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Opinion

Facets of AGI: Where Science Meets Spirituality

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This opinion piece offers an insight on the origins of the debates around the question of whether and when we can reach artificial general intelligence in machine learning, and how science meets with spirituality when addressing this matter. It also offers an introduction to Obvious' new series of African masks: Facets of AGI.

Artificial general intelligence (AGI). The notion of an artificial intelligence that would reach, or even exceed, human intelligence triggers an everlasting conflict among researchers. Many claim we will reach it, and some even claim we'll reach it soon enough. Some offer a different viewpoint, saying it won't exist as we all picture it (a human-like intelligence) or that it won't exist at all. This polemic subject has started countless debates about the nature of intelligence as well as our ability to describe and understand it.

The core of those debates remains the same: will we reach AGI, and if so, when? It turns out that nobody can answer this question. Nevertheless, everyone seems entitled to her or his own opinion on the subject, and most firmly believe they are right. Some took the bad habit of trying to persuade, as opposed to convince, society into adhering to their beliefs.

We couldn't help but notice the similarities between these beliefs in the artificial intelligence field and a cult. A group of people believing in an ideal that is a higher power, trying to prove its existence, and turning out to be the main reason this ideal actually exists and endures. While this idea might not be the most popular among scientists, the tight relationship of this sector with evangelists from the business world leads this opinion to be the most popular. Another group of people claims this to be nonsense and that we should focus on today's matters with the specialized AI algorithms that we already have, which we already have trouble manipulating in an ethical way. Another group chose to ignore the debate and to focus on making science move forward, and research about AGI for the sole purpose of deepening their understanding of intelligence, and regardless of whether or not it is a good thing for society. A lot of people also find themselves in the middle of this conflict, witnessing heated exchanges on the existence of AGI and trying to form an opinion. To us, artificial intelligence has become a field where science meets with spirituality after these two notions spent so many years being kept apart.

We believe the best way to understand the origins and implications of this debate is to explain what machine learning is and its relationship with the notion of intelligence.

Intelligence is a very complex notion to grasp. We tend to associate it to the human brain and to define it using terms such as knowledge, understanding, learning, adaptation. Nevertheless, we

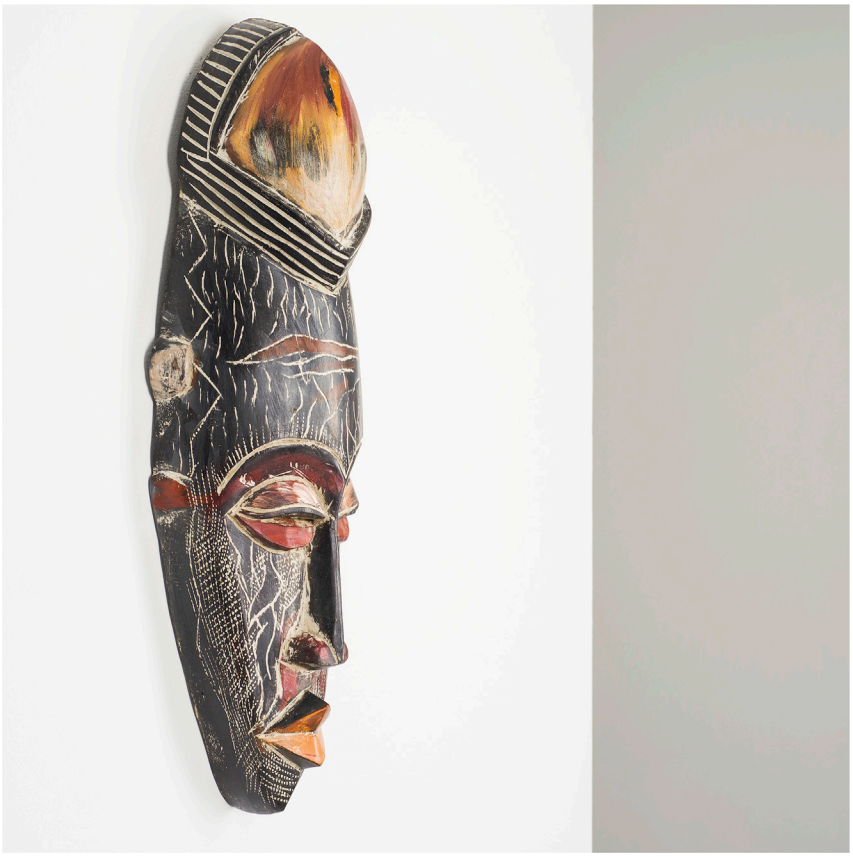

Figure 1. Uchambuzi, the Mask of Analysis, Obvious, GANs algorithms, ofoton & osese wood, 2020

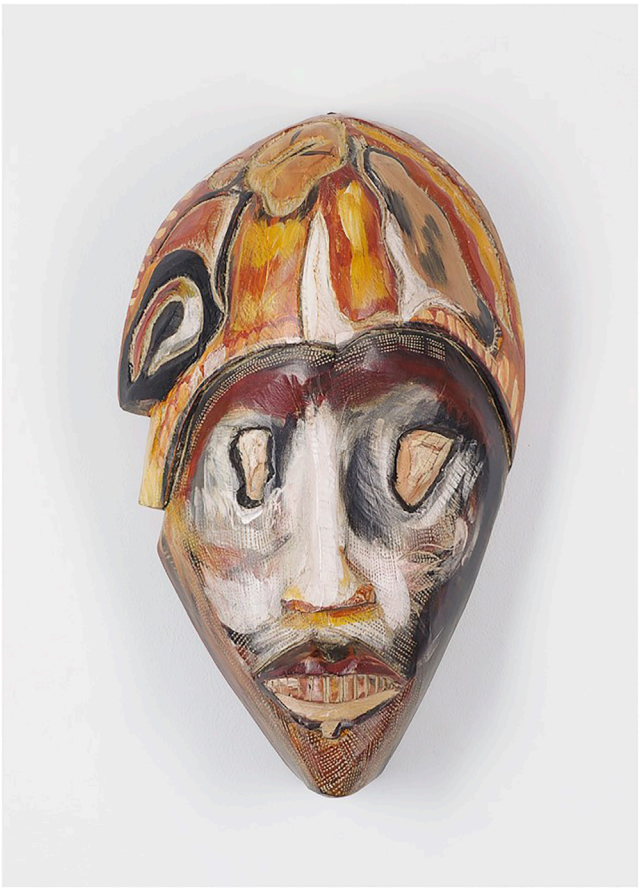

Figure 2. Ubunifu, the Mask of Creativity, Obvious, GANs algorithms, ofoton & osese wood, 2020

can't manage to find a single definition that would be agreed upon by everyone. Each brain is different, and we have a very limited knowledge of the functioning of this particular part of our body. Thanks to advances in science, we are able to connect part of the brain to certain states and emotions and to predict the physical reactions to a situation. This is leading us to have a glimpse of understanding over the mechanisms that take place in our brain. This limited understanding already allows us to find applications, such as controlling hardware using signals originated from our brain, allowing the development of a human-machine interface. Nevertheless, we are very far from understanding it completely, and fields such as dreams, creativity, and intelligence remain vastly open to interpretation. The complexity and uniqueness of our cognitive organ is restraining us from being able to fully understand the reasoning process of an individual. Many incentives are exploring toward learning how our brain works. One of them, which forces oneself to try to understand its mechanisms by replicating it with algorithms, is artificial intelligence.

An algorithm is a set of instructions that aims at completing a simple task. We often mention the bias in algorithms and the way their functioning is the reflection of the way of thinking of its creators. Perhaps the greatest bias of all is the one resulting from the fact that all algorithms are created by humans. In that sense, algorithms try to replicate human behaviors. Whether it is conscious or not, by observing and studying human behavior, we are able to identify some features. We then try to instill those features into the formulas we write, in order to lead those algorithms to complete a goal. This approach can be seen as quite limiting, taking into consideration we are trying to replicate an intelligence we don't know about and that might not be optimal. Currently, and due to the level of advancement of research, many algorithms are trying to replicate the behavior of an infant child. Indeed, the best we can do is try to replicate the best example of a given intellectual capacity available we can hope to match. But what if there was a higher form of intelligence? One of the ways we found around this issue is machine learning: the art of making algorithms learn by themselves. Nevertheless, this approach is still limited as the algorithms learn in a frame that has been designed by us humans. Nevertheless, it constitutes the quickest path we have identified toward mimicking intelligence in an artificial manner. This being considered, we can move forward with the idea that the machine learning research field and the way we design algorithms in general forces us to identify and understand the mechanisms at stake in our own brains through practical application.

Due to large investments for its foreseen applicability in promising businesses, research in machine learning is progressing at a very fast pace. Similar to our brain and intelligence, the sector is composed of multiple fields, and each one of them is complementary with the others. As an example, major discoveries in image recognition have allowed the development of image-to-text applications, as well as image generation, and led generative adversarial networks to earn the major place they occupy in the field now. We can imagine that a major discovery in the translation from text to image could lead to yet another revolution in the generation field, and researchers are currently exploring this path. As intelligence is composed of different skills that interlink diverse sensory information (sound, vision, language), we aim at building algorithms capable of learning using multi-modal inputs and outputs. Increasing the number of algorithms that are able to interlink these fields can be compared to increasing the number of connections we construct in this global artificial brain we are trying to build, which would display new features, allowing it for example to conceptualize a notion, by defining it using more than just a set of examples.

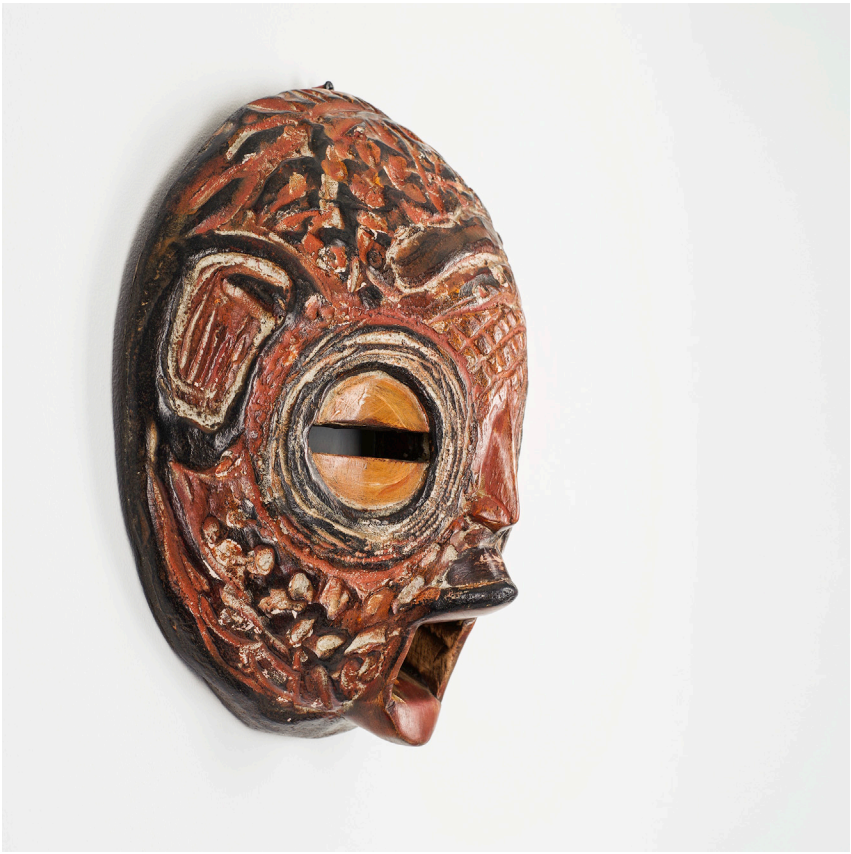

Figure 3. Habari, the Mask of Information, Obvious, GANs algorithms, ofoton & osese wood, 2020

We decided to break down these fields into five ideals, for which active research is being done. The following description isn't a scientific study; it corresponds only to our artistic vision. Our approach describes that each of the following characteristics corresponds to a major component of the human intelligence we are trying to reach using machine learning. These ideals are Logic, Creativity, Interaction, Knowledge, and Existence. We are fairly advanced in the field of logic, with algorithms able to make decisions based on simple analysis and deduction. We are struggling to replicate creativity, although the recent development of generative adversarial networks and text generation are acknowledged to be able to replicate inventiveness. Interacting algorithms such as the ones powering chatbots are not yet on point and have their limits. The knowledge part is much more advanced with all the data made available on the internet, even though these data can be misleading for an algorithm that can't yet experience common sense. Finally, we are very far from being able to replicate existence, a notion we see as the ability to interact with an environment, as the interfaces between robots and AI are still at an early stage of development. Our postulate is that the combination of these facets of human intelligence we are trying to replicate correspond to AGI. We distillated these large notions into thinner components, which are more linkable to current research incentives.

As you are probably thinking by now, these notions don't englobe all the underlying traits of intelligence. This is due to the complexity of the notion, and our limited understanding of it. More than an exhaustive definition, this scheme offers a new approach as to what intelligence is composed of, or at least how we believe we can build it in the artificial intelligence field.

As artists using artificial intelligence to create art, we are at the crossroads between the research world and society. We decided to crystallize all these observations into a series of 22 African masks, which we generated using artificial intelligence. We then collaborated with a Ghanaian artisan to give them a physical form, while respecting the traditional craftsmanship used for making the pieces (Figures 1–3). Five major pieces represent the five categories of intelligence we are working on replicating, and the other masks correspond to one of the beliefs about intelligence we identified, which is linked to one of those categories. The entire collection is a representation of an African secret society, with its share of history, spirituality, secrecy, rituals, and beliefs. Using this metaphor, we hope to give a new perspective on the subject of artificial intelligence as a whole and to bring people to deepen their interest into what can currently be done, what researchers are truly working on, and how common belief influences the direction science itself moves toward.

About the Organization

Obvious wishes to explore, use, and share the different ways machine learning algorithms can empower our natural creativity. By staying up to date with the latest research and finding artistic applications to the tools being discovered, we bring knowledge and future perspective to the world, by reducing the gap between research and applications. We also wish to demonstrate once again the complementarity between science and art. Technology has always been at the service of human ambitions as the best tool to push our limits. This is why Obvious focuses on accompanying the emergence of benevolent and harmless ideas, by promoting alternative uses for technology and unveiling its true creative potential.