Inteligencia Artificial

Una Revolución

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2019

Presentación

Científico y Emprendedor, Enfocado en Inteligencia Artificial

anastasia
Inteligencia Artificial

SORT BOX

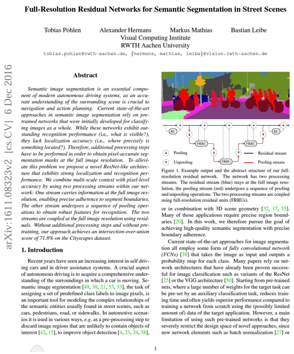
Aparnix

- No es una ciencia más, es una **meta ciencia**.
- **Inteligencia Artificial**
  - Aprendizaje de Máquinas
    - Aprendizaje Profundo (*Deep Learning*)
- **Robótica**, IA en un sistema físico capaz de interactuar con el mundo físico.

- A partir del 2011, sorpresivamente y en contra del sentido común, las **redes neuronales profundas resolvieron problemas difíciles con facilidad**.
- Schwartz-Ziv and Tishby, el 29 of April of 2017, **demuestran en "Opening the black box of Deep Neural Networks via Information", ArXiv, que se cruzó un umbral matemático, hasta el momento desconocido, que permitió diseñar con facilidad IAs complejas**.

Inteligencia Artificial

Estado del Arte



arXiv:1611.08323v2 [cs.CV] 6 Dec 2016

Full-Resolution Residual Networks for Semantic Segmentation in Street Scenes

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Abstract

Semantic image segmentation is an essential component of modern autonomous driving systems, as an accurate understanding of the surrounding scene is crucial to navigation and action planning. Current state-of-the-art approaches in semantic image segmentation rely on pre-trained networks that were initially developed for classifying images as a whole. While these networks exhibit outstanding recognition performance (i.e., what is visible?), they lack localization accuracy (i.e., where precisely is something located?). Therefore, additional processing steps have to be performed in order to obtain pixel-accurate segmentation masks at the full image resolution. To alleviate this problem we propose a novel ResNet-like architecture that exhibits strong localization and recognition performance. We combine multi-scale context with pixel-level accuracy by using two processing streams within our network: One stream carries information at the full image resolution, enabling precise adherence to segment boundaries. The other stream undergoes a sequence of pooling operations to obtain robust features for recognition. The two streams are coupled at the full image resolution using residuals. Without additional processing steps and without pre-training, our approach achieves an intersection-over-union score of 71.8% on the Cityscapes dataset.

1. Introduction

Recent years have seen an increasing interest in self driving cars and in driver assistance systems. A crucial aspect of autonomous driving is to acquire a comprehensive understanding of the surroundings in which a car is moving. Semantic image segmentation [49, 38, 21, 53, 33], the task of assigning a set of predefined class labels to image pixels, is an important tool for modeling the complex relationships of the semantic entities usually found in street scenes, such as cars, pedestrians, road, or sidewalks. In automotive scenarios it is used in various ways, *e.g.* as a pre-processing step to discard image regions that are unlikely to contain objects of interest [42, 15], to improve object detection [4, 23, 24, 58],

Pooling
Unpooling
Residual stream
Pooling stream

Figure 1. Example output and the abstract structure of our full-resolution residual network. The network has two processing streams. The residual stream (blue) stays at the full image resolution, the pooling stream (red) undergoes a sequence of pooling and unpooling operations. The two processing streams are coupled using full-resolution residual units (FRRUs).

or in combination with 3D scene geometry [32, 17, 35]. Many of those applications require precise region boundaries [20]. In this work, we therefore pursue the goal of achieving high-quality semantic segmentation with precise boundary adherence.

Current state-of-the-art approaches for image segmentation all employ some form of *fully convolutional network (FCNs)* [38] that takes the image as input and outputs a probability map for each class. Many papers rely on network architectures that have already been proven successful for image classification such as variants of the ResNet [25] or the VGG architecture [50]. Starting from pre-trained nets, where a large number of weights for the target task can be pre-set by an auxiliary classification task, reduces training time and often yields superior performance compared to training a network from scratch using the (possibly limited amount of) data of the target application. However, a main limitation of using such pre-trained networks is that they severely restrict the design space of novel approaches, since new network elements such as batch normalization [27] or

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2016-12-6

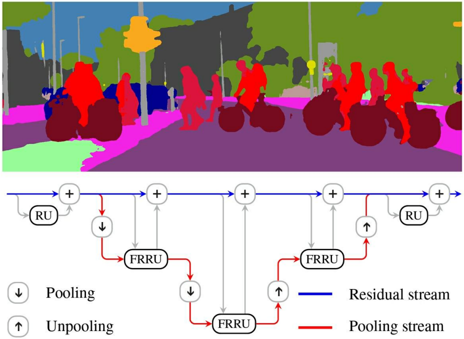
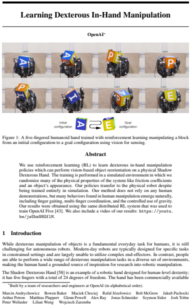


Figure 1. Example output and the abstract structure of our full-resolution residual network. The network has two processing streams. The residual stream (blue) stays at the full image resolution, the pooling stream (red) undergoes a sequence of pooling and unpooling operations. The two processing streams are coupled using full-resolution residual units (FRRUs).



Learning Dexterous In-Hand Manipulation

OpenAI*

Figure 1: A five-fingered humanoid hand trained with reinforcement learning manipulating a block from an initial configuration to a goal configuration using vision for sensing.

Abstract

We use reinforcement learning (RL) to learn dexterous in-hand manipulation policies which can perform vision-based object reorientation on a physical Shadow Dexterous Hand. The training is performed in a simulated environment in which we randomize many of the physical properties of the system like friction coefficients and an object's appearance. Our policies transfer to the physical robot despite being trained entirely in simulation. Our method does not rely on any human demonstrations, but many behaviors found in human manipulation emerge naturally, including finger gaiting, multi-finger coordination, and the controlled use of gravity. Our results were obtained using the same distributed RL system that was used to train OpenAI Five [43]. We also include a video of our results: `https://youtu.be/jwSbzNHGflM`.

1 Introduction

While dexterous manipulation of objects is a fundamental everyday task for humans, it is still challenging for autonomous robots. Modern-day robots are typically designed for specific tasks in constrained settings and are largely unable to utilize complex end-effectors. In contrast, people are able to perform a wide range of dexterous manipulation tasks in a diverse set of environments, making the human hand a grounded source of inspiration for research into robotic manipulation.

The Shadow Dexterous Hand [58] is an example of a robotic hand designed for human-level dexterity; it has five fingers with a total of 24 degrees of freedom. The hand has been commercially available

*Built by a team of researchers and engineers at OpenAI (in alphabetical order).

Marcin Andrychowicz Bowen Baker Maciek Chociej Rafał Józefowicz Bob McGrew Jakub Pachocki Arthur Petron Matthias Plappert Glenn Powell Alex Ray Jonas Schneider Szymon Sidor Josh Tobin Peter Welinder Lilian Weng Wojciech Zaremba

2018-7-30

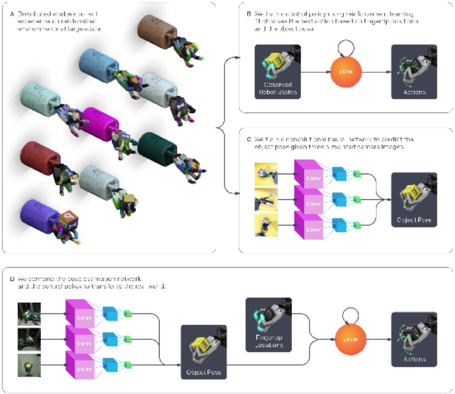


Figure 2: System Overview. (a) We use a large distribution of simulations with randomized parameters and appearances to collect data for both the control policy and vision-based pose estimator. (b) The control policy receives observed robot states and rewards from the distributed simulations and learns to map observations to actions using a recurrent neural network and reinforcement learning. (c) The vision based pose estimator renders scenes collected from the distributed simulations and learns to predict the pose of the object from images using a convolutional neural network (CNN), trained separately from the control policy. (d) To transfer to the real world, we predict the object pose from 3 real camera feeds with the CNN, measure the robot fingertip locations using a 3D motion capture system, and give both of these to the control policy to produce an action for the robot.

Inteligencia Artificial

Estado del Arte

A Deep Reinforced Model for Abstractive Summarization

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Abstract

Attentional, RNN-based encoder-decoder models for abstractive summarization have achieved good performance on short input and output sequences. However, for longer documents and summaries, these models often include repetitive and incoherent phrases. We introduce a neural network model with intra-attention and a new training method. This method combines standard supervised word prediction and reinforcement learning (RL). Models trained only with the former often exhibit "exposure bias" – they assume ground truth is provided at each step during training. However, when standard word prediction is combined with the global sequence prediction training of RL the resulting summaries become more readable. We evaluate this model on the CNN/Daily Mail and New York Times datasets. Our model obtains a 41.16 ROUGE-1 score on the CNN/Daily Mail dataset, a 5.7 absolute points improvement over previous state-of-the-art models. It also performs well as the first abstractive model on the New York Times corpus. Human evaluation also shows that our model produces higher quality summaries.

1 Introduction

Text summarization is the process of automatically generating natural language summaries from an input document while retaining the important points.

By condensing large quantities of information into short, informative summaries, summarization can aid many downstream applications such as creating news digests, search, and report generation.

There are two prominent types of summarization algorithms. First, extractive summarization systems form summaries by copying parts of the input (Neto et al., 2002; Dorr et al., 2003; Nallapati et al., 2017). Second, abstractive summarization systems generate new phrases, possibly rephrasing or using words that were not in the original text (Chopra et al., 2016; Nallapati et al., 2016; Zeng et al., 2016).

Recently, neural network models (Nallapati et al., 2016; Zeng et al., 2016), based on the attentional encoder-decoder model for machine translation (Bahdanau et al., 2014), were able to generate abstractive summaries with high ROUGE scores. However, these systems have typically focused on summarizing short input sequences (one or two sentences) to generate even shorter summaries. For example, the summaries on the DUC-2004 dataset generated by the state-of-the-art system by Zeng et al. (2016) are limited to 75 characters.

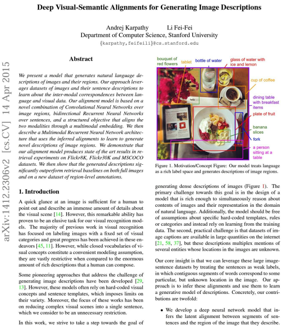
Nallapati et al. (2016) also applied their abstractive summarization model on the CNN/Daily Mail dataset (Hermann et al., 2015), which contains input sequences of up to 800 tokens and multi-sentence summaries of up to 100 tokens. The analysis by Nallapati et al. (2016) illustrate a key problem with attentional encoder-decoder models: they often generate unnatural summaries consisting of repeated phrases.

We present a new abstractive summarization model that achieves state-of-the-art results on the CNN/Daily Mail and similarly good results on the New York Times dataset (NYT) (Sandhaus, 2008). To our knowledge, this is the first model for abstractive summarization on the NYT dataset. We introduce a key attention mechanism and a new learning objective to address the repeating phrase

2017-5-19

Source document
Jenson Button was denied his 100th race for McLaren after an ERS prevented him from making it to the start-line. It capped a miserable weekend for the Briton; his time in Bahrain plagued by reliability issues. Button spent much of the race on Twitter delivering his verdict as the action unfolded. 'Kimi is the man to watch,' and 'loving the sparks', were among his pearls of wisdom, but the tweet which courted the most attention was a rather mischievous one: 'Ooh is Lewis backing his team mate into Vettel?' he quizzed after Rosberg accused Hamilton of pulling off such a manoeuvre in China. Jenson Button waves to the crowd ahead of the Bahrain Grand Prix which he failed to start Perhaps a career in the media beckons Lewis Hamilton has out-qualified and finished ahead of Nico Rosberg at every race this season. Indeed Rosberg has now beaten his Mercedes team-mate only once in the 11 races since the pair infamously collided in Belgium last year. Hamilton secured the 36th win of his career in Bahrain and his 21st from pole position. Only Michael Schumacher (40), Ayrton Senna (29) and Sebastian Vettel (27) have more. He also became only the sixth F1 driver to lead 2,000 laps. Nico Rosberg has been left in the shade by Lewis Hamilton who celebrates winning his third race of the year Kimi Raikkonen secured a record seventh podium finish in Bahrain following his superb late salvo, although the Ferrari driver has never won in the Gulf Kingdom. It was the Finn's first trip to the rostrum since the 2013 Korean Grand Prix, but his triumph brought a typically deadpan response: 'You're never happy when you finish second... I'm a bit pleased to get a result.' Sparks fly off the back of Kimi Raikkonen's Ferrari en route to finishing second in Bahrain Bernie Ecclestone was in the Bahrain paddock this weekend. He denied trying to engineer a deal for Hamilton, out of contract at the end of the season, to join Ferrari despite earlier insisting that such a move would be 'great' for the sport. The 84-year-old also confirmed that F1 would be in Azerbaijan for the first time next year, even with concerns surrounding the countrys human rights record. 'I think everybody seems to be happy,' Ecclestone said. 'There doesn't seem to be any big problem there. There's no question of it not being on the calendar. It's going to be another good race. Formula One supremo Bernie Ecclestone speaks to Nico Rosberg ahead of the Bahrain Grand Prix
Ground truth summary
Button denied 100th race start for McLaren after ERS failure. Button then spent much of the Bahrain Grand Prix on Twitter delivering his verdict on the action as it unfolded. Lewis Hamilton has out-qualified and finished ahead of Mercedes team-mate Nico Rosberg at every race this season. Bernie Ecclestone confirms F1 will make its bow in Azerbaijan next season.
ML, with intra-attention (ROUGE-1 41.58)
Button was denied his 100th race for McLaren. ERS prevented him from making it to the start-line. The Briton. He quizzed after Nico Rosberg accused Lewis Hamilton of pulling off such a manoeuvre in China. Button has been in Azerbaijan for the first time since 2013.
RL, with intra-attention (ROUGE-1 50.00)
Button was denied his 100th race for McLaren after an ERS prevented him from making it to the start-line. It capped a miserable weekend for the Briton. Button has out-qualified. Finished ahead of Nico Rosberg at Bahrain. Lewis Hamilton has. In 11 races. . The race. To lead 2,000 laps. . In. . . And. .
ML+RL, with intra-attention (ROUGE-1 44.00)
Button was denied his 100th race for McLaren. The ERS prevented him from making it to the start-line. Button was his team mate in the 11 races in Bahrain. He quizzed after Nico Rosberg accused Lewis Hamilton of pulling off such a manoeuvre in China.

Table 3: Example from the CNN/Daily Mail test dataset showing the outputs of our three best models after de-tokenization, re-capitalization, replacing anonymized entities, and replacing numbers. The ROUGE score corresponds to the specific example.



Deep Visual-Semantic Alignments for Generating Image Descriptions

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arXiv:1412.2306v2 [cs.CV] 14 Apr 2015

Abstract

We present a model that generates natural language descriptions of images and their regions. Our approach leverages datasets of images and their sentence descriptions to learn about the inter-modal correspondences between language and visual data. Our alignment model is based on a novel combination of Convolutional Neural Networks over image regions, bidirectional Recurrent Neural Networks over sentences, and a structured objective that aligns the two modalities through a multimodal embedding. We then describe a Multimodal Recurrent Neural Network architecture that uses the inferred alignments to learn to generate novel descriptions of image regions. We demonstrate that our alignment model produces state of the art results in retrieval experiments on Flickr8K, Flickr30K and MSCOCO datasets. We then show that the generated descriptions significantly outperform retrieval baselines on both full images and on a new dataset of region-level annotations.

1. Introduction

A quick glance at an image is sufficient for a human to point out and describe an immense amount of details about the visual scene [14]. However, this remarkable ability has proven to be an elusive task for our visual recognition models. The majority of previous work in visual recognition has focused on labeling images with a fixed set of visual categories and great progress has been achieved in these endeavors [45, 11]. However, while closed vocabularies of visual concepts constitute a convenient modeling assumption, they are vastly restrictive when compared to the enormous amount of rich descriptions that a human can compose.

Some pioneering approaches that address the challenge of generating image descriptions have been developed [29, 13]. However, these models often rely on hard-coded visual concepts and sentence templates, which imposes limits on their variety. Moreover, the focus of these works has been on reducing complex visual scenes into a single sentence, which we consider to be an unnecessary restriction.

In this work, we strive to take a step towards the goal of generating dense descriptions of images (Figure 1). The primary challenge towards this goal is in the design of a model that is rich enough to simultaneously reason about contents of images and their representation in the domain of natural language. Additionally, the model should be free of assumptions about specific hard-coded templates, rules or categories and instead rely on learning from the training data. The second, practical challenge is that datasets of image captions are available in large quantities on the internet [21, 58, 37], but these descriptions multiplex mentions of several entities whose locations in the images are unknown.

Our core insight is that we can leverage these large image-sentence datasets by treating the sentences as weak labels, in which contiguous segments of words correspond to some particular, but unknown location in the image. Our approach is to infer these alignments and use them to learn a generative model of descriptions. Concretely, our contributions are twofold:

- We develop a deep neural network model that infers the latent alignment between segments of sentences and the region of the image that they describe.

Figure 1. Motivation/Concept Figure: Our model treats language as a rich label space and generates descriptions of image regions.

2015-4-14

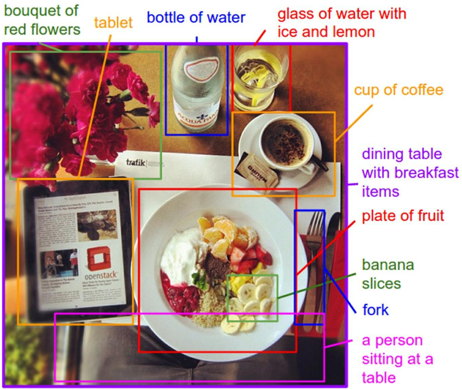
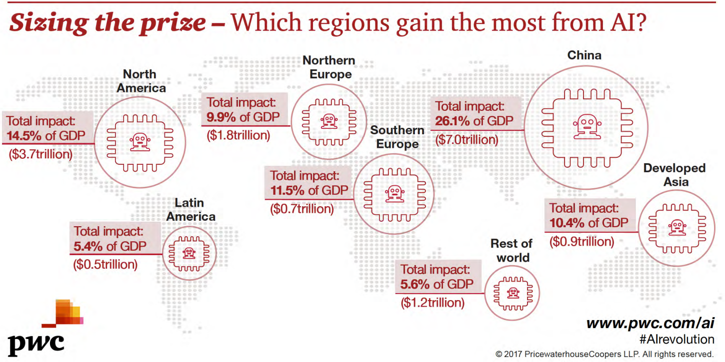


Figure 1. Motivation/Concept Figure: Our model treats language as a rich label space and generates descriptions of image regions.

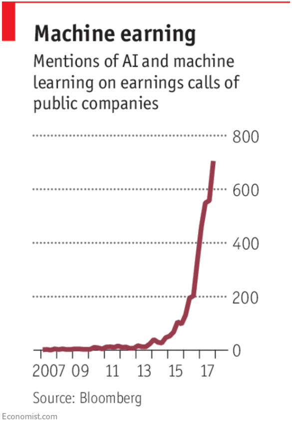
Creación de US $15,7 Millones de Millones de Valor Económico




Personas caminando por el Sendero Chilkoot durante la Fiebre del Oro en Yukon, Alaska, a fines del siglo XIX (Wikipedia).

- Incide en **todas las actividades humanas**, no es sobre un producto o servicio.
- Afecta a **donde sea que haya personas**, no está localizada geográficamente.
- Produce una **reacción de empresas y gobiernos** que tiene como fin asegurar posiciones en este nuevo escenario.

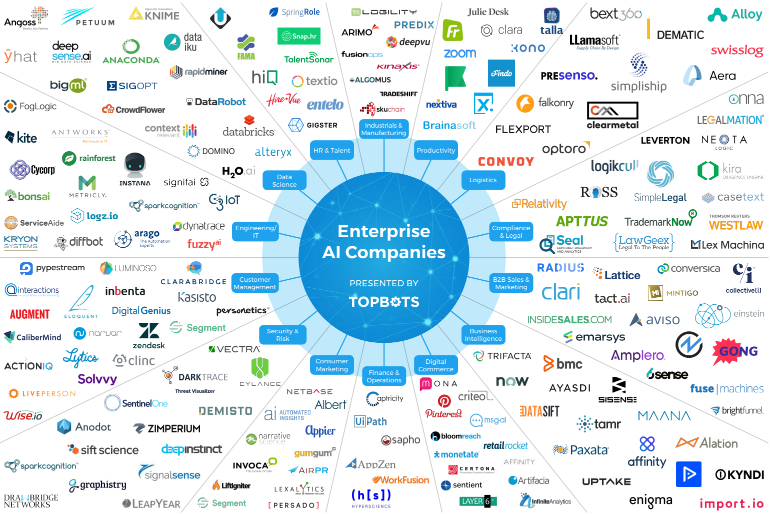
Adaptaciones de las Empresas
Reacciones



Non-tech businesses are beginning to use artificial intelligence at scale, The Economist, 31 de marzo de 2018.

- Mercados horizontales compuestos por consumidores generales están dominados por **Alibaba, Amazon, Apple, Baidu, Facebook, Google, IBM, Microsoft y Tencent**.
- El resto son **silos aislados**.
- **Quién tiene la gente y los datos domina.**
- Los algoritmos se están transformando en un **commodity**.

Adaptaciones de las Empresas
IA en la **Internet**



AI Lanscape 2018, Topbots, septiembre de 2018.

Adaptaciones de las Empresas

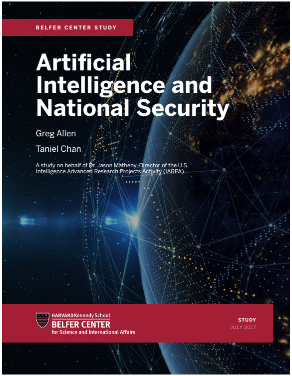
IA en el **Mundo Físico**

YuMi de ABB.

- **El último paso.**

Reacciones de los Gobiernos

Visión



- Executive summary
  - Researchers in the field of Artificial Intelligence (AI) have demonstrated significant technical progress over the past five years, **much faster** than was previously anticipated.
  - Most AI research advances are occurring in the **private sector and academia**.
  - **Existing capabilities in AI have significant potential for national security.**
  - Future progress in AI has the potential to be a transformative national security technology, **on a par with nuclear weapons, aircraft, computers, and biotech**.
  - Advances in AI will affect national security by driving change in three areas: **military superiority, information superiority, and economic superiority**.
  - We analyzed four prior cases of transformative military technologies—nuclear, aerospace, cyber, and biotech—and generated **"lessons learned" for AI**.
  - Taking a "whole of government" frame, **we provide three goals for U.S. national security policy toward AI technology and provide 11 recommendations**.

Reacciones de los Gobiernos

Fuerzas Armadas

Reacciones de los Gobiernos

Capacidad de Manipulación

Psychological targeting as an effective approach to digital mass persuasion

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Edited by Susan T. Fiske, Princeton University, Princeton, NJ, and approved October 17, 2017 (received for review June 17, 2017)

People are exposed to persuasive communication across many different contexts: Governments, companies, and political parties use persuasive appeals to encourage people to eat healthier, purchase a particular product, or vote for a specific candidate. Laboratory studies show that such persuasive appeals are more effective in influencing behavior when they are tailored to individuals' unique psychological characteristics. However, the investigation of large-scale psychological persuasion in the real world has been hindered by the questionnaire-based nature of psychological assessment. Recent research, however, shows that people's psychological characteristics can be accurately predicted from their digital footprints, such as their Facebook Likes or Tweets. Capitalizing on this form of psychological assessment from digital footprints, we test the effects of psychological persuasion on people's actual behavior in an ecologically valid setting. In three field experiments that reached over 3.5 million individuals with psychologically tailored advertising, we find that matching the content of persuasive appeals to individuals' psychological characteristics significantly altered their behavior as measured by clicks and purchases. Persuasive appeals that were matched to people's extraversion or openness-to-experience level resulted in up to 40% more clicks and up to 50% more purchases than their mismatching or unpersonalized counterparts. Our findings suggest that the application of psychological targeting makes it possible to influence the behavior of large groups of people by tailoring persuasive appeals to the psychological needs of the target audiences. We discuss both the potential benefits of this method for helping individuals make better decisions and the potential pitfalls related to manipulation and privacy.

persuasion | digital mass communication | psychological targeting | personality | targeted marketing

Persuasive mass communication is aimed at encouraging large groups of people to believe and act on the communicator's viewpoint. It is used by governments to encourage healthy behaviors, by marketers to acquire and retain consumers, and by political parties to mobilize the voting population. Research suggests that persuasive communication is particularly effective when tailored to people's unique psychological characteristics and motivations (1–5), an approach that we refer to as *psychological persuasion*. The proposition of this research is simple yet powerful: What convinces one person to behave in a desired way might not do so for another. For example, matching computer-generated advice to participants' dominance level elicited higher ratings of source credibility and increased the likelihood of participants changing their initial opinions in response to the advice (2). Similarly, participants' positive attitudes and purchase intentions were stronger when the marketing message for a mobile phone was tailored to their personality profile (4). While these studies provide promising evidence for the effectiveness of psychological persuasion, their validity is limited by the fact that they were mainly conducted in small-scale, controlled laboratory settings using self-report questionnaires. Self-reports are known to be affected by a whole range of response biases (6), and there are numerous reasons why people's natural behavior might differ from that displayed in the laboratory (7). Consequently, it is questionable whether—and to what extent—these findings can be generalized to the application of psychological persuasion in real-world mass persuasion (see ref. 8 for initial evidence).

A likely explanation for the lack of ecologically valid research in the context of psychological persuasion is the questionnaire-based nature of psychological assessment. Whereas researchers can ask participants to complete a psychological questionnaire in the laboratory, it is unrealistic to expect millions of people to do so before sending them persuasive messages online. Recent research in the field of computational social sciences (9), however, suggests that people's psychological profiles can be accurately predicted from the digital footprints they leave with every step they take online (10). For example, people's personality profiles have been predicted from personal websites (11), blogs (12), Twitter messages (13), Facebook profiles (10, 14–16), and Instagram pictures (17). This form of *psychological assessment from digital footprints* makes it paramount to establish the extent to which behaviors of large groups of people can be influenced through the application of psychological mass persuasion—both in their own interest (e.g., by persuading them to eat healthier) and against their best interest (e.g., by persuading them to gamble). We begin this endeavor in a domain that is relatively uncontroversial from an ethical point of view: consumer products.

Significance

Building on recent advancements in the assessment of psychological traits from digital footprints, this paper demonstrates the effectiveness of psychological mass persuasion—that is, the adaptation of persuasive appeals to the psychological characteristics of large groups of individuals with the goal of influencing their behavior. On the one hand, this form of psychological mass persuasion could be used to help people make better decisions and lead healthier and happier lives. On the other hand, it could be used to covertly exploit weaknesses in their character and persuade them to take action against their own best interest, highlighting the potential need for policy interventions.

Author contributions: S.C.M. and M.K. designed research; S.C.M., M.K., and D.J.S. performed research; S.C.M. analyzed data; and S.C.M., M.K., G.N., and D.J.S. wrote the paper.

Conflict of interest statement: D.J.S. received revenue as the owner of the myPersonality Facebook application until it was discontinued in 2012. Revenue was received from displaying ads within the application and charging for a premium personality test. The revenue received by D.J.S. was unrelated to the studies presented in this paper, and there will be no future revenue generated from the application. None of the authors received any compensation for working on the marketing campaigns used to collect data for the studies presented in this manuscript.

This article is a PNAS Direct Submission.

Data deposition: The data reported in this paper have been deposited in the Open Science Framework (OSF), https://osf.io/srjv7/?view_only=90316b0c2e06420bbc3a1cc857a9e3c7.

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[2]M.K. and D.J.S. contributed equally to this work.

This article contains supporting information online at www.pnas.org/lookup/suppl/doi:10.1073/pnas.1710966114/-/DCSupplemental.

12714–12719 | PNAS | November 28, 2017 | vol. 114 | no. 48

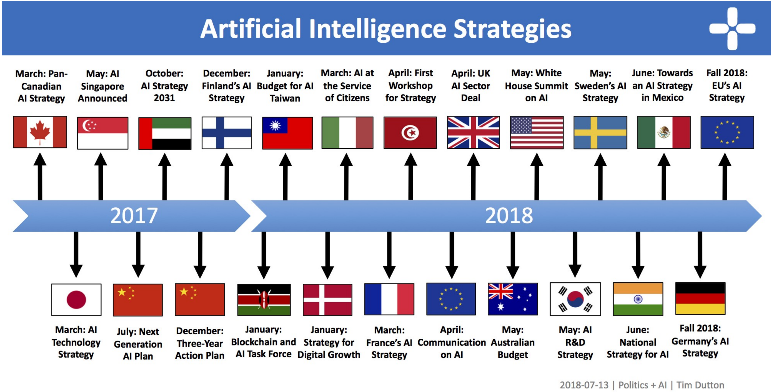
www.pnas.org/cgi/doi/10.1073/pnas.1710966114

2017-11-28

- "**Some countries are already moving in this direction. China has begun to construct a digital authoritarian state by using surveillance and machine learning tools to control restive populations, and by creating what it calls a “social credit system.” Several like-minded countries have begun to buy or emulate Chinese systems. Just as competition between liberal democratic, fascist, and communist social systems defined much of the twentieth century, so the struggle between liberal democracy and digital authoritarianism is set to define the twenty-first.**" (*How Artificial Intelligence Will Reshape the Global Order*, Foreign Affairs, 10 de julio de 2018)

Reacciones de los Gobiernos

Planes Gubernamentales

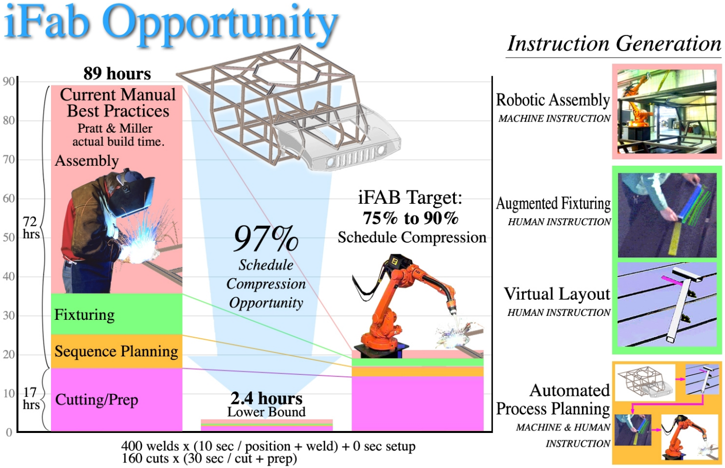


When	Where	Jobs Destroyed	Jobs Created	Predictor
2016	worldwide		900,000 to 1,500,000	Metra Martech
2018	US jobs	13,852,530*	3,078,340*	Forrester
2020	worldwide		1,000,000-2,000,000	Metra Martech
2020	worldwide	1,800,000	2,300,000	Gartner
2020	sampling of 15 countries	7,100,000	2,000,000	WEF
2021	worldwide		1,900,000-3,500,000	IFR
2021	US jobs	9,108,900*		Forrester
2022	worldwide	1,000,000,000		Thomas Frey
2025	US jobs	24,186,240*	13,604,760*	Forrester
2025	US jobs	3,400,000		ScienceAlert
2027	US jobs	24,700,000	14,900,000	Forrester
2030	worldwide	2,000,000,000		Thomas Frey
2030	worldwide	400,000,000-800,000,000	555,000,000-890,000,000	McKinsey
2030	US jobs	58,164,320*		PWC
2035	US jobs	80,000,000		Bank of England
2035	UK jobs	15,000,000		Bank of England
No Date	US jobs	13,594,320*		OECD
No Date	UK jobs	13,700,000		IPPR

Every study we could find on what automation will do to jobs, in one chart, Erin Winick, Technology Review, 25 de enero de 2018.

La Sociedad Humana

El **Escenario Centauro**



Robots and People Can Work Faster Together, David Bourne, Director del Rapid Manufacturing Lab, Robotics Institute, Carnegie Mellon University, 25 de julio de 2013. Leer *Collaborative Intelligence: Humans and AI Are Joining Forces*, Harvard Business Review, Julio-Agosto, 2018.

- La IA detecta que alguien compra **insulina**.
- La máquina establece que es **diabética**.
- Para aumentar la venta el algoritmo descubre que lo mejor es ofrecerle comprar un **dulce**.
- **¿Está bien?**

Conclusión

¿Preguntas?