What comes next

Some consultants would just like a quick look inside your brain (p64). Alexa, please teach me how to spread propaganda (p72). Taiwan is testing out the future of democracy (p74). A science fiction vision of where the fight against fake news will ultimately take us (p80). And if you're not sure whether you're talking to a bot, here's a handy flowchart (p88).

3

algorithms to make sure we're seeing an unbiased representation of views. And yes, he admits, people would complain about publicly funding such a platform and question its even-handedness. But given the lack of other viable solutions, he says, it's worth a shot.

The Problem is us

Jay Van Bavel, a social psychologist at New York University, has studied social posts and analyzed which ones are most likely to gain traction. He's found that "group identification" posts acti- vate the most primitive non-intellectual parts of the brain. So, for example, if a Republican politician tells people that immigrants are moving in and changing the culture or taking locals' jobs, or if a Democrat tells female students that Christian activists want to ban women's rights, their words have power. Bavel's research suggests that if you want to overcome partisan divisions, avoid the intellect and focus on the emotions.

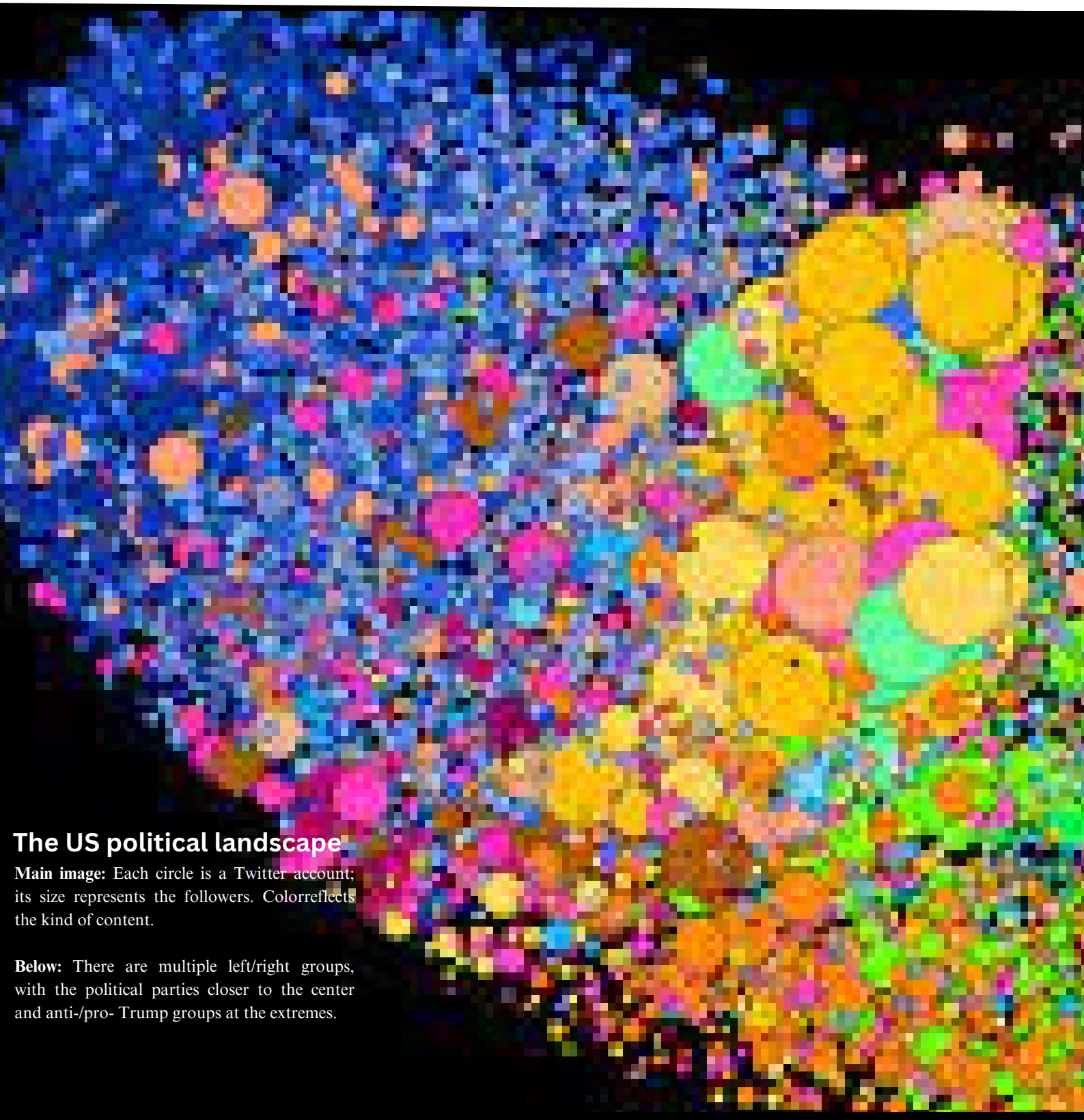
After the Social Mirror experiment, members of Roy's lab debuted a project called FlipFeed, which exposed people on Twitter to others with different political views. Martin Saveski, the study's lead author, says the point was to change how peo- ple felt about the other side. One of the experiments prompted participants to imagine, whenever they came across an opposing view, that they were disagreeing with a friend. Those given this prompt were more likely to say they would like to speak with the person in the future, and that they understood why the other person held an opposing view.

The results were congruent with another observation made by Pariser. He's noticed that some of the best political discus- sions online happen in sports forums, where people are already united by the common love of a team. The assumption there is that all are fans of the team first, and conservative or liberal second. There's an emotional connection before politics even enters the discussion.

If you look at all the various projects from Zuckerman and Roy and others, what they're really trying to do is employ technology to get us to engage with content outside our political bubbles. But is that workable? As Roy himself says, "I don't think there are any pure, simply technological fixes."

Maybe in the end it's up to us to decide to expose ourselves to content from a wider array of sources, and then to engage with it. Sound unappealing? Well, consider the alternative: your lat- est outraged political post didn't accomplish much, because the research shows that anyone who read it almost certainly agreed with you already.

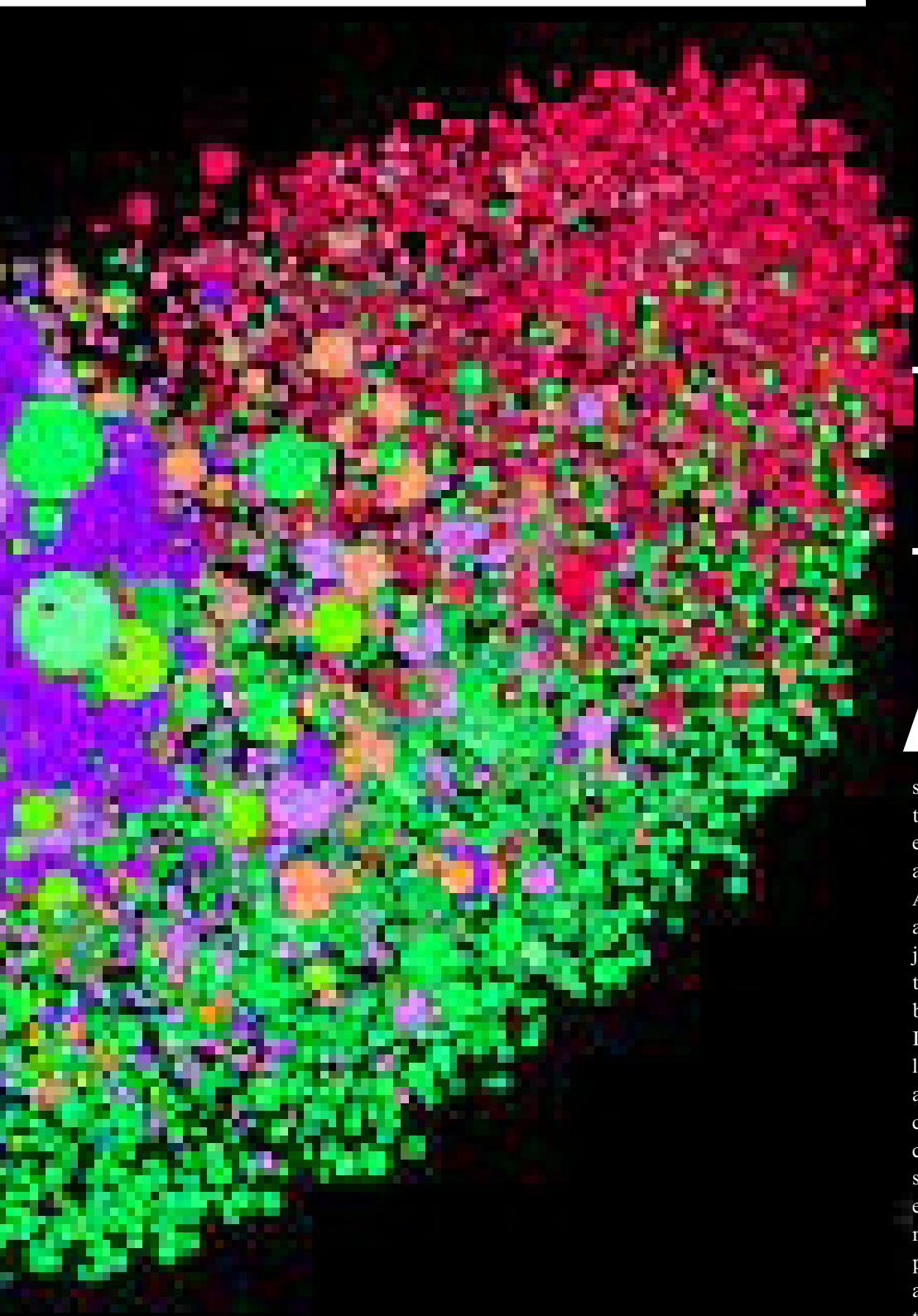
Adam Piore is the author of The Body Builders: Inside the Science of the Engineered Human,



The US political landscape

Main image: Each circle is a Twitter account; its size represents the followers. Colorreflects the kind of content.

Below: There are multiple left/right groups, with the political parties closer to the center and anti-/pro- Trump groups at the extremes.



A vision of division

Maps of Twitter activity show how political polarization manifests online and why divides are so hard to bridge.

By John Kelly and Camille François

American public life has become increas- ingly ideologically segregated as news-

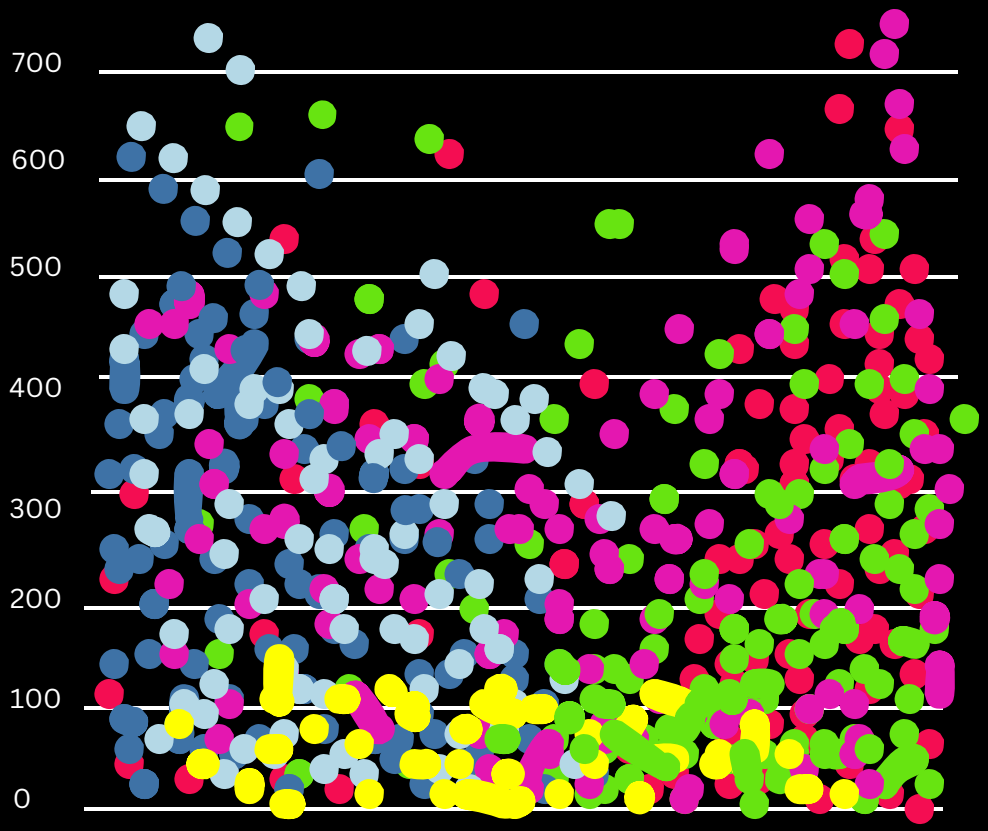
segregated as news- papers have given way to screens. But societies have experienced extremism and fragmentation without the assis- tance of Silicon Valley for centuries. And the polarization in the US began long ago, with the rise of 24-hour cable news. So just how responsible is the internet for today's divisions? And are they really as bad as they seem?

In this Twitter map of the US politi- cal landscape, accounts that follow one another are clustered together, and they are color-coded by the kinds of content they commonly share. At first glance, it might seem reassuring: although there are clear echo chambers, there is also an intertwined network of elected officials, the press, and political and policy pro- fessionals. There are extremes, but they are mediated through a robust middle.

However, as the diagrams on the fol- lowing pages will show, that middle is a lot weaker than it looks, and this makes public discourse vulnerable both to extremists at home and to manipulation

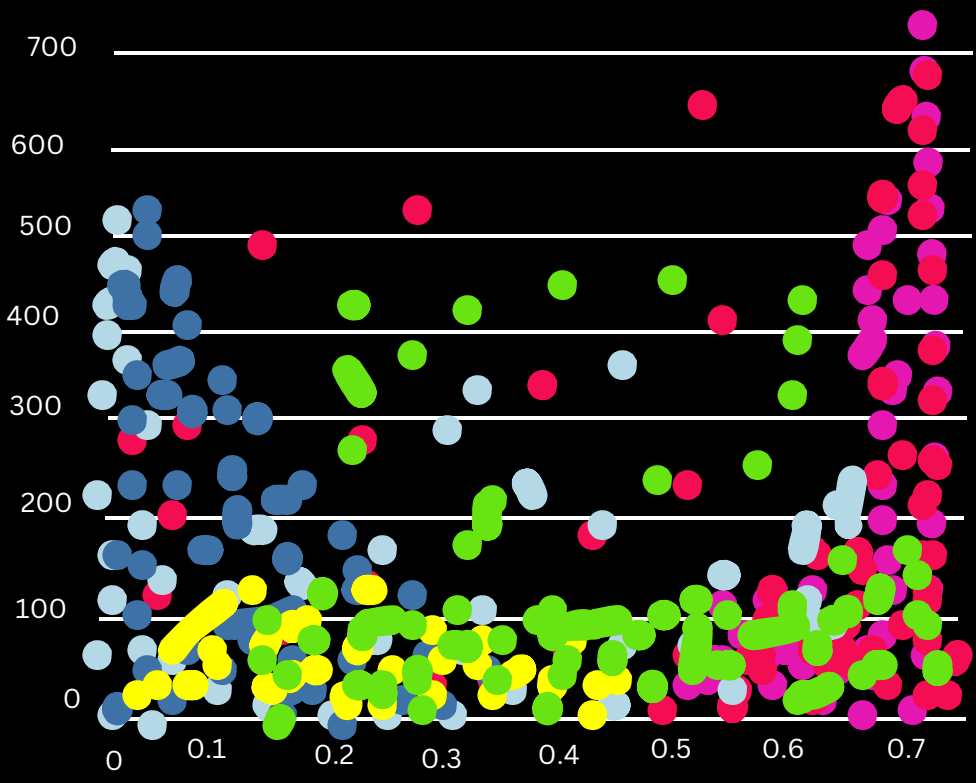
Noisy,partisan bots

The center of the universe is far quieter than the polarized wings. This plot of average daily tweets (vertical axis) from the network shown on the previous page shows that the extreme partisans on both sides are screaming while the center whispers. It also shows divisions being amplified by bots on both sides: we see clearly automated activity, with accounts churning out a hundred tweets a day or more on a common schedule, Hundreds of accounts (especially on the left) have identical daily tweet counts, furthe evidence that they are bots



The silence of the center

The polarization looks even more extreme when the accounts are plotted according to their "valence," a measure of how politically homogeneous their connections are. A valence of O means an account follows of is followed only by progressive accounts, while 1 means it's connected only to conservative accounts



Inside the race to catch the worryingly real fakes that can be made using artificial intelligence.

BY WILL KNIGHT
PHOTOGRAPH BY BRUCE PETERSON

Guess what? I just got hold of some G embarrassing video footage of Texas senator Ted Cruz singing and gyrating to Tina Turner. His political enemies will have great fun showing it during the midterms Donald Trump will call him "Dancin' Ted."

Okay, I'll admit it-I created the video myself. But here's the troubling thing: making it required very lit- tle video-editing skill. I downloaded and configured software that uses machine learning to perform a con- vincing digital face-swap. The resulting video, known as a deepfake, shows Cruz's distinctively droopy eyes stitched onto the features of actor Paul Rudd doing lip-sync karaoke. It isn't perfect-there's something a little off-but it might fool some people (watch it technologyreview.com/cruzrudd).

Photo fakery is far from new, but artificial intelli- gence will completely change the game. Until recently only a big-budget movie studio could carry out a video face-swap, and it would probably have cost millions of dollars. Al now makes it possible for anyone with a decent computer and a few hours to spare to do the same thing. Further machine-learning advances will make even more complex deception possible-and make fakery harder to spot.

These advances threaten to further blur the line between truth and fiction in politics. Already the internet accelerates and reinforces the dissemina- tion of disinformation through fake social-media accounts. "Alternative facts" and conspiracy theories are common and widely believed. Fake news stories, aside from their possible influence on the last US presidential election, have sparked ethnic violence

These still images of Ted Cruz and Paul Rudd are taken from the footage that was fed to a face-swapping program.

Getting things to work is a bit of an art: if you choose clips that are too different, the results can be a mishmash of noses, ears, and chins.

in Myanmar and Sri Lanka over the past year. Now imagine throwing new kinds of real-looking fake vid- eos into the mix: politicians mouthing nonsense or ethnic insults, or getting caught behaving inappro- priately on video-except it never really happened.

"Deepfakes have the potential to derail political discourse," says Charles Seife, a professor at New York University and the author of Virtual Unreality: Just Because the Internet Told You, How Do You Know It's True? Seife confesses to astonishment at how quickly things have progressed since his book was published, in 2014. "Technology is altering our perception of reality at an alarming rate," he says.

Are we about to enter an era when we can't trust anything, even authentic-looking videos that seem to capture real "news"? How do we decide what is credible? Whom do we trust?

Real fake

Several technologies have converged to make fakery easier, and they're readily accessible: smartphones let anyone capture video footage, and powerful com- puter graphics tools have become much cheaper. Add artificial-intelligence software, which allows things to be distorted, remixed, and synthesized in mind-bending new ways. Al isn't just a better ver- sion of Photoshop or iMovie. It lets a computer learn how the world looks and sounds so it can conjure up convincing simulacra.

I created the clip of Cruz using OpenFaceSwap, one of several face-switching programs that you can download for free. You need a computer with an advanced graphics chip, and this can set you back a few thousand bucks. But you can also rent access to a virtual machine for a few cents per minute using a cloud machine-learning platform like Paperspace. Then you simply feed in two video clips and sit back for a few hours as an algorithm figures out how each face looks and moves so that it can map one onto the other. Getting things to work is a bit of an art: if you choose clips that are too different, the result can be a nightmarish mishmash of noses, ears, and chins. But the process is easy enough.

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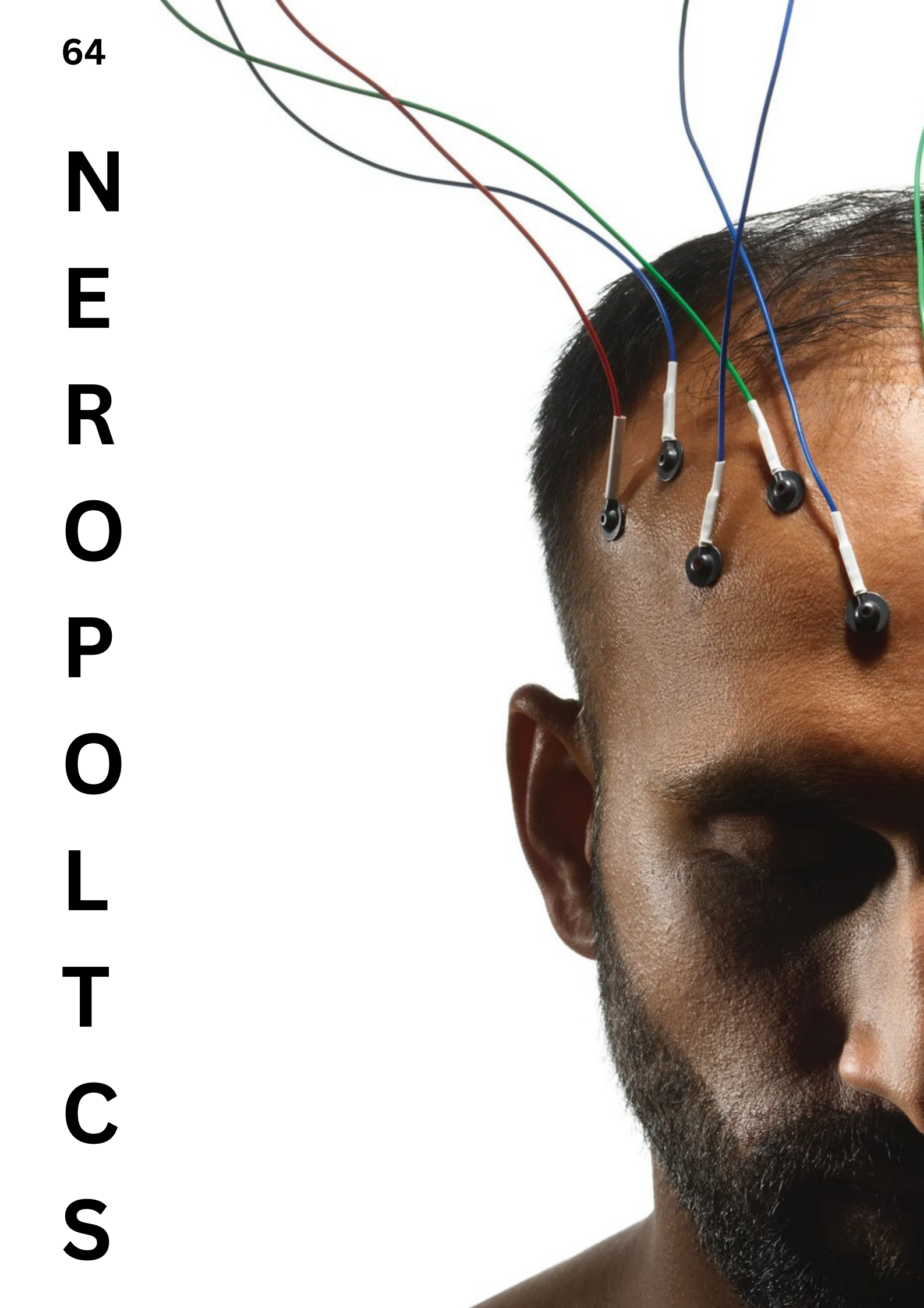
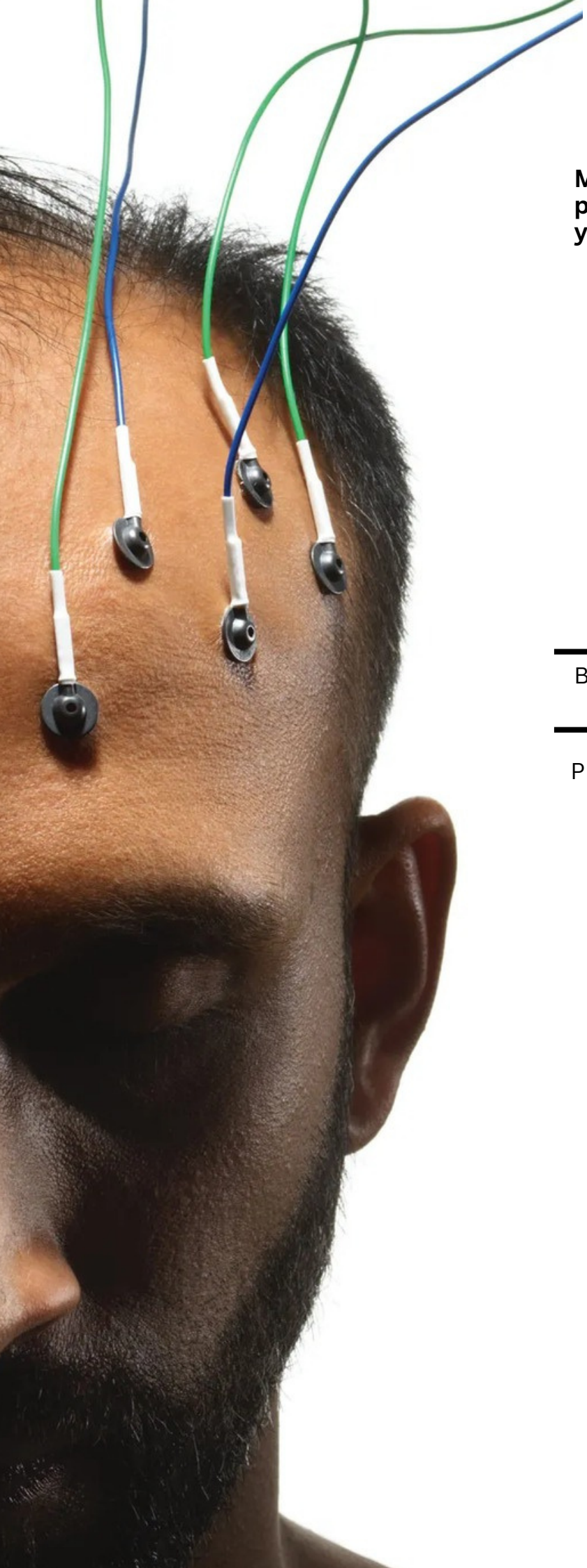
NEUROPOLITICS





Meet the consultants who divine your politicaL preferences by peering inside your brain.

BY ELIZABETH SVOBODA

PHOTO BY BRUCE PETERSON

Maria Pocovi slides her laptop over to me with the webcam switched on. My face stares back at me, overlaid with a grid of white lines that map the contours of my expression. Next to
it is a shaded window that tracks six "core emotions": happiness, surprise, disgust, fear, anger, and sadness. Each time my expression shifts, a measure- ment bar next to emotion fluctuates, as if my feelings were an audio . After a few seconds, a bold green word flashes in the window: ANXIETY. When I look back at Pocovi, I get the sense she knows exactly what I'm thinking with one glance.

Pettte with a welcoming smile, Pos that founder of Emotion Research Lab in Valencia, tipatin, is a global entreprene par excetience. When the comes to Silicon Valley, she doeur't even rent in office she just grabs a talde here at the Plug and Play coworking space la Sunnyvale, California But the technology she's showing me is at the forefront of a quiet political revo Inlon. Campaigns around the world are employing Emation Research Lab and other marketers versed in neuroscience to penetratovoters' unspoken feelings.

This spring there was a widespread out in ery when American Facebook users found out that information they had posted on the social network- including their likes, Me Interests, and political preferences had ke been mined by the voter targeting firm Cambridge Analytica. While it's not clear how effective they were, the company's algorithms may have helped fuel Donald in Trump's come from behind victory in 2016 .

But to ambitious data scientists like lo Pocovi, who has worked with major polit if Ical parties in Latin America in recent we elections, Cambridge Analytica, which the shut down in May, was behind the curve to Where it groged people's receptiveness to Campaign messens by analyzing data they typed into Facebook, today's "neuropolit Ical consultants say they can peg voters feelings by observing their spontaneous responses: an electrical impulse from a key brain region, a split-second grimace, or a moment's hesitation as they ponder a question. The experts aim to divine voters' intent from signals they're not aware they're producing. A candidate's advison p can then attempt to use that biological data to influence voting decisions.

Political insiders say campaigns are buying into this prospect in increasing numbers, even if they're reluctant to acknowledge it. "It's rare that a campaign would admit to using neuromarketing techniques-though it's quite likely the well- funded campaign

neuromarketing in 2016, SCL the parent firm of Cambridge Analytica, which worked for Trump-has reportedly used facial analysis to assess whether what voters said they felt about candidates was genuine.

But even if US campaigns won't admit to using neuromarketing, "they should be interested in it, because politics is a blood sport," says Dan Hill, an American expert in facial-expression coding who advised Mexican president Enrique Peña Nieto's 2012 election campaign. Fred Davis, a Republican strategist whose clients have included George W. Bush, John McCain, and Elizabeth Dole, says that while uptake of these technologies is somewhat limited in the US, campaigns would use neuromar keting if they thought it would give them an edge. "There's nothing more import- ant to a politician than winning," he says.

The trend raises a torrent of questions in the run up to the 2018 midterms. How well can consultants like these use neuro- logical data to target or sway voters? And if they are as good at it as they claim, can we trust that our political decisions are truly our own? Will democracy itsell start to feel the squeeze?

Unspoken truths

Brain, eye, and face scans that tease out people's true desires might seem dystopian. But they're offshoots of a long-standing political tradition: hitting voters rightin the feels. For more than a decade, campaigns have been scanning databases of consumer preferences-what music people listen to, what magazines they read-and, with the help of computer algorithms, using that information to target appeals to them. If an algorithm shows that middle-aged female SUV drivers arel likely to vote Republican and care about education,

Biometric practitioners say they can tap into truths that voters are unable to express.

Biometric technologies raise the stakes further. Practitioners say they can tap into truths that voters are often unwilling or unable to express. Neuroconsultants love to cite psychologist Daniel Kahneman, winner of the Nobel Prize in economics, who distinguishes between "System I" and "System 2" thinking. System 1 "operates automatically and quickly, with little or no effort and no sense of voluntary control," he writes; System 2 involves conscious deliberation and takes longer.

"Before, everyone was focused on System 2," explains Rafal Ohme, a Polish psychologist who says his firm, Neurohm, has advised political campaigns in Europe and the United States. For the past decade, Onme has devoted most of his efforts to probing consumers' and voters' System 1 leanings, which he thinks is as important as listening to what they say. It's been great for his business, he says, because his clients are impressed enough with the results to keep coming back for more.

Many neuroconsulting pioneers built their strategy around so-called "neuro- focus groups." In these studies, involving anywhere from a dozen to a hundred peo- ple, technicians fit people's scalps with EEG electrodes and then show them video footage of a candidate or campaign ad. As subjects watch, scalp sensors pick up elec- trical impulses that reveal, second by sec- ond, which areas of the brain are activated.

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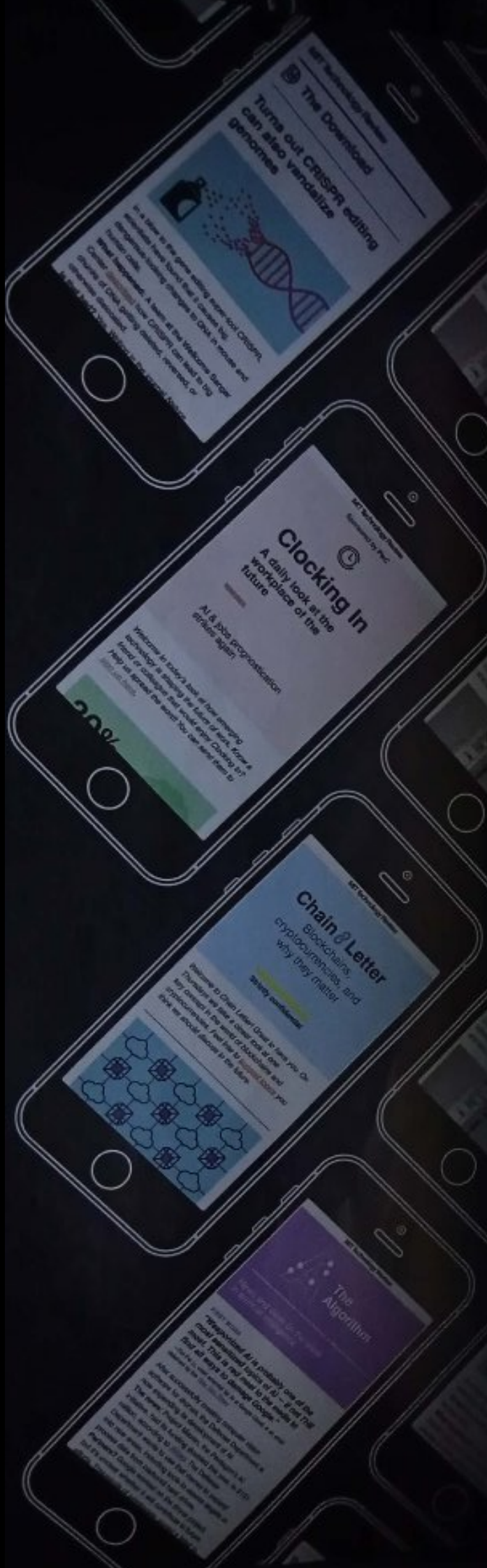

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From 2008 to 2018

The first Obama campaign kicked off a technological revolution

What a difference adecade makes consider: in 2008,the iphneas less than the a year oild inated the palms of corporate and political information continued the dominant dvertising and debates. Social media was a curiosity; governments and politicians who used it were still something of a novelty. It took the protests of the 2009 #IranElection-Time magazine dubbed Twitter "the medium of the movement"-to make mainstream journalists and politicians realize that smart- phones and internet connections were fundamentally shifting how we lived, worked, played, advocated, campaigned, and governed.

Since then we've been living through probably the most 5 rapid evolution of political campaigning in recent history. In S each US election cycle, the technology used has advanced and morphed; the tools that gave Barack Obama the 2008 and 2012 are very different from the ones that nudged Donald Trump to victory in 2016.where might things go next? What lessons will candidates for Congress in November's midterms have taken from Trump's victory? First, here's a brief history of a heady decade.

08

in electioneering. where its going next?By Alex Howard

20

2008

The key technological innovation that brought Barack Obama to the White House wasn't his tweets or a smartphone app. It was the Obama campaign's novel integration of e- mail, cell phones, and websites.

The young, technology-savvy staffers didn't just use the web to convey the candidate's message; they also enabled supporters to connect and self-organize, pioneering the ways grassroots movements would adapt and adopt platforms in the campaign . and get information on the voters in their neighbor- hoods. The campaign converted online energy into offline action, from virtual phone bank rallies to voter registration to get-out-the-vote drives during prima- ries and the general election. Of course, it didn't hurt that Obama was a unique and inspirational candidate to many- young, char- ismatic, and African-American. But it was adopting existing modern technology that helped an agile, insurgent campaign defeat Hillary Clinton, a member of one of America's political dynasties, in the prima- ries and then John McCain, a popular war hero.

2012

The 2012 campaigns drew on these technologies still further. TV remained the dominant political medium for debates, but by August 2012, a majority of US adults were on Facebook. That meant more voters could now watch the social-media chatter accompanying the debates on a phone or computer screen, creating new opportunities for the campaigns to respond in real time and craft fund-raising appeals or amplify the messages that had resonated most.

resources to key districts and media buys, the reelec- tion effort took the political application of data science to unprecedented heights. The Obama team cre- ated sophisticated analytic models that personalized social and e-mail messaging using data generated by social-media activity.

The Republican side, too, tried to create smarter tools, but it botched them. The Romney campaign's "Orca," a platform for marshaling volunteers..

2016

In many ways, Hillary Clinton's presidential campaign operation was a descendant of Obama's.

A big team of engineers led by ex-Googler Stephanie Hannon built dozens of tools, with a special focus on voter registration and turnout, and similarly formed an analytics unit to inform campaign decisions. The Clinton team built upon the institutional knowledge of the Democratic Party, trying to optimize and improve little things instead of developing a new "killer app."

In contrast, for all of Trump's prowess at mes- saging on Twitter, his campaign was an improvisa- tional, bare-bones operation. Whereas Obama's and Clinton's teams poured resources into building their own systems in 2012 and 2016, Trump's campaign chose off-the-shelf tools and everyday vendors. It used social-media platforms and relatively simple websites to target voters, with data acquired from Facebook apps and targeting tools designed for com- mercial advertisers.

Just how much Cambridge Analytica helped in this effort is still highly contested. The firm, which worked for the Trump campaign, boasted that its "psychographic profiles," assembled using data that turned out to have been purloined from Facebook by an academic, contained as many as 5,000 data points on each of 220 million Americans. Yet Brad Parscale, who ran Trump's digital operation and has been named his 2020 campaign manager, has repeatedly insisted the campaign didn't use those profiles, relying instead on data from the Republican Party.

While the Trump campaign didn't havdozens of engineers and analysts on staff, however, it had something else that helped to close a yawning tech- nological gap. These were the "embeds"- employees from Facebook, Twitter, and Google, picked for their Republican sympathies, who worked directly in the campaign's offices, teaching staffers how to get the most out of the platforms. The Clinton campaign was offered embeds but chose not to accept them. While it also spent tens of millions of dollars advertising on Facebook, it was much less sophisticated about it.

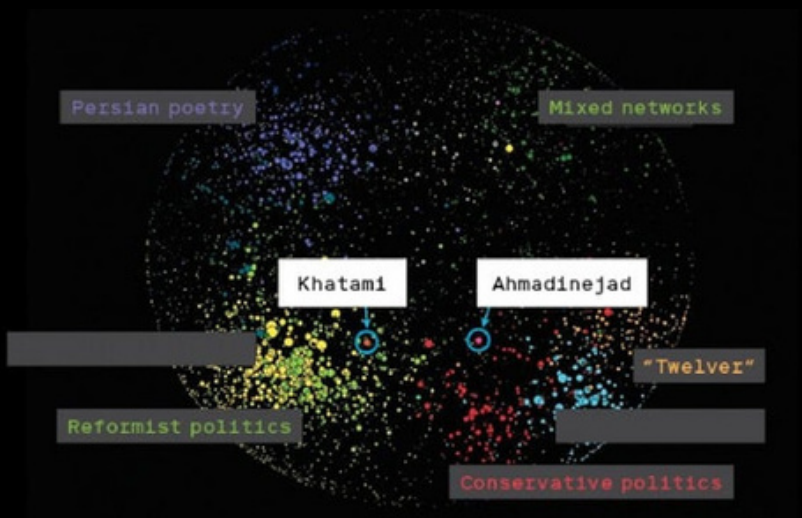
We have Facebook's own word for this. An internal company white paper that Bloomberg News obtained earlier this year reported that from June to November of 2016, Clinton's campaign tested 66,000 distinct ads while Trump's tested 5.9 million.

On top of this, of course, the Trump campaign had Trump himself, whose personal communication style turned out to be perfectly suited both to social media and to the political moment. His capacity for regularly provoking outrage won him $5.9 billion worth the mainstream media over the whole campaign, more than twice as much as Clinton, according to the analytics firm mediaQuant.

And it would be a mistake to forget that media attention, and the news that drives matter more than any Facebook ad campaign. The scandals Hillary Clinton's private e-mail server and the leaks of e-mails the Democratic National Committee and her campaign chairman-believed to be the work of Russian hackers-generated .

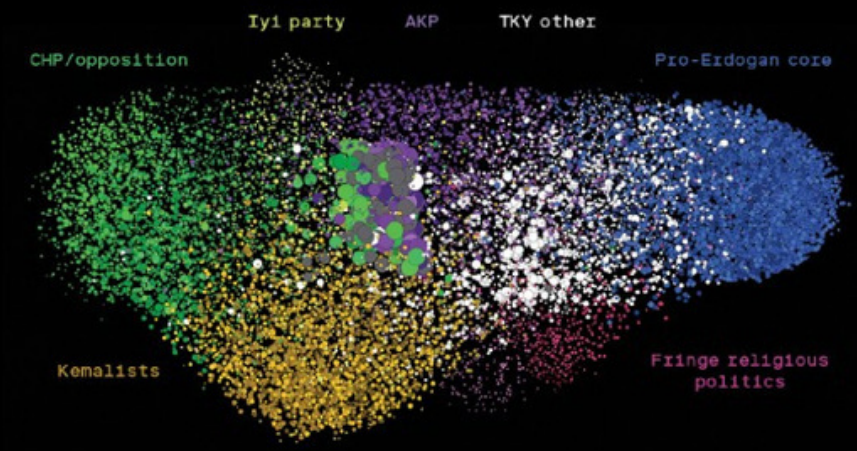
The Iranian blogosphere

The echo-chamber effect on the internet is nothin new. This 2008 map depict the blogosphere in Iran, clustering together blogs that link to each other and coloring them by their content. Before a sustained government crackdown on online speech, supporters (lowe right) and detractors (lower left) of the clerical regime each enjoyed substantial followings.



Turkish Twitter

This Twitter map of the political landscape in Turkey, analogous to the US map on pages 22-23, shows multidimensional polarization, with a dense sphere of influence around Erdogan supporters, on the far right side of the map, and two different poles of opposition on the other. These "amplification cores" of highly connected accounts have a disproportionate influence on the conversation and can rapidly boost polarizing messages.



Russia: The same but different

This Twitter map of the Russian political landscape shows polarization in another context. There are clear pro- and anti- Putin clusters, but they're knit together by a broad set of mainly pro-government news and discussion- oriented accounts. A halo of apparently automated "personal" and marketing accounts surround the Putin fans.