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# *Lamuse*: Leveraging Artificial Intelligence for Sparking Inspiration

Bart Lamiroy<sup>1</sup>[0000–0003–0871–0149] and Emmanuelle Potier<sup>2</sup>

<sup>1</sup> Université de Reims Champagne Ardenne, CReSTIC EA 3804, 51100 Reims, France  
Bart.Lamiroy@univ-reims.fr

<sup>2</sup> <https://www.emmanuellepotier.com>    [emmanuelle.potier@gmail.com](mailto:emmanuelle.potier@gmail.com)

**Abstract.** *Lamuse* is a joint project between artists and Machine Learning academic scholars. It aims at building pictorial compositions in order to provide sources of inspiration and assist painters in their process of creation. It relies on Artificial Intelligence, mainly based on various artificial neural networks, used for object recognition and style transfer. This article presents how, with minimal effort and without requiring extensive computational power *Lamuse* can take into account the visual universe of a painter, their artistic references, personal inspiration sources and preferred visual code books to create suggestions of painting subjects the human artist can then use as a source of inspiration for actual creation. Code developed in this project is Open Source and a free-to-use demonstration website is publicly accessible.

## 1 Introduction

This work describes joint research on how Artificial Intelligence can be leveraged to spark inspiration for artists, and more particularly painters.

It finds its roots in a quest by one of the authors to find means to help her decide what to paint. The question of what to paint is both something one wants to avoid but, on the other side, is compelled to embrace. As an artist, E. POTIER has, throughout various creations, applied protocols and concepts to let random hazard enter the creation process and let the question of what to paint become of secondary concern or even disappear completely. One example is "*1001 crashes aériens*"<sup>3</sup> where the sheer quantity of produced canvases essentially transforms the artist into a painting machine and imposes a mechanical repetition of their gestures; another one is "*365 jours*"[12] consisting of a series of 365 paintings made from the first news item heard when turning on the radio in the morning and tuning in on *France Info*. In order to pursue in this direction of reasoning and reflecting on the concept of liberty in choosing a topic in the general creative process, the idea arose to conceive software that would impose (or merely suggest) upon the painter the subjects for their painting.

The rest of this paper is structured as follows: Section 2 describes the global creative process in which this work is engaged; Section 3 outlines the Artificial

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<sup>3</sup> Solo show exhibition, "*Jours de lune*" gallery, Metz, France, 2014  
<https://www.emmanuellepotier.com/expo-jours-de-lune>

Intelligence tools that have been implemented to instantiate the process; Section 4 provides the outcomes of the end-to-end process and opens discussions with practitioners on the use of the program.

## 2 The Creative Process

### 2.1 Context

Humans build and organize their life according to rituals, beliefs, habits. But sometimes, the daily course of life is disrupted. Events happen and surprises occur. Would this mean everything is not in our power? What we are, our decisions, our actions, does not allow us to avoid what impossible to predict or to infer through rational reasoning and available knowledge. What a dramatic misfortune for those who want to master everything! More and more... the human being and the world are failing, but couldn't this actually a good thing? An accident, indeed, can be seen as an injury, a threat, or, on the contrary, as a breath of fresh air among the strain of defined determinism; a game-changing and thought-provoking glitch.

E. POTIER considers her painting isn't answer any questions, nor is it looking for a culprit. It is simply a space where chance has its place, opens a breach. The idea is to let the painting become a vessel to let the unknown speak out and requires us to figure out how to listen. She therefore often paints subjects that those things that impose themselves upon us without our being able to do anything about it.

We live in the age of immediate planetary communication. Thanks to the Internet, it is now possible to instantly transmit and receive images, sounds, texts, thus abolishing physical distances. At the beginning of the 20<sup>th</sup> century, P. BONNARD wrote: "*I have all my subjects at hand. I will see them, take notes and then I go home. And before painting, I reflect, I dream.*" In 2006, about the canvases made from television images, E. POTIER wrote: "*My subjects? I no longer need to go see them, they are here, at home. They are no longer subjects of my choosing, they are subjects that I undergo.*" Speed has become a global performance criterion. Those who are unable to live a hundred miles an hour are considered having somehow lost the battle of life. In all areas, the winners are those who are the fastest in achieving results. There is, in the way we receive the world, a principle of sterile reproduction of images, without distanciation. We receive a type of highly codified, endlessly repeated images that appear before us like hallucinations. Worse, through these images it is possible to influence the opinion of a population simply by the nature of what is presented to them, regardless of the content. P. VIRILIO, in his interview dated 2009, entitled "*Penser la vitesse*" affirmed that "*our societies are not so much societies of opinion, as societies of emotions. We feel the same emotion all over the world because there was a tsunami in certain islands or because there was the collapse of the World Trade Center, it is a considerable power, it is a power of speed and indeed if time is money, speed is power*" [11].

The main stance of the work presented in this paper therefore is to reflect on the process of generating emotions from unexpected or unsolicited images and how undergoing them can still spark inspiration and creation. The tool developed for this experimental research is an AI powered program that freely interprets what it considers to be representative for a particular artist and can produce a range of new, unexpected, yet sense-making visual representations of what it "feels" appropriate to their interest. By doing so, the AI both becomes a distorting mirror of reality but equally a filter between the brutality of the relentless flow of images providing a refuge to the artist to reflect on.

## 2.2 General Assumptions and Process

The AI induced previously mentioned process is based on the following general assumptions and actions in the course of creating art:

- Iconic artwork (paintings in our case) inherently respects and follows a series of rules defining what makes it relevant to the painter<sup>4</sup>.
- The painter gathers samples of artwork that they consider of particular interest at a given point in time. The painter is also influenced by other images that are of particular value to them, unrelated to the artwork.
- The AI will try and figure out the aesthetic rules characterizing the artwork and apply them to or combine them with collected images of interest in order to combine and create unexpected and supposedly surprising chimera paintings.
- The AI created chimera image, if correctly done, should invoke a reaction to the painter given that it combines compositional, graphic or other rules gathered from the iconic painting collection as well as subjective visual cues retrieved from the unrelated images.
- The artist then freely interprets the chimera image as an inspiration for further painting.

In what follows we will be developing a first proof of concept leading to the creation of an AI that would support the artist in above process. Although the description in this paper focuses on a specific algorithmic instance, it should be clear to the reader that the whole artist – AI interaction is to be considered as a continuous process, constantly evolving and adapting and that the model presented in this paper is a first, modest, stage in this evolution.

Also, the stance of this work is that the eventual artwork is produced by the human artist, inspired by the relevant input from the AI. While the issue may be open to debate, we are considering that our AI is not creating art in any way but is merely a muse to the artist, a tool.

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<sup>4</sup> We are definitely not making the statement there is such a thing as "good" art or that there are explicit rules that would actually define it. However, we are making the assumption that, when a painter is considering starting a new project, there may be a class of existing inspirational paintings sharing a number of inherent properties (composition, color, texture ...) that confer them a particular subjective interest at that point in time and for that specific artist.



**Fig. 1.** Initial inception. Left: iconic painting – *Les hasards heureux de l'escarpolette* by Jean-Honoré Fragonard (1732 - 1806); Right: chimera image

### 2.3 Data Requirements

In what follows we will be relying on the following concepts, all of which are freely defined by the artist, and may evolve or change in function of the creative project or goals they may be pursuing. They can be a voluntary human input, duly curated and selected as to fit specific requirements, or, on the other hand, being randomly generated by the AI.

*Artwork* comprises a collection of iconic reference paintings serving as compositional and syntactic basis of the final chimera image.

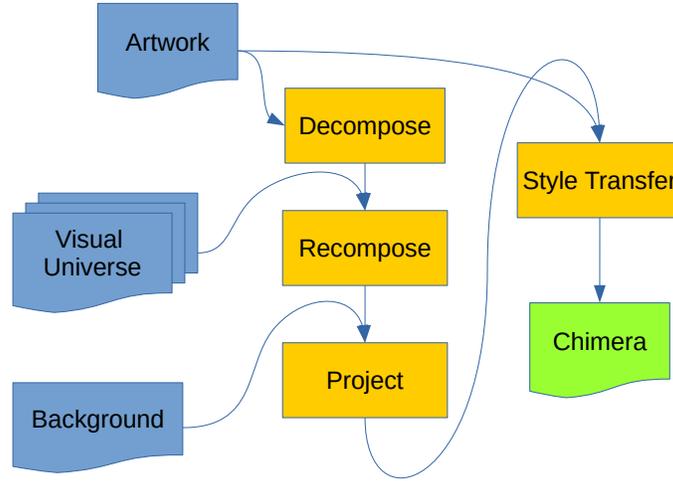
*Visual Universe* of the painter comprises a collection of visual item snippets, that will be used as collage-like clippings in the final chimera image (*e.g.* the dog in Fig. 1).

*Inspirational Backgrounds* comprises any global visual support that may serve as general background of the chimera image.

The use of these collections by the AI to form a chimera painting are represented in Fig. 2. The actual implementation is described in the next section.

## 3 The Artificial Intelligence

As mentioned earlier, the global interaction process between the artist and the AI is to be considered in constant evolution and adjustment. Furthermore, the tool should not be seen as forcing a way of thinking or working upon the painter, but rather be considered as something to interact with, to challenge or to possibly deflect from its initially intended use. This section describes the current status of our AI. As a proof of concept it was developed essentially with off-the-shelf components and functions in four phases, as depicted in yellow in Fig. 3: a decomposition phase, consisting of extracting compositional elements from a given work of art; a recomposition phase, replacing the extracted elements with



**Fig. 2.** General chimera creation flow followed by the AI: an artwork is decomposed and reconstructed using the artists visual universe; re-projected onto a selected background and rendered in the original artwork’s style.

counterparts from the visual universe; a reprojection of the recomposed elements onto an inspirational background and, finally, a style transfer from the original artwork onto the reprojected image.

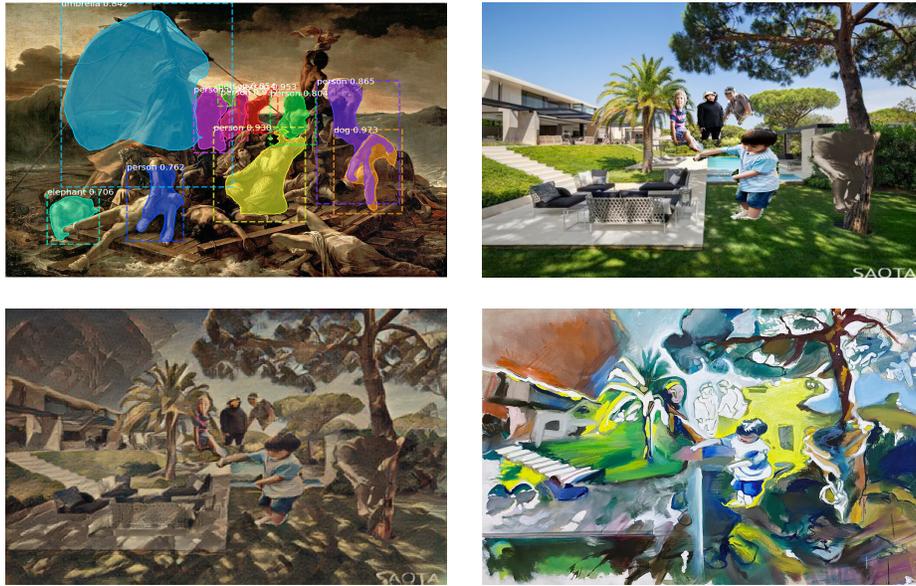
### 3.1 Artwork Decomposition

The decomposition phase consists in trying to find significant items in the scene and label them (*cf.* first image in Fig. 3). This result is obtained using a semantic segmentation neural network. Semantic segmentation is the process in which an algorithm labels pixels in an image as belonging to one or more predefined classes of things, thus, by grouping the pixels effectively identifying whole objects in scenes.

It is not within the scope of this paper to develop a particular way of detecting objects in paintings, nor is there any specific need in evaluating the wide range of possible approaches of achieving semantic segmentation. Interested readers can refer to [3, 10, 1] for an overview. As a matter of fact, there is a real interest in specifically not selecting top-ranked state-of-the-art AI as will be made clear below.

One of the interesting parts of this approach, resulting from the use of off-the-shelf neural networks is that they have essentially been conceived and trained on pictures of real world scenes, and not that much on paintings. As such they produce the following useful side effects :

1. They have a fixed, sometimes limited range of categories they can recognize. Very often they produce uncertain guesses to the actual presence of specific objects or provide a confidence measure in what they have identified. The painter can therefore interact with the AI to have it adjust its level of confidence when detecting objects.
2. Since they have not been specifically trained on paintings, their detection capacity is altered and can result in the perception of hallucinatory objects that are not quite in the picture.



**Fig. 3.** Illustration of the AI at work. From left to right, top to bottom: decomposition of original artwork – *Le radeau de la méduse*, oil on canvas, 490 cm × 716 cm, 1818–1819 / Théodore Géricault, Louvre museum –, recomposition with visual universe and projection upon background, style transfer, actual artist’s rendering – *Mes verts*, oil on canvas, 80 × 120 cm , 2020 / Emmanuelle Potier, courtesy of the artist

While these effects are considered limitations or failures in the production engineering environments for which they were originally conceived they are of creative impact in our case. We have used the Mask R-CNN network [5] trained on the MS-COCO data set [9], the code and network parameters of which are freely available<sup>5</sup>. As can be seen in Fig. 3 the detected objects are surprising: an elephant is detected in the lower left part, and what originally is a sail is mistakenly taken for an umbrella, *etc.* Notwithstanding these misinterpretations,

<sup>5</sup> [https://github.com/matterport/Mask\\_RCNN](https://github.com/matterport/Mask_RCNN)

all detected objects fit within the main relative positions that define the general composition of the painting.

These uncontrolled (and uncontrollable) effects of imperfection can be seen as the AI-counterpart of human observers interpreting an artwork with a classical *lector in fabula* effect [2, 7]: seeing things and exploring references in a work that were not of the intention of the artist.



**Fig. 4.** Illustration of the AI to painter process From left to right, top to bottom: original artwork – *The Birth of Venus*, tempera on canvas, 172.5 cm × 278.9 cm, 1484–1486 / Sandro Botticelli – decomposition of the painting; recomposition with visual universe and projection upon background; style transfer; actual artist's rendering – *Il est des questions d'âmes damnées qui resteront éternellement sans réponse*, oil on canvas, 32 cm × 46 cm, 2020 / Emmanuelle Potier, courtesy of the artist

### 3.2 Recomposing with a Visual Universe and Projection

The next phase consists of taking elements from the painters own visual universe and project them in a new environment that mimics the structure and composition of the initial painting.

From an AI point of view this is actually a very similar process to the one of decomposition, only that it is done on a series of images coming from (and provided by) the artist's personal collection of visual inspirational sources (pictures, paintings, drawings ...). By using the same semantic segmentation approach as described before, we construct a collection of AI-identified snippets from the artist's visual universe, each of which being classified into one of the categories known to the AI (*cf.* [9] for the examples presented in this paper). The following algorithm is then applied :

- locate and identify objects in the given initial artwork (Section 3.1); the size, relative position and type of objects are considered representative of the general figurative composition of the work;
- from the visual universe, retrieve objects of the same category, and having a similar shape; shape similarity is determined by comparing Hu moments [6] form the contours of the objects identified in the initial artwork and those retrieved from the visual universe;
- select an inspirational background image from the artist's visual universe;
- project the retrieved objects onto the background image, reproducing their relative positions and size from the original artwork.

The result of this phase can be observed in the second image of Fig. 3 or in Fig. 4-6. This is essentially comes down to "borrowing" the compositional form of the provided painting by identifying objects, their size and their position, and then recomposing a similar compositional form in a totally unrelated setting. The obtained image is rarely engaging and is usually missing chromatic coherence because of its rough collage-like characteristics on the one hand, and the fairly brutal superposition of contextually unrelated objects on the other hand.

### 3.3 Style Transfer

In order to achieve a final representation that is chromatically more coherent and better relates to the initially provided artwork, we apply another neural network consisting in operating a style transfer from the original work to the previously collage-like image [4]. Here again, we are using a publicly available off-the-shelf AI solution, and, as in the previous sections, the result is beyond control of the artist, highly dependable of minor variations in both the original artwork and the collage image. As a consequence, the final rendered image will contain unexpected quirks and curiosities. One of the more significant parameters is for instance the relative digital image resolutions of the original artwork and the inspirational background: identical images at different resolutions may produce quite different (yet coherent) results.

## 4 Results Analysis and Discussion

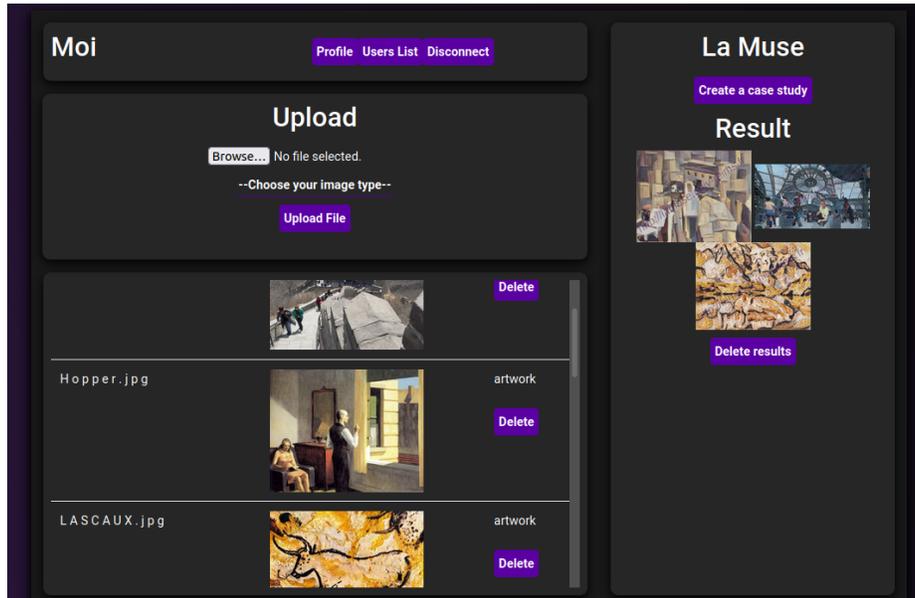


Fig. 5. Illustration of operational website

A few results are presented in Fig. 4-6 showing the full process from an iconic painting over the various stages by our AI to the final actual human produced painting. An experimental website is accessible for testing at <https://lamuse.univ-reims.fr>.

This section provides a summarized overview of the opinions, feelings or first experiments of several artists with respect to *Lamuse*. Some of them have tried to use the tool, others have not yet, but reflect on how its existence and usage could, or could not interact with their personal practice.

### 4.1 E. Potier

E. POTIER is a painter established in Metz, France<sup>6</sup>. She has been using *Lamuse* in her artistic work since the first preliminary images created by the program in 2018. She was at the inception of the initial idea, and it has been a source of great inspiration for her since.

For many years, as an artist, she has been using protocols in her work, allowing her to paint without interference of a rational thinking process, but only needing to focus on the act of painting itself. In addition, she tends to work

<sup>6</sup> <https://www.emmanuellepotier.com>



**Fig. 6.** Illustration of the AI to painter process. From left to right, top to bottom: original artwork – *Pope St Clement Adoring the Trinity*, oil on canvas, 488 cm × 256 cm, 1737–1738 / Giovanni Battista Tiepolo, Alte Pinakothek, Munich – decomposition of the painting; recomposition with visual universe and projection upon background; style transfer; actual artist’s rendering – *Manège complexe et vivant d’une journée universelle*, oil on canvas, 143 cm × 111 cm, 2020 / Emmanuelle Potier, courtesy of the artist

in series. Since 2019, her paintings have been inspired by results from *Lamuse* and the program, which is the acme of her protocols, has become an invaluable source of thought food for a new approach to pictorial practice. One of the current directions being explored are the generation of series, based on the one well identified and chosen work from the History of Painting for which *Lamuse* can generate an infinity of variations. The artist is currently using the process for making a series based on “*The Birth of Venus*” by Botticelli (Fig. 4).

*Lamuse* offers images, which are in turn interpreted by the painter and cut out on canvas. From there on, the artist chooses certain areas that will remain. Others are erased to emphasize those selected. The images are cropped or taken as they are, depending on the inspiration provoked by the pictorial suggestions of the program. The final part of the creative process consists of choosing a title for the work. It provides the link with the profound subjective and personal dimension the artist perceived through the impulse of the program.

The process becomes a dialogue between the AI and the inner feelings of the painter, not unlike the introspective exchanges with a psychologist. Given that they are mysterious, almost abstract, deformed and complex, the images proposed by *Lamuse* unveil passions, instincts, unknown desires of the artist that are projected back to her full awareness once exposed on the canvas through the uncontrolled and unconscious process sparked by the AI’s suggestions. This progressive revelation during the execution of the painting, once it has come to an end, depending on the artist’s decision, takes the opposite view of the concept. Indeed, the concept of developing an AI is, in this approach, a means of transmitting a different message than what can be inferred from the general usage of the tool. As if the AI is trying to impose their view upon the painter, and the painter resisting this tentative of control. It hints at the limited “intelligence” of the AI and its inability to have access to the inner subjectivity of the artist which remains the real source of creativity.

The actual “meaning” behind the painting can therefore only become clear at the very end of the process, after the painting has been finished. This is what appeals to E. POTIER because surprise and discovery are constantly present throughout the creative process. The artist does therefore not seek to paint any idea. The idea does not exist beforehand, but it is built during the execution of the work to eventually be revealed and start its proper existence *a posteriori* at the end of the road.

## 4.2 Rarès-Victor

Not all painters need to adhere to the process described in the previous section. RARÈS-VICTOR is an artist established in Nancy, France<sup>7</sup> who was interviewed before using *Lamuse*. The painter works by letting himself be guided by the material, and like many artists, has his own rituals. A program like *Lamuse* could be, according to him, a crutch when confronted to recurrent painters’ block, or a source of inspiration when working on a specific order. He insists on

<sup>7</sup> <http://raresvictor.com>

the need to maintain the condition that artists remain attached to working for the common interest and therefore can choose when and how long the program is to be used. He fears there is a risk of the AI destroying his ability to reflect, to think and to imagine the impossible: everything that is at the basis of artistic creation.

RARÈS-VICTOR also considers such a program as the continuity of another artist's project. A heritage. If the tool can provide strong ideas for research or suggest solutions, and if these seem better than the ones the artist would conceive, he could follow them. His own ideas may sometimes coincide with *Lamuse's*, have common roots. The main challenge therefore is to find a common internal logic to creation, creativity in which the AI would find its place.

In any case, the painter wishes to remain in control and will allow himself to follow *Lamuse's* proposals without thinking about them beforehand.

### 4.3 N. Varoqui

N. VAROQUI is a painter in Lahaymeix, France<sup>8</sup>. His creative process usually starts with a title, found at random (through a word, an expression, song lyrics, or piece of text) and which calls for a painting. Then the subject follows. More rarely, he discovers a patch of nature that becomes a compelling and inevitable contribution to an already identified title. He names every painting that will be executed from the start on, so that subject and title are in agreement at the time of making.

The artist most often confronts his natural surroundings, the landscape. Painting is an immersive process within this environment. Working in a studio and needing to process images displayed on a computer screen requires a significant amount of concentration from the artist, as he needs to recreate the original atmosphere to remember the physical sensations he has experienced. Images are something he quickly detaches himself from and are more of a support for his memory and recollections. His multiple times spent in the forest, both during day and night times, have created for him routine habits and an experience in his creative process.

By using *Lamuse*, he thinks he would first feel depersonalized, dispossessed, then bewildered, until finally finding his bearings. The fun would come next, maybe, probably in expressing another form of freedom. The changes in his practice through *Lamuse*, would come over the long term, with several canvases produced in this way, and sufficient time to really let go... to figure out how to approach and tame the tool and select the parts that fit his needs.

This process would probably shake up the writing, introducing more hesitation or lean towards more emancipation in the execution of the paintings. The artist wonders if he will have to adapt by changing his tools, rethinking the choice of his pigments, his formats. For the composition, being a self-described monomaniac, he will certainly have to sidestep, succeed in detaching himself

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<sup>8</sup> <https://www.noelvaroqui.fr/>

from his affect to concentrate on the form rather than on the substance. He thinks that coherence will no longer belong to him.

Nevertheless, the artist is eager to test the program, to be surprised and to try and accept the astonishment of the elements chosen by the AI.

#### 4.4 O. Masmonteil

O. MASMONTEIL is a painter in Paris, France<sup>9</sup>. His desire to paint results from a theme, a motif, or just the pure urge to paint. He collects the subjects he would like to treat: landscapes, nudes, images that have marked him by their shape or their color. In the event that the desire to paint is present without a subject, the artist makes a copy of a painting from the History of Painting, so as not to remain inactive and prolong the time spent painting. Sometimes he may throw paint on the canvas, as if to soil it and cause stains. In his studio, he also has a multitude of unfinished canvases from previous series that he can eventually take up again.

A program like *Lamuse*, which would give him subjects, very much appeals to him because it would come and provoke his desire to paint. Indeed, collaboration is important in the production of the artist, in that he likes to solicit collaborators or even simple visitors on the feelings of his work. Often his best paintings do not come from an idea that he has personally had, but from a rebound on an idea that was slipped to him. *Lamuse* could therefore be this non-human entity that would “slips ideas” to him, which is always creatively interesting. The challenge is then to surpass oneself in painting, whatever the starting point. Practice is king!

## 5 Conclusion

We have developed and experimented a tool for creating inspirational pseudo-paintings based on the visual universe of a painter, highly adaptable to a broad range of uses and configurations. The integration of artificial neural networks in the process of creation generates various uncontrolled effects that very likely will spark inspiration and creative questioning

The current version of the framework is freely accessible for experimenting at <https://lamuse.univ-reims.fr> and code is open source on GitHub (LGPL3)<sup>10</sup>.

The tool is under active development, and further work will consist in extending its scope by introducing other AI resources, like automated caption generation [8] and art critique descriptions like, for instance those created by I. KIM<sup>11</sup>, based on the data provided by the artist’s universe and the generated images.

We have started collecting reactions and comments from artists on their perception of getting inspiration from AI before and after using *Lamuse*. Some

<sup>9</sup> [https://fr.wikipedia.org/wiki/Olivier\\_Masmonteil](https://fr.wikipedia.org/wiki/Olivier_Masmonteil)

<sup>10</sup> <https://github.com/lamiroy/LaMuse>

<sup>11</sup> <http://isabel.kim/infiniteartwork/>

of their returns have been integrated in this paper, but further work will consist of a broader study and collection of practices and comments and will need to be fully compiled and summarized.

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