available to perform this such as deepdreamgenerator.com and deepai.com.