文章的主要内容：主要将英国伦敦的两个机构利用机器学习算法，结合当地特拉法加广场的狮子，设计了一个橘红色的狮子，人们可以“喂”狮子单词，然后经过6个小时，狮子就会吐出一句诗，他们还将线下和线上联系起来，一方面与人互动，传播了当地的传统，另一方面也将科技用在了现实生活中，简直棒棒哒~

文章最后还提了5个建议，给学习和使用交互式技术的人们，其中第二条专注，我认为不仅可以用在使用交互技术上，还可以用在科研、工作等领域：一旦找到自己有把握的技术，就一直去钻研，力求做精，这样才会将一个技术用得炉火纯青。当然在写程序过程中，最后一条也特别特别重要，需要结合程序的使用场景不断利用测试用例进行鲁棒性测试，这样可以改进程序和增加用户体验。

以下是原文：↓

《“请喂狮子”——使用交互式人工智能将伦敦地标的历史带入生活》

How do you connect audiences everywhere with a chance to take part in a collective design installation artwork in Trafalgar Square? In this case study, Es Devlin, the London Design Festival and Google Arts and Culture explain how they used interactive technology to bring a piece of the festival experience to audiences beyond the city’s borders, with help from The Space.

如何将观众与各地的观众联系起来，并有机会参加特拉法加广场的集体设计装置艺术品？ 在本案例研究中，Es Devlin，伦敦设计节和谷歌艺术与文化解释了他们如何利用互动技术在The Space的帮助下为城市边界以外的观众带来一部分节日体验。

Es Devlin is widely recognised to be one of the most visionary and artistically ambitious figures bridging the fields of music, art, theatre and technology today. She is known for creating large-scale performative sculptures and environments that fuse technology and poetry and, in September 2017, Es was walking through Trafalgar Square with Sir John Sorrell, Chairman of the London Design Festival(LDF). They were discussing the history of the square and its long association with major public moments from celebrations to protests, when Sorrell made a chance remark about the lions that have inhabited its imposing plinths since 1867.

Es Devlin被广泛认为是当今音乐，艺术，戏剧和技术领域最具远见和艺术雄心的人物之一。 她以创造融合技术和诗歌的大型表演雕塑和环境而闻名。2017年9月，Es与伦敦设计节（LDF）主席John Sorrell爵士一起穿过特拉法加广场。 他们正在讨论广场的历史以及与庆祝活动和抗议活动之间的重要公共时刻的长期联系，当时Sorrell有机会评论自1867年以来栖息于雄伟基座的狮子。

“He nudged me and said ‘Landseer never wanted those lions to look so passive. He proposed a much more animated stance, but Queen Victoria found it too shocking,” recalls Devlin.

“The thought lodged in my mind: what if we could invest the lion with a diversely crowdsourced, single collective poetic voice?

“Trafalgar Square is a place many of us stack up memories — it’s like a great corridor of this city. If every time someone walked through the square, they felt linked to all those voices that have been heard since its inception in the 1850s, or if this piece became a sort of hinge that connected them to a deeper understanding of the square and about the city we live in, [I thought] that would be something,” she says

“他轻推我说'兰塞尔从不希望那些狮子看起来如此被动。 他提出了一个更加生气勃勃的立场，但维多利亚女王发现它太令人震惊，“德夫林回忆道。

“这个想法在我脑海中浮现：如果我们能够用一种多样化的众包，单一的集体诗意声音投资狮子怎么办？

“特拉法加广场是我们许多人积累回忆的地方 - 它就像是这个城市的一条很棒的走廊。 如果每次有人走过广场，他们都会感受到自19世纪50年代成立以来所听过的所有声音，或者如果这件作品成为一种铰链，使他们更深入地了解广场和城市 我们住在，[我想]那将是一件事，“她说

At the time in 2017, Devlin had started exploring and experimenting with AI through a collaboration with Google Arts and Culture, working with creative technologist Ross Goodwin. This began through a conversation with Hans Ulrich Obrist, leading to an installation titled PoemPortraits, at the Serpentine Galleries Summer Party 2017 — guests were invited to donate a word and become part of a transient social sculpture, their word extended into a line of poetry by a machine learning algorithm.

2017年，Devlin与创意技术专家Ross Goodwin合作，开始与Google Arts and Culture合作，开始探索和实验人工智能。 这是通过与汉斯·乌尔里希·奥布里斯特（Hans Ulrich Obrist）的对话开始的，在2017年的蛇形画廊夏季派对上导致了一个名为诗歌肖像的装置 - 邀请嘉宾捐出一个词，成为一个短暂的社会雕塑的一部分，他们的话语延伸到一系列的诗歌中 机器学习算法。

With support from Google Arts and Culture Lab, and working closely again with Ross Goodwin, Devlin began to work on Please Feed the Lions, an installation idea that would introduce a new, bright red lion to Trafalgar Square as part of LDF 2018, a lion that would ‘eat’ words submitted by visitors and ‘digest’ them to create a collective poem that evolved and grew over 6 days. The poem would be generated by a machine learning algorithm displayed to visitors inside the lion’s mouth during the day, and projected onto Nelson,s Column at night.

在Google艺术与文化实验室的支持下，并与Ross Goodwin再次密切合作，Devlin开始研究Please Feed the Lions，这是一个安装创意，将特拉法加广场引入一只新的，鲜红的狮子作为LDF 2018的一部分，狮子 那些会“吃掉”游客提交的文字并“消化”他们创作一首集体诗，这首诗的演变和发展超过6天。 这首诗将通过机器学习算法生成，该算法在白天向狮子口内的访客展示，并在晚上投射到尼尔森的柱子上。

Meanwhile, Google Arts and Culture would create a parallel online exhibition of content that allowed audiences everywhere to explore the work and the story behind it, where they’d make the full poem available at the end of the six days.

与此同时，谷歌艺术与文化将创建一个平行的在线内容展览，让各地的观众可以探索其背后的工作和故事，他们将在六天结束时提供完整的诗歌。

**Reaching beyond London到达伦敦以外**

For the Festival team, this was an exciting opportunity for the first major public installation during LDF using Artificial Intelligence (AI) and the potential to attract new audiences to their work through the use of interactive technology.

对于节日团队来说，这是LDF使用人工智能（AI）进行首次重大公共安装的一个令人兴奋的机会，并且有可能通过使用交互式技术吸引新的受众进入他们的工作。

It’s the first project of its kind that we’ve worked on, says Hanna Barber, Partnership Manager at LDF. “We were thrilled that Es wanted to work with us and, from a technological perspective, the project was exciting because it gave us a chance to attract a wider audience.

“But while weŇre very used to producing physical installations, working with this kind of technology was a new area for us, so we needed that expertise from our partners.

“It was also about expanding upon our usual global reach — we set it up so that people could feed in a word on our website, meaning the piece had a life in both the physical space and online, and could be experienced by audiences both in London and across the world. For us, that idea of augmenting the Festival in the digital environment was great and using those new channels enabled us to reach different audiences.

LDF合伙经理Hanna Barber说，这是我们开展的第一个此类项目。 “我们很高兴Es希望与我们合作，从技术角度来看，该项目令人兴奋，因为它让我们有机会吸引更多的观众。

“虽然我们非常习惯于生产物理装置，但使用这种技术对我们来说是一个新领域，因此我们需要合作伙伴的专业知识。

“这也是为了扩展我们通常的全球影响力 - 我们设置它以便人们可以在我们的网站上提供一句话，这意味着这件作品在物理空间和在线都有生命，并且可以被观众体验到 伦敦和世界各地。 对我们来说，在数字环境中增加音乐节的想法很棒，使用这些新频道使我们能够接触到不同的观众。

The Google Arts & Culture Lab also saw the piece as an opportunity to create a different kind of work.

谷歌艺术与文化实验室也将此作品视为创造不同作品的机会。

“One of our focus areas is supporting and facilitating experimentation between arts and tech which this absolutely did,Ŋ says Creative Lead Freya Murray. ŉIt explored and experimented with AI in a creative context and we were excited by that. It was also the first time we had worked on a physical public artwork on this scale powered by AI: It explored and experimented with AI in a creative context a tool that enabled Ed’s vision to be realised.

ŉSupporting access to arts and culture is a big part of what we do and this was a really accessible artwork — it allowed people to have both an individual and a collective experience and to engage with an iconic part of London in a new and playful way.

ŉAnd what we found was that it wasnŇt just one type of person who engaged with it but a really broad audience. It was a great way to reach beyond LDFŇs regular visitors because it was also

about passers-by and how you engage people in that way.”

“我们的重点领域之一是支持和促进艺术与科技之间的实验，这绝对是做到的，”Creative Lead Freya Murray说。 “在创造性的环境中探索和实验人工智能，我们对此感到非常兴奋。 这也是我们第一次在AI的基础上开展这种规模的实体公共艺术作品：它在创意环境中探索和试验了AI，这是一种能够实现Ed的愿景的工具。

“支持艺术和文化的获取是我们工作的重要组成部分，这是一个非常容易获得的艺术品 - 它允许人们既有个人经历又有集体经验，并以新的和有趣的方式与伦敦的标志性部分互动。

“我们发现的不仅仅是一种与之相关的人，而是一个真正广泛的受众。 这是超越LDF常客的一种很好的方式，因为它也是关于过路人以及你如何以这种方式吸引人们。“

When Murray approached The Space to come on board to support with digital production and the development of a digital engagement plan it was the rich story behind the piece — and Google Arts and CultureŇs plans to give it an online life beyond the festival — that convinced them to get involved.

当Murray找到The Space加入数字制作以及制定数字参与计划的支持时，这件作品背后的丰富故事 - Google Arts andCulture’s计划为其提供超越音乐节的在线生活 – 说服他们去涉足。

“The narrative concept and subject matter around it and Es’ beautiful way of articulating that were what we were most interested in supporting,” says Executive Producer Sarah Toplis.

“We wanted to bring more people to that by helping LDF to reach beyond their core audiences as well as supporting them to build capacity to create their first digital work. We worked with them to look at how the public were going to interact with the piece and what the digital and social engagement plans were going to be.”

“We donŇt do many site-specific projects but we are always looking for the right ones. For us itŇs often about whether there is an online element that allows the piece to live on online so that more people will be able to engage with it.”

执行制片人萨拉·托普利斯说：“围绕它的叙事概念和主题以及Es'美妙的表达方式是我们最感兴趣的支持方式。”

“我们希望通过帮助LDF超越其核心受众以及支持他们建立创建他们的第一个数字作品的能力来吸引更多人。 我们与他们一起研究了公众将如何与这件作品进行互动，以及数字和社会参与计划将会是什么样的。“

“我们不会做很多针对特定地点的项目，但我们总是在寻找合适的项目。 对于我们来说，通常是关于是否存在允许该作品在线生活的在线元素，以便更多人能够参与其中。“

Engaging the audience吸引观众

A key factor in the piece’s ability to engage an audience lay in the physical design of the installation itself.

Devlin explains how this informed the design process. ŉUsing a lidar scanner we created a precise model of one of the original lions but we manipulated the mouth open and put a screen in there that so that during the day when you approached the lion you were invited to feed it a wordŊ she says. ŉThen it spoke back load and roaring giving you a two-line verdict on your choice.”

Devlin解释了这如何为设计过程提供信息。 ŉ使用激光雷达扫描仪，我们创建了一个原始狮子的精确模型，但我们操纵嘴巴打开并在那里放置一个屏幕，以便在你接近狮子的那一天，你被邀请喂它一个字Ŋ她说。 ŉ然后它发出负载和咆哮的声音，给你一个关于你选择的两行判决。“

“We wanted to cut through the grey of London so it had to be fluorescent. I hoped that an unsuspecting passer-by or tourist might actually think that someone had come and dipped Trafalgar SquareŇs fifth lion in several cans of red-orange spray paint.”

“我们想要切断伦敦的灰色，所以它必须是荧光的。 我希望一个毫无防备的过路人或游客可能会认为有人来过特拉法加广场将第五只狮子在几罐红橙色喷漆中浸泡了。“

“At night the text ricocheted from the lion in projection mapping and then ran up NelsonŇs Column creating a real beacon for people to take part.”

“晚上，文字在投影映射中从狮子身上弹出，然后跑上尼尔森柱子，为人们参与创造了一个真正的灯塔。”

Sarah Toplis adds that the sound design also played a big part in engaging passers-by

莎拉·托普利斯（Sarah Toplis）补充说，声音设计在吸引过路人方面也发挥了重要作用

“The roar was really resonant in Trafalgar SquareŊ she recalls. ŉWhen the projections werenŇt running in the full light it was the roar that drew your attention‑ the sound effects drew you in and grew as the interactions triggered sounds.

她回忆说，咆哮在特拉法加广场真的很响亮。 ŉ当投影没有在全光线下运行时，引起你注意的咆哮是声音效果吸引你进入并随着交互触发声音而增长。

Then there was GoodwinŇs development of the algorithm that would drive the interaction. Because DevlinŇs vision was to create a work that connected people to the SquareŇs history he trained the algorithm on a vast library of 19th century poetry books — each time a word was fed to the lion the algorithm would reference this library to predict the next character of the phrase over and over until it had generated two lines of new verse sparked by the submitted word effectively connecting the contributions of present-day visitors to the voices of poets who were writing when the Lions were created 150 years ago.

然后是Goodwin开发的算法可以推动交互。 因为Devlin的愿景是创造一个将人们与SquareŇs历史联系起来的作品，所以他将这个算法训练在一个庞大的19世纪诗集书库中 - 每次将一个单词输入狮子时，算法会引用该库来预测下一个字符。 这句话一遍又一遍，直到它产生了两行新词，由提交的词汇引发，有效地将当今访客的贡献与150年前建立狮子会时写作的诗人的声音联系起来。

Each of these elements came with their own challenges. As the designer of the installation DevlinŇs main concerns were around peopleŇs reaction to the concept:

每个元素都有自己的挑战。 作为装置设计师Devlin的主要关注点是人们对这个概念的反应：

“I was really sensitive to the criticism that I knew was going to be levelled at it people saying: ŉwhy didnŇt you just get a poet?Ŋ or ŉwhy do you need machine learning and algorithms?Ŋ she says.

ŉThere is always going to be this question about the extent to which machine learning and algorithms can augment human capacities and not replace them. My answer is that no one is suggesting that there shouldnŇt be human poets‑ weŇre just saying that if you walk into Trafalgar Square and you werenŇt about to write a poem you can take part in one.”

“我对我所知道的那些批评非常敏感，人们会说：”为什么你没有得到一位诗人？Ŋ或者你为什么需要机器学习和算法呢？“她说。

关于机器学习和算法在多大程度上可以增强人的能力而不是取代它们，这个问题总会存在。 我的回答是没有人暗示不应该是人类诗人，我们只是说，如果你走进特拉法加广场并且你不打算写一首诗，你可以参加其中一首。”

For Goodwin the main challenge was technical. ŉThe biggest issue was finding an approach that I was confident enough aboutŊ he says. ŉWith PoemPortraits we didnŇt really worry as much about bad words. In this case itŇs a different context because people were submitting words that would be projected on a very public surface and at a very large scale.Ŋ

Names too proved problematic — when testing the algorithm the team found that submitting their own names interrupted the natural flow of the poem.

Both issues were resolved by adding a system that allowed the lion to filter names and inappropriate contributions but it was important that this was done in a way that maintained the storytelling experience.

对于古德温来说，主要挑战是技术性的。他说，最大的问题是找到一种我足够自信的方法。 “有了PoemPortraits，我们并没有真正担心坏词。 在这种情况下，它是一个不同的背景，因为人们提交的词汇将被投射到非常公开的表面并且规模很大。

名称也证明是有问题的 - 在测试算法时，团队发现提交自己的名字会打断诗歌的自然流动。

这两个问题都通过添加允许狮子过滤名称和不恰当贡献的系统来解决，但重要的是这样做是为了维持讲故事的体验。

Meanwhile Murray was keen to manage the visitor experience so that visitors wouldnŇt have to wait long to submit their words:

“I was concerned about there being really long linesŊ she says. ŉAnd yes there was a queue but what was great to see was that people were really taking delight in just seeing what other people were contributing and what poems their words created‑ I actually think it was that collective experience that worked so well.”

与此同时，默里热衷于管理游客体验，以便游客不必等待很长时间才能提交他们的话：

她说：“我担心会有很长的路线。” ŉ是的，有一个队列，但很高兴看到人们真的很高兴看到其他人的贡献和他们的话创造了什么诗我实际上认为这是集体经验运作良好。

Telling the world

Choosing which online platforms to promote and publicise the piece on was another key consideration. LDF focused on making the interactive element of the installation available through its own channels.

选择哪些在线平台来宣传和宣传这篇文章是另一个关键考虑因素。 LDF专注于通过自己的渠道提供安装的互动元素。

Visitors could “feed” the lion with words via our website and our online comms activity was complemented by content on Google and The SpaceŇs channelsŊ explains Barber.

To drive awareness and interaction The Space worked with LDF to develop a digital engagement plan with a particular focus on using the FestivalŇs social media channels to engage new audiences and grow their social following.

访客可以通过我们的网站“喂养”狮子，我们的在线通讯活动由Google和TheSpace’s频道的内容补充解释Barber。

促进意识和互动空间与LDF合作制定数字参与计划，特别关注使用Festival的社交媒体渠道吸引新的受众并发展他们的社交追随者。

As part of this Head of Distribution Sarah Fortescue and associate Mel Spencer developed a social marketing plan for the piece and supported LDF with the creation and seeding of social content including a Facebook Live that captured the lion in action in Trafalgar Square. They also provided help with planning and setting up promoted social activity that targeted the periphery of LDFŇs audience.

作为分销负责人Sarah Fortescue及其合作伙伴Mel Spencer的一部分，他为该片创作了一个社交营销计划，并支持LDF创建和播种社交内容，其中包括在特拉法加广场拍摄狮子的Facebook Live。 他们还帮助规划和建立针对LDF受众群体外围的促进社交活动。

For Google Arts and Culture the focus was on preserving the piece through the online exhibition.

对于Google Arts and Culture，重点是通过在线展览保留这件作品。

“We scanned the lion in the Square then captured the whole area in 360 so now we have a digital version preservedŊ explains Murray.”

ŉWith promotion it was a joint effort across all our channels — we created a trailer social content and a documentary and communicated the project across the Google Arts and Culture and Google UK social platforms.Ŋ

This ņdivide and conquerŇ approach proved to be an effective one: ŉOur ambitions were always to try and broaden the audience outside of London and for something to live on in the digital world and we managed to achieve thatŊ says Barber.

ŉWorking with The Space and with Google really helped us to optimise the digital potential of the activity‑ so many of the words that were fed in actually came from outside the physical site itself so that shows that people really were engaging not just by going to the installation but also if they werenŇt able to physically be there by interacting online.

“我们在广场扫描了狮子然后在360中拍摄了整个区域，所以现在我们保留了数字版本ŊMurray解释道。”

“通过推广，这是我们所有频道的共同努力 - 我们创建了预告片社交内容和纪录片，并在Google Arts and Culture和Google UK社交平台上传达了该项目。

这种分裂和征服的方法被证明是一种有效的方法：“我们的野心总是试图扩大伦敦以外的观众，以及在数字世界中生活的东西，我们设法实现了这一目标。

“与The Space合作并与Google合作确实帮助我们优化了活动的数字潜力，因此许多被提供的单词实际上来自物理站点本身之外，这表明人们真正参与其中不仅仅是通过安装 但如果他们不能通过网上互动来实际存在。

Over the course of the installation almost 50000 visitors submitted words to the lion.

ŉThere was a constant stream of interaction — people were inputting words from the moment it opened to the moment it finishedŊ says Toplis.

The piece was also seen by 240000 visitors to the square —  success that Barber attributes to its attention-grabbing design:

ŉWe wanted to create an impactful and newsworthy visual moment and I think we certainly achieved that‑ for anyone who passed Trafalgar Square it was hard to miss!Ŋ

In terms of audience development the rewards of extending the pieceŇs reach online were significant. LDF notes in its evaluation that nearly half the visitors feeding words into the algorithm submitted them online and that online engagement with the piece spanned a far broader audience in terms of both geography and demographics.

在安装过程中，有近5万名游客向狮子提交了文字。

“Toplis表示，人们从开放的那一刻到完成的那一刻都在输入文字。

广场上有24万名参观者看到了这件作品 - 巴伯的成功归功于其引人注目的设计：

ŉ我们想要创造一个有影响力且具有新闻价值的视觉时刻，我认为我们确实为通过特拉法加广场的人们实现了这一点，这很难错过！

在受众群体发展方面，将这些内容扩展到网上的回报意义重大。 LDF在其评估中指出，近一半的访问者在网上提交的文字在网上提交了这些内容，并且在这方面的在线参与在地理和人口统计方面都覆盖了更广泛的受众。

Meanwhile the social activity around the installation garnered over 50000 active engagements across Facebook Instagram and Twitter   
video views of over 10 seconds shares likes etc. and contributed to a 5.4% growth in LDFŇs social following over the festival period with its Instagram channel posting an impressive 12% jump in followers.

Following this success LDF is exploring opportunities to trial new areas of innovation such as VR AR or streaming content. We might not have seen the last of the Lion either.

与此同时，围绕该装置的社交活动在Facebook Instagram和Twitter上获得了超过5万个积极参与

视频观看超过10秒的股票喜欢等，并且在节日期间推动了LDF社交活动增长5.4％，其Instagram频道的关注者增加了12％。

在此成功之后，LDF正在探索尝试新的创新领域（如VR AR或流媒体内容）的机会。 我们可能也没见过狮子座的最后一个。

Top tips for projects using interactive tech使用交互式技术的项目的重要提示

1. Consider the story. The tech shouldnŇt be the vision for the work but part of the story — a way of getting people involved. ŉOne thing that was central to the success of this piece was joining the dots between the physical on-site experience and the online experienceŊ says Toplis. ŉWith any interactive project itŇs important to think about how youŇll use the narrative to make it a whole coherent piece for an audience.Ŋ

1.考虑一下这个故事。 技术不应该是工作的愿景，而是故事的一部分 - 一种让人们参与的方式。 TopToplis表示，对于这件作品的成功至关重要的一点是加入物理现场体验和在线体验之间的关键点。 ŉ对于任何互动项目，重要的是要考虑如何使用叙述来使其成为观众的整体连贯作品。

2. Be focused. ŉInstead of getting involved in exploring all the possible things you can do with different technologies it often works best to concentrate on the element that will help you deliver your vision and make sure thatŇs really robustŊ says GoogleŇs Murray. ŉItŇs better to have one technical aspect which youŇre 100 per cent confident in than to have multiple different technologies involved that could potentially dilute the experience.Ŋ

2.专注。而不是参与探索你可以用不同技术做的所有可能的事情，它通常最好集中在有助于你实现愿景的元素上，并确保really真的很强大Ŋ谷歌的默里说。 ŉ最好有一个技术方面，你有100％的信心，而不是涉及多种不同的技术，可能会削弱经验。

3. Get the right timeframe and expertise in place. LDF advise anyone planning an interactive project to start as early as possible and to bring on board experts and specialists who can look after the technical/digital components.

3.获得适当的时间框架和专业知识。 LDF建议任何计划交互式项目的人尽早开始，并聘请能够负责技术/数字组件的专家和专家。

4. Beware of the basics. ŉThereŇs always a risk with anything technical that the technology will fail and itŇs often the most basic things — like power supplies — that go wrongŊ says Murray. For Please Feed the Lions the team contracted a technical partner to remain on site to monitor all the essentials.

4.注意基础知识。 MurMurray说，技术失败的任何技术风险总是存在风险，而且通常最基本的东西 - 比如电源 - 都会出错。 对于请喂狮子会，团队与技术合作伙伴签约，留在现场监控所有必需品。

5. Test test test. Murray stresses that a robust testing process was absolutely crucial to refining the algorithm. ŉWe ran lots of tests with different words to check that we were happy with the poetry that was being producedŊ she says. ŉOnce it goes live you have no control so that process was really important.Ŋ

5.测试测试。 Murray强调，强大的测试过程对于改进算法绝对至关重要。 ŉ我们用不同的词语进行了大量测试，以检查我们对正在制作的诗歌感到满意Ŋ她说。 ŉ一旦它上线，你就无法控制，所以这个过程非常重要