

Outwitting image recognition

PARMY OLSON

Last year, engineers at ZeroFOX, a security startup, noticed something odd about a fake social-media profile they'd found of a well-known public figure. Its profile photo had tiny white dots across the face, like a dusting of digital snow. The company's engineers weren't certain, but it looked like the dots were placed to trick a content filter, the kind used by social networks like Facebook to flag celebrity imitations.

They believed the photo was an example of a new kind of digital camouflage, in which a picture is altered in ways that leave it looking normal to the human eye but cause an image-recognition system to misclassify the image.

Such tricks could pose a security risk in the global rush among businesses and governments to use image-recognition technology. In addition to its use in social-network filters, image-recognition software shows up in security systems, self-driving cars, and many other places, and tricks like this underscore the challenge of keeping such systems from being fooled or gamed.

One senior technology executive says groups of online attackers have been launching "probing attacks" on the content filters of social-media companies. Those companies have ramped up their efforts to eliminate banned content with expanded content filters. "There's a bunch of work on attacking AI algorithms, changing a few pixels," the executive says.

A spokesman for Facebook said the company was aware of users trying to trick its image-recognition systems, a technique it refers to internally as "image and video content matching." Such users were often trying to sell banned items like drugs or guns in Facebook groups or on ads, but most approaches were rudimentary, the spokesman said.

Facebook struggled to handle another low-tech form of adversarial attack in April, when millions of copies of the live-streamed video of the gunman who killed 51 people in two mosques in Christchurch, New Zealand, kept getting uploaded to the site. Facebook blamed a "core community of bad actors." Their methods were rudimentary and involved slightly editing the videos or filming them and re-uploading new copies, so that Facebook couldn't rely on the digital fingerprint it had assigned the initial video. Facebook also struggled because its image-recognition system for flagging terrorist content had been trained on videos filmed by a third person, not a first-person perspective the gunman had used, the spokesman said.

Facebook has expanded its use of artificial intelligence in recent years. While the company has hired 30,000 human content moderators, it relies primarily on AI to flag or remove hate speech, terrorist propaganda and spoofed accounts. Image recognition is one form of AI typically used to screen the content that people post, because it can identify things like faces, objects or a type of activity.

Google has said it also plans to increasingly rely on using AI-powered software to block toxic content on YouTube. It has hired 10,000 people to help moderate content, but wants that tally of human workers to go down, according to a senior official from the company. A growing body of science shows image-recognition systems' vulnerability to adversarial attacks. One example comes from an experiment from September 2018, where academics took a digital photo of crack cocaine being heated up in a spoon and slightly modified its pixels. The image became a little fuzzier to humans, but was now classified as "safe" by the image-recognition system of Clarifai Inc.

Clarifai is a New York-based content-moderation service used by several large online services. Clarifai said its engineers were aware of the study, but declined to comment on whether it had updated its image-classification system as a result. "We found that even though AI and deep learning have been making great advancements, deep-learning systems are easily fooled by adversarial attacks," says Dawn Song, the University of California, Berkeley, professor who worked on the drug-photo experiment. Deep-learning neural networks, a type of computer system that's loosely inspired by the human brain, underpins most image-classification systems.

Researchers also have shown that image-recognition systems can be fooled offline. In April, researchers at KU Leuven, a university in Belgium, tricked a popular image-classification system by holding a small, colorful poster, about the size of a vinyl-record album cover, in front of them while standing before a surveillance camera. The special poster made the person holding it invisible to the software.

In a 2018 experiment, Dr Song's team put several black-and-white stickers on stop signs to fool image-classification systems into thinking they were speed-limit signs. The academics didn't test self-driving car systems in this experiment, but said that the attack's success pointed to the risks of using such software. The tools to trick image-recognition systems are easy enough to find online. Wieland Brendel, a machine learning researcher with the University of Tübingen in Germany, has gathered one collection of programming code that can be used to carry out adversarial attacks on image-recognition systems. He acknowledges that anyone could use the code to trick content filters on social-media sites "in principle," but adds: "That was never the goal. Any technique can be used in positive or negative ways."

Source: The Wall Street Journal

The business of appropriate housing

Minds are bound to work overtime puzzling out why Mr Modi is sending Mr Shah before he reaches the top to where Vajpayee paused on the way out



WHERE MONEY TALKS

SUNANDA K DATTA RAY

The Sangh Parivar may well feel a twinge of anxiety as Amit Shah moves to a more spacious bungalow and his new garden sprawls over nearly an extra acre of fruit and flower. For to the extent that their activities are not without the law, they must see themselves as falling within the home minister's jurisdiction. They aren't "termites" but can easily be regarded as such by the long-suffering public.

In the ancient world of Hindu values Narendra Modi extols, Mr Shah's exaltation might have been signified by some mark of

traditional honour. A title, perhaps, like "Brahmarishi" or "Rajguru". Or, maybe, an additional string to the sacred thread or, even, the right to wear one. Colonialism didn't change anything. Neither did a fiercely egalitarian Constitution. Nor the trite and tiresome chatter of TV anchors trotting out superfluous superlatives about the world's supposedly biggest democracy.

As the US Senator Adlai Stevenson once said, India has representative government but not democracy. Birth and status matter in a society that remains profoundly hierarchical. Only the outward symbols of the pecking order have changed, as they have done often enough during the "1,200 years of ghumami" to which Mr Modi once referred.

Take, for, instance the simple matter of the size of an office and the carpet covering its floor. Older New Delhi hands recall the tale of an officer who was installed in a room that was more sumptuous than his rank warranted because nothing else was available. He wasn't at all surprised when a servitor turned up with a large pair of scissors and snipped six inches off each of the four sides of the carpet. That reminder of his true entitlement cut the officer down to size.

Of course, no one would dream of reducing the grounds of the bungalow Atal Bihari

Vajpayee once occupied. But minds are bound to work overtime puzzling out why Mr Modi is sending Mr Shah before he reaches the top to where Vajpayee paused on the way out.

Given Hindu society's timeless ranking, the better informed among British members of the Indian Civil Service devised the theory that Indians saw their Anglo-Saxon rulers as another layer on the existing many-tiered power structure. Right or wrong, the men who operated the British Raj made full use of these gradations with the difference between knighthoods and British orders on the one hand and "native" titles (Rai Bahadur, Khan Sahib etc) on the other replicated in the distinction between King's and Viceroy's Commission.

Traces of the last might still be discerned not just in the difference between President's Commission and Non-Commissioned Officers but in the titles – subedar, havaldar, naik – still in use for the latter. It persists in the civil service in the great divide between officer and subordinate, and in the perquisites of rank in organisations like the railways. India's army may have done away (in theory at least) with batmen and given them a grand Sanskrit-sounding professional appellation, but a railway general manager still travels (when he travels by rail instead

LUNCH WITH BS ► KIRAN MAZUMDAR-SHAW | CHAIRPERSON | BIOCON

The First Lady of biotech

Mazumdar-Shaw talks to Pavan Lall about her new venture, curing cancer and the perils of a divisive society

I like to spend a lot of time on the beach. Scuba diving. Snorkeling. But that's when I have a little time, Kiran Mazumdar-Shaw confesses. When they do happen, these rare trivial pursuits don't usually lead her further than the Maldives or Thailand — destinations close to India. The founder and chairperson of Biocon, India's largest bio-pharmaceutical company, is hosting a lunch for *Business Standard* at Biocon's Dining Hall, called what else, Fine Dine.

Outfitted in a silk waistcoat with a dark dress, the 60-something entrepreneur is a Bengalar native. She was schooled in Bishop Cotton Girls' School, and later at Melbourne University. Best known for manufacturing insulin at affordable prices for a country where diabetes is rampant, her road ahead involves far serious maladies, I am to learn.

Fine Dine feels part a modern Richmond Road restaurant and part country club adorned with paintings by artists such as Basuki Dasgupta. It has several large windows that open to a lot of sunshine and greenery. As we step in, I am greeted by elegant teak furniture and prompt service. Light vegetarian fare is the order of the day. Lunch starts with a clear sweet corn soup, followed by a main course of dry paneer masala, crisp, puffy *phulkas*, plain yogurt, a cucumber and tomato salad, mint pilaf, a sunshine-yellow dal fry, rounded off by bananas for dessert. The table is set — plates are laid out with portions of each of these. I learn "Biocon omelettes", the second course, are an in-house specialty.

We get down to business. Shaw, who wears the twin credo of capitalism and philanthropy with aplomb, explains that "I want people to understand that we have never been a me-too company and have

done what is right and innovative, and that's how we succeeded in tackling diabetes, cancer", in an adamant tone.

Being the daughter of the managing director and chief brewmaster of United Breweries meant that Shaw is a Bangalorean at heart. It also meant that there was some inclination to follow a similar career path. No surprise when it surfaces that her postgraduate degree was in Malting and Brewing from Ballarat College, Australia. So why the shift from liquor to health-care, industries that are poles apart? Her answer is, she shifted to pharma after first using fermentation science for enzymes and then leveraging the same technology for biopharma. In other words, it was the process of science that intrigued her both the times.

As lunch progresses, Shaw adds that she tells her pharma colleagues that they are in a humanitarian business — like it or not, patients come first and if patients are the focus, profits would come naturally. "The high-value, low-volume pharma model that caters only to the West is totally flawed," she opines. "If you take the analogy of mobile phones affordable drugs can be world-changing."

A waiter brings in the famous omelettes, spherical and infused lightly with vegetables without a trace of oil, like everything else on the table. They're pre-sliced into quarters, cooked almost like spanish-style quesadillas and I help myself to one. It's near perfect. Shaw agrees. So, what's new for her in that area? "When it comes to important lifesaving therapies in business terminology it's always the

US, Europe, and the Rest of the World and that is absolutely wrong. It should be the US, Europe and Most of the World — because around six billion of the 7.5 billion people that inhabit the world are in Most of the World, and therein lies the inequity."

Take blood cancer. There are cures in the West where T-cells, part of the immune system that get fooled into inaction by cancer cells, are now being extracted and reprogrammed so that they swing into action when put back and do their job. The technology, called the CAR-T-cell therapy, is a form of immunotherapy used to fight cancer but the procedure costs around \$500,000 and the hospital charges would add up to another \$500,000. Shaw stops for a spoonful of her dal. "In India, no one can afford that." So she spearheaded the creation of a brand new company called Immuneel formed on philanthropic capital and with an initial platform of about \$25 million with a view to bringing affordable oncology treatment to India.

Others involved in the venture include Kush Parmar, an investor and managing partner at San Francisco-based life sciences venture 5AM Ventures, and Siddhartha Mukherjee, oncologist and author best known for this book *The Emperor of All Maladies: A Biography of Cancer*.

I peel a banana as I think... Biocon, Syngene and now another company. Shaw seems to hear me and says, "Yes, I know, I need another



ILLUSTRATION BY BINAY SINHA

company like I need a hole in the head, but this needs to be done." Through Immuneel, she expects to treat the first patient who needs a bone-marrow infusion by the year-end. I'm convinced.

Shaw is done with her lunch; so am I. "Have you read anything lately for leisure, maybe while on the beach?" I ask. *Factfulness* by Hans Rosling (with Ola Rosling and Anna Rosling Rönnlund), a best-seller that challenges stereotypes, is the

answer. Shaw's mother could easily feature in it. Well into her 80s she's an entrepreneur who runs her own dry-cleaning service, goes to work every day and is a role model whom she talks to daily. While it's clear that Shaw is philanthropic — committing to donating a majority of her fortune to charity and setting up specialty cancer care hospitals and treating cancer patients at her own cost — she also has iron beliefs and can't be swayed easily.

For example, her heart goes out to the plight of exploited women in the hinterland of Rajasthan and those that are "trafficked" from the north-east to Punjab. "That is the result of a divisive society that doesn't educate women," she rues, saying it's important that our country and government tackle these issues. Friendship is also a strong part of her. "I don't turn my back on friends," she says. Liquor tycoon Vijay Mallya, who she's known for decades and is wanted by the government, is one example. "He built a successful brewing business which created jobs and investments, and if he had committed a crime I would not support him," she says.

How does Shaw think medicine will change India 20 years into tomorrow? She pauses, then says "There would be many, but key would be a paradigm shift in the treatment of cancer. Stem cell therapy and 3D bio-printing would allow human body parts to be replaced with laboratory-grown organs with costs coming down exponentially."

All of this sounds wonderfully utopian. And what of Biocon and her company's growth plans, the foray into biologics, immuno-oncology and the drug molecules? "I have promises to keep... and miles to go before I sleep," Shaw smiles as she escorts me out.

Could doomsday be upon us?



PEOPLE LIKE THEM

GEETANJALI KRISHNA

The NITI Aayog recently reported that by next year, 21 Indian cities will run out of groundwater. With this year's monsoon expected to be below par, pre-monsoon rain lowest in 65 years and 43.4 per cent of the country already reeling under drought conditions (as per the real-time drought monitoring platform Drought Early Warning System) — could doomsday finally be upon us? Perhaps. However, the newly formed ministry for water resources and related issues Jal Shakti could help postpone this eventuality by implementing proper policies to harvest rainwater, regulate groundwater usage and most importantly, recharge groundwater through rural ponds and

reservoirs. Let me tell you the story of a pond in Lalpur village of Mohanlalganj block in Lucknow to illustrate how.

Till 2017, Lalpur's pond was a water-body choking with sewage and garbage. It stank so much that even animals did not go near it. Its bed had become hard with years of accumulated dirt, so its water could not recharge the water table. But when I visited Lalpur last month, I saw a very different picture. The pond was relatively clean, the stink had disappeared and so had most of the garbage. A kingfisher was swooping on the water surface and fishing nets indicated that the pond was actually being used for fishing. What had changed?

A December 2017 intervention by WaterAid India and Lucknow-based NGO Vatsalya had trained the villagers to empty the pond, clean its bed and create four levels on it. Today, the highest level stores dirty water that drains from the village. Solid contaminants settle at the bottom and the relatively cleaner water on the top decants to the second level, and so on. By the time the water decants to the third and fourth levels, it can be used in irrigation, pisciculture and animal husbandry.

The impact of the pond cleanup is discernable already. "Earlier, we used to find water at a depth of 40 feet here," a resi-

dent, Hari Shankar Verma, told me. "Now it's available at 30 feet." This agrarian community has profited by the improved availability of water. Some farmers have started planting a third crop of *mentha arvensis* (wild mint) between the two main crops of wheat and rice. Its short growing time and high yields make it a good option to supplement agricultural revenues, but it requires a lot of irrigation. "Till last year, marginal farmers like me who depend on rains for irrigation, couldn't have successfully planted this crop," said Verma, standing in a lush field full of this fragrant herb. Now, they can. Last year, Verma extracted 18 litres of *mentha* oil from the crop grown on a *bigha* of farmland. "I was able to sell it at about ₹900 per litre," he says.

The Lalpur case is easily replicable across rural India where wetlands and ponds have been traditionally used to collect rain and groundwater. Cleaning their beds and employing natural filtration methods is a relatively inexpensive way to recharge underground aquifers today — and could ensure greater water availability in future. If the new ministry does not act on this now, Prime Minister Narendra Modi's promise of providing piped drinking water to every household by 2024 could end up as nothing more than a pipe dream.



PEOPLE LIKE US

KISHORE SINGH

If you wake early, as I often do, you get to see some extraordinary winged creatures that disappear as soon as the sun has skirted the horizon. The ones that frequent our balcony are tiny with long beaks and midnight blue feathers that I am tempted to describe as humming birds. They feed on blossoms on trees but never on the silly sort of flowers my wife grows in pots. Because they are rarely still, I haven't been able to take their pictures, though I did manage to photograph a tiny green bird with a black slash around the eyes that seemed to enjoy posing and wasn't the least bit nervous. It was sitting on a fence against a backdrop of

figus leaves, so it's difficult to spot even in the picture, which is why I can tell my pre-dawn peregrinations are turning me into a naturalist.

As the sun rises, so does my acquaintance with the neighbourhood's avifauna. Red-wattled lapwings set off alarm calls, screeching like streetfighters. I tried to explain to my daughter that they were calling "Did you do it" on a rapid loop, to which she suggested I was suffering from a hangover. She's either tone deaf or bereft of a romantic bone in the body. At least the call of the koel — or I might mean the brainfever bird — is musical. It can be excessive though, which might be why some people find it annoying.

The neighbour's house attracts a family of peacocks that strut and preen on the parapet, which annoys my wife because we only get monkeys who are prone to trashing her greenhouse. Because of our proximity to the river, I can spot the occasional kingfisher, which I remember used to be more plentiful in my childhood. The river is the reason for the number of eagles we see soaring in the air currents looking to spot any prey they can find in the fields. My *maali* says he keeps the water level in the lily pool low so they

don't make off with the koi carps, but I think he's just lazy and couldn't be bothered filling it as frequently as it keeps evaporating in the heat. The pool attracts dragonflies, but these days it's bees you see staggering around drunk — they seem partial to some of the creepers that bloom abundantly in the harsh sun.

There are other species of birds I can never tell because they're dowdy and, therefore, uninteresting. A mousy one with a long tale often hangs around, but it's the return of the sparrows after an absence of several years that is particularly heartwarming as they peck on seeds, or insects, picking their way across the lawn. My son's balcony, though, is infested by pigeons, some of whom roost on his air-conditioner, and their hygiene habits being disgusting, he must resort to having the gas refilled every few weeks.

What's turned me into a birdwatcher? Well, dear reader, I wake early to go for a walk my son insists on imposing on me, while he snoozes in bed. My remedy has been to put on jogging tracks and shoes, throw some water on my clothes, and pretend to slump exhaustedly in a chair as I wait for the newspapers to be delivered — while nature takes its course.

WEEKEND RUMINATIONS

T N NINAN

Change or *status quo*?

The elections are over, and it is time to assess the interpretations of the outcome. The message from the voter is said to be anti-elitist; an expression of hope by the aspiring; endorsement by beneficiaries of the Modi government's programmes; and a victory of the culturally rooted over the deracinated. It may be all that and more, but in the story-line of seminal change it is instructive to see whom the victors are targeting — and whom they are not.

We have left behind the Left vs Right debate. The Left has been decimated, and there is no serious market-orientation to take its place. Rather, those presiding over an under-performing, unequal system intend to mollify losers with more welfareism. When the newly elected Lok Sabha members' median wealth is about ₹5 crore, and average wealth ₹20.9 crore, the majority of those elected belong to the wealthiest 0.1 per cent of the adult population. From these plutocrats' perspective, welfareism, combined with mobilisation around religion, encourages palliatives, not structural change.

What about feudalism and dynasties: *naamdars* vs *kaamdars*? The rhetoric struck home because of the Narendra Modi vs Rahul Gandhi binary. But we also have Varun Gandhi, Harsimrat Kaur (assets declared: ₹40 crore), Dushyant Singh (address: City Palace, Dholpur), Rajkumari Diyakumari (address: City Palace, Jaipur) and sundry others who have all been elected as members of the ruling alliance.

On the positive side, the idea of the aspirational *kaamdaar* extends to business, with the celebration of thousands of start-ups. The new India believes with Deng that to become rich is glorious. And so, despite demonetisation, people in business feel safe with Mr Modi. The *naamdars* to be targeted are only political rivals, and safe targets on the fringe like Vijay Mallya and Nirav Modi.

What does this mean? That amidst the narrative of change, what we have is a deeply conservative preservation of the *status quo*. Substantive change is reserved for Lutyens Delhi-ites in their new avatar as the Khan Market gang — a term originally coined for parliamentarians who preferred the upscale market's restaurants to the more basic fare of the Parliament House canteen. But in using the term, Mr Modi neatly transposed it to mean the post-colonial generation that prospered in, indeed owned, the Nehru-Gandhi era. An ideologue from the Rashtriya Swayamsevak Sangh (RSS) then said this "gang" will be "discarded" from the media, culture and academia. We may see no storming of the Bastille, but we do want to invade the India International Centre.

Why is this fading group, hopelessly unprepared for battle, so important? Because it still perpetuates the old idea of India, its syncretism the exemplar of a tolerant ethic in a civilisation that seeks to protect the weak, not celebrate strength. That narrative has to be uprooted, along with Constitutional ideas borrowed from the European Enlightenment, and colonial arrangements imposed by England-educated barristers, all of it to be replaced with homegrown, ie pre-Islamic and naturally pre-colonial, values that await serious articulation. The *de facto* reality of everyday governance has already changed; *de jure* change must follow and no one must stand in the way.

Under attack, Babar's de-legitimised *aulad* have retreated into frightened silence, while some among Macaulay's great-grandchildren have become like Rubashov, the jailed commissar of the people in Arthur Koestler's mid-century classic, *Darkness at Noon*: Ready to "remove his oppositional attitude and to denounce publicly his errors". Not because they might have to face one of the "agencies" (that is still reserved mostly for the chaps who were up to no good), but for fear of becoming irrelevant. Living in Delhi without mattering is worse than being in Dante's sixth circle of hell, reserved for heretics.

But if Mr Modi's extraordinary popularity, hard-earned, is to be the pivot for a swing to an Indian version of a strongman system (like Singapore, we already throw people in jail for insulting a leader), with criticism drowned out by abusive trolls, confusion between homegrown myth and scientific fact, an RSS worldview in history books, street-level storm-troopers indulged by the police, and appropriately manned institutions bending to the political wind, we run the danger of throwing out the baby and retaining the bathwater.

ILLUSTRATION BY BINAY SINHA



It's just not cricket, MS

Dhoni shouldn't take his regiment to the pitch. Sportsmen bring glory for their nations by playing to win, not as ambassadors for their militaries

We cannot question the old truism that while politics divides, sport unites. Even more so in the season of the ICC World Cup, which India has won twice in the past.

There is a qualification to this: It unites, but only the partisan. We as Indians are united behind our team, as are others behind theirs. That's what brings us to the controversy over Mahendra Singh Dhoni sporting on his big wicket-keeping gloves the "*Balidaan*" (supreme sacrifice) dagger, the insignia of the Indian Army's formidable special forces.

The International Cricket Council (ICC), which oversees the game, has objected to this. Under the rules of the ICC, as of any other significant international sports body, there are restrictions on religious, national or commercial symbols or logos a player can display on his body or livery.

The logos, for example, are of sponsors, deals from whom are approved by the ICC and the respective nation's associations. The permitted national symbols can be worn. Anything customised is a no-no. Anything military is definitely out. It is a field of sport, not military combat.

The Board of Control for Cricket in India (BCCI) says it has appealed to the ICC to let him be. Popular opinion is behind Dhoni's gloves. Think about it: Team India in the World Cup, Dhoni and our valiant special forces who not so long ago carried out the post-Uri surgical strikes, immortalised somewhat more colourfully more recently by that Vicky Kaushal movie. Which Indian would argue on the other side of this irresistible triple-magnet of nationalism?

But someone must do so and say the ICC is right. Dhoni should remove the insignia. A field of sport, competitive enough, should have no place for what symbolises killing or getting killed. That's why some of us must dare to swim against the tide, particularly those of us who love the sport and also want India to win. If our sporting nationalism is questioned, so be it. It might be comforting to borrow the old line from Jesus Christ: Father, forgive them, for they (those accusing us of being unpatriotic) do not know what

they are doing.

Let us first list the arguments from the "nationalists" and their trumpeters in the commando-comic channels already running nutty hash-tags like #DhoniKeepTheGloves. First, we must respect the armed forces. Second, India is being bled by the Pakistanis so a statement must be made wherever they're present. And third, you cannot deny an individual his choice, especially because Dhoni is an honorary lieutenant colonel with the special forces and has earned his "dagger and wings" after making the parachute jumps to qualify. You can't deny him his regimental insignia.

The third is answered easily: His regiment isn't playing cricket for India. And when the regiment fights the bad guys for India, its troops do not wear

the BCCI's crest, or that of Hockey India or Indian Olympic Association, although all of them represent the pride and glory of India.

That we must respect the armed forces and their sacrifices is accepted. But what follows, that this statement, as also the protest against what the Pakistanis are doing in Kashmir, should be made by our cricketers in Lord's, Old Trafford or the Oval and so on, is nonsense. Protests are made by politicians and diplomats, wars are fought by soldiers. Sportsmen bring glory for their nations by playing to win, not by becoming brand ambassadors for their militaries while wearing their sporting uniform.

Because it is a game two can play. If an Indian turns out in his Army's colours, so can — or will — the Pakistanis. A game of cricket, which only one of them can win, will take on the hues of a military contest. The spirit will immediately travel to the crowds, which are guaranteed to be predominantly Indian and Pakistani. This will turn sport into enmity, reminiscent of the bitter contests between warring Iran and Iraq in a distant past.

"At the international level sport is frankly mimic warfare," wrote George Orwell in his prescient 1945 essay "The Sporting Spirit". He goes on to say that the "significant thing is not the behaviour of the play-



NATIONAL INTEREST

SHEKHAR GUPTA

Stage set for the cricket coach



VIEWPOINT

DEVANGSHU DATTA

Team games tend to be driven by coaches, psychologists and back-room statisticians. American football is an extreme example. Squad formation and team selection are driven by statistics. The number-crunching indicates the best bang for the buck and the optimal team composition. The coach decides on strategy (again relying on stats), and calls every set-piece play. Basketball is similar. Football and hockey are more free-flowing but even there, strategy is coach-driven. Captains play symbolic roles.

Cricket is an outlier. This is partly because it is an unusual format, as a

sequence of head-to-head set-pieces. Two persons are centre stage; the other eleven play supporting roles. An individual, batsman or bowler may have far greater influence than a Messi or a Magic Johnson.

The second reason why captains dominate cricket strategising is tradition. Tradition endows the captain with responsibility for on-field decisions. There is no apparent reason why a coach cannot use technology to ring bowling changes, tweak field settings, or ask batsmen to change pace. Indeed, the 12th man does pass on instructions, in a time-honoured, cumbersome way. But it caused huge controversy when Hansie Cronje wore an earpiece on-field to confer with Bob Woolmer back in the 1999 World Cup and it's never happened since.

Still, the role of statistics and coaching has increased exponentially. Squad formation is driven by number-crunching in T20. The opposition is studied in detail to figure out the strengths and weaknesses. Bowling and fielding changes are micro-managed, with games sliced up over to over. Weather, pitch and historical performances are analysed to target "par scores" and to plan chases. Batsmen bat to a plan, bowlers bowl to a plan. Field settings are micro-managed to cut down

every specific batsman's shot-making preferences.

Traditionally, selection involved picking the four best bowlers, the best keeper and the best five batsmen plus all-rounder, or the best six batsmen. But modern limited-over selection is driven by strategy. A model that assesses 350 as par score will also indicate playing two sloggers who bowl, rather than a quality bat and a quality bowler. A team may even gamble on just three specialist bowlers. A team may play an average off-spinner to target opposition lefties, rather than play a quality left-arm spinner. A team may open with a spinner to target an opener shaky against spin.

This sort of use of "sabermetrics" started with baseball many decades ago. American baseball teams found better value for money via number-crunching, rather than "scouting". Statisticians could find undervalued players, who slotted together better as teams. Number-crunching also helped teams develop better playing strategies.

Cricket inevitably went the same way once the money flowed in. Given that video analysis is now easily married to silicon muscle, fine-tuning has improved. All the IPL teams, and most of the World Cup

squads, include statistical geeks, and sports psychologists providing inputs. Some of this analysis creeps into the public domain, as stats and graphics start streaming on to viewers' screens.

The 2019 champions, whoever they are, will be deserving winners. The format is among the fairest that can be devised. The Australia-New Zealand 1991-92 World Cup had a similar format, but it was vitiated by a really stupid rain-rule.

There is very little to choose between four squads, or even five, in terms of skill. There will probably be at least one team making the semis on the basis of a better run rate, and any one of the semi-finalists will be good enough to win the trophy.

The team that wins will be the one that has picked the optimal strategy, deployed the cleverest tactics, and executed plans with the least nervous hiccups. Finding the right plans will, of course, go beyond statistics in requiring an understanding of what each player can do, and maximises the team's collective strengths and targets the opposition's weaknesses best.

Although the captains retain lots of agency, the coach and the backroom will contribute far more than ever before to this process. This World Cup is, therefore, likely to be much more a clash of plans than of talent. WC2019 might well be remembered as the one where the coaches took over.

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Modi, Sitharaman, Keynes and Fisher



LINE AND LENGTH

T C A SRINIVASA RAGHAVAN

Towards the end of the second decade of the 20th century, two events occurred, leading to the creation of modern macroeconomics. One was the Communist revolution in Russia in 1917; the other was the end of the Great European War in 1918. The overall consequence of these two events was a huge depletion of European capital by 1920, which till then had financed global economic growth.

All European governments were virtually bankrupt in 1920. America, however, prospered because European capital had found its way to New York. The Americans, however, didn't know how to deal with so much money. So they went into a decade-long binge-and-boom,

which ended in bust in October 1929.

As a result, by the end of 1930 all major western economies had gone bust. In the 1930s, therefore, in the face of the Communist threat and the economic disaster, two broad strands of macroeconomic thought emerged.

One was due to John Maynard Keynes, who, in 1936, said governments had what amounted to a moral duty to spend money — even if they didn't have it — to put cash into people's pockets. This would increase aggregate demand and put some wind into the sails of the stalled economic boats.

Fisher's diagnosis

The other strand was less political. It was due to a now virtually forgotten but very great thinker called Irving Fisher. He said credit booms were inevitably followed by a bust because the real value of the debt went up when prices and incomes fell precipitously due to excesses of different kinds.

So, when debts don't get repaid, banks go bust. When banks go bust, credit dries up. When credit expansion declines, the economy slows. When the economy slows, incomes and prices fall. And so on in an expanding circle.

The best way to tackle this problem, he said, was to somehow get the real value

of the debt back to the (lower) level at which it was contracted. The problem, of course, was how to do this: By debt relief or by "fiscal stimulus", ala Keynes.

The former didn't appeal to the bankers but the latter appealed hugely to the politicians. Typically, they said let's do both, and that is what the world has been doing since about 1970.

India, in particular, has emerged as a world champion in this. Its politicians have been unctuously writing off debt and exuberantly pumping in money. Some of both has stuck to their fingers.

When the music stops

But now the money pump has seized up and debt relief has reached its limits. Like the European governments a hundred years ago, the Indian government is very broke. As the saying goes, "*Na rahega paisa, na bajega baja*". Narendra Modi's boat is not only stuck in the doldrums, it is also taking on water.

The new finance minister can look at the sky and wait — or do something completely new to put the wind back into the sails of the economy. The question is what.

I have been saying for the last 25 years, to no avail naturally, that the only government asset that is politically unproblematic is land. Unlike with the public

sector enterprises, labour doesn't come embedded in it. It is, therefore, easy to sell or lease.

But it won't. For example, in south and central Delhi, it is re-developing almost a thousand acres for its employees who will pay around 10 per cent of their basic salaries as rent, amounting to perhaps ₹5 crore a year. It has thus frozen the value of that land instead of unlocking it. If it had sold it to builders — like Donald Trump, say, because Indian builders are broke — its fiscal problems would have vanished for at least a decade if not more.

My bureaucrat friends tell me that they have blocked the idea in the past — one defence minister had thought about selling military land — because of corruption fears. But it is different now. Whatever else the prime minister is accused of, corruption is not one of them.

That is why he must set up the equivalent of a disinvestment commission, a sort of Treuhandanstalt if you like, to identify which of its land can be redeveloped, not just in Delhi but all over India. (Treuhandanstalt, or trust agency, was the body set up by the East German government in 1990 to supervise the privatisation of the public sector.)

All other avenues are closed. Neither Keynes nor Fisher can come to the rescue.

ers but the attitude of the spectators: And, behind the spectators, of the nations who work themselves into furies..." Our sportsmen and women have contested against Pakistan, lately with much greater success than in the past, while displaying an unforgiving, "take-no-prisoners" fighting spirit, but only in the game. During and after the game, the two teams have been friendly and sporting, even humouring each other's families and children.

At this juncture, fortunately, there isn't a war actually on — Balakot was a tiny skirmish that cost no lives and almost four months ago. In 1971, while a full-fledged war was being fought, Sunil Gavaskar and Zaheer Abbas played together as members of the 'Rest of the World' team touring Australia. This, when the IAF was routinely carrying out bombing runs over Karachi.

Again, in 1999, the two teams played in the World Cup in England on the day (night in India) of the fiercest fighting in Kargil. Hands were shaken, anybody who tripped and fell was helped along, as with tying the shoe-laces of rival batsmen. You didn't want either side bringing in Tiger Hill here.

Military symbols, uniforms with their lanyards and epaulettes, medals, strings and finery, bands, marches and style are all heady. They also come loaded with baggage where success or failure could look like victory or defeat in a war. In any game of sport — including the India-Pakistan league match on June 16 in Manchester — one side will win, but the other will lose. Will it be then like your army lost that battle? And what if both sides brought their "armies" on their sleeves into Old Trafford? The British will run short of police to be able to manage the crowds then.

At which point, we return to Orwell. "I am always amazed when I hear people saying that sport creates goodwill between the nations, and that if only the common peoples of the world could meet one another at football or cricket, they would have no inclination to meet on the battlefield," he wrote and used the example of the 1936 Berlin Olympics. He was both right, and wrong.

Human civilisation has moved way forward since the World Wars and the Cold War. Frequent sporting contact has become an antidote for toxic old enmities. It allows players, their fans, their families and friends to learn more about each other, build people-to-people linkages, sometimes even help vent their frustrations with each other through sport.

I do appreciate that today this view is neither wildly popular nor so politically correct. But, from Olympics to ping-pong, from basketball to cricket, from soccer to hockey, brutally competitive sport has helped smoothen the edges of militarised hostilities, and helped heal scars on our minds.

We certainly appreciate an individual's special devotion to the Army, particularly as he also exhibits that by serving it in an honorary capacity. Dhoni, for example, went to accept his Padma award in his full special forces' regalia, including the maroon beret. It was a perfectly good gesture. The Rashtrapati is also the supreme commander of the armed forces.

He doesn't have to take his regiment to the pitch. He will never be short of killer instinct behind the stumps. He could still feel the inspiration of that "dagger" in his palms each time he catches a batsman out of his crease. Insignias or not, Dhoni's will remain the deadliest pair of gloves behind the stumps.

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Jane Eyre: Reader, she dances with him

EYE CULTURE

ROSLYN SULCAS

"You are feeling trapped, like the walls are closing in," said the ballet mistress, demonstrating a sequence of frantic, elbow-jutting arms. "Keep the legs low, it's not about the height, it's about wanting to get out of here."

Devon Teuscher, Misty Copeland and Isabella Boylston, the American Ballet Theater principals who are all cast in the title role in Cathy Marston's "*Jane Eyre*," opening at the Metropolitan Opera House on Tuesday, listened intently as they copied the movements and tried to absorb the intentions behind them. It was February, and an early rehearsal for the full-length ballet, based on Charlotte Brontë's 1847 novel.

With its first-person narrative and intense focus on an interior consciousness, Brontë's novel isn't an obvious candidate for a ballet. But Ms Marston, 43, a British choreographer who has slowly forged a reputation for her ability to create narrative works, seems undaunted by the challenges of transmuting literary complexity into dance.

It was the strength and unpredictability of Jane's character that attracted her, she said, adding that she was often drawn to strong women as protagonists, including Mrs Alving in Ibsen's "*Ghosts*," Cathy in "*Wuthering Heights*" and Queen Victoria — all characters around whom she has created ballets.

Jane, she added, "is a kind of early feminist, fighting both the world and questioning her own emotions and reactions." "*Jane Eyre*," to a score by Philip Feeney that incorporates music by Schubert, Felix Mendelssohn and Fanny Mendelssohn, was first created for Northern Ballet in England in 2016. It has proved a game changer for Ms Marston.

British critics praised the clear storytelling in "*Jane Eyre*," Ms Marston's craft and her innovative physicality. This Jane is "emancipated from the conventional tropes of the ballet heroine," Judith Mackrell wrote in *The Guardian*.

After years of relative obscurity, Ms Marston was suddenly on the radar. Helgi Tomasson, the director of the San Francisco Ballet, invited her to create a work ("*Snowblind*") for the company's "Unbound" festival last year; she also made a full-length ballet, "*Victoria*," about the queen, for Northern Ballet. A new piece for the Royal Ballet is scheduled for February 2020.

"It's funny how things slowly trickle through," Ms Marston said over coffee at

the Royal Opera House in London recently. "Once you have a couple of big companies backing you, others follow suit."

She acknowledged that the pressure on ballet directors to find and feature female choreographers, hasn't hurt. "The woman thing is certainly part of it," she said. "And I think that companies know that narrative ballets often end up being productive for all in the end, and I have a lot of experience with narrative ballets by now."

Kevin McKenzie, the director of American Ballet Theater, said he first heard about Ms Marston after "*Snowblind*" was commissioned. "Then her name kept coming up," he said. "I liked that she was a storyteller at heart and the sound of her process." Still, when he met her after her stint in San Francisco, "I had to be blatantly honest and say I had never seen anything she had done."

After that meeting, Ms Marston sent Mr. McKenzie videos of her work, including one of "*Jane Eyre*," which he found "unusual and fascinating." He asked her to create a new one-act ballet for Ballet Theater's fall 2020 season. Then a crisis loomed. A full-evening program planned for this year's Met season fell through. Mr. McKenzie thought of "*Jane Eyre*." "I told Cathy that if she could figure out how to stage the ballet in a short time, let's do it." Ms Marston didn't hesitate. "You have to grab the moment," she said firmly.

Her interest in choreography began early. She took part in workshops and looked up to older students like Christopher Wheeldon and David Dawson, who were making choreographic inroads. There was certainly a glass ceiling, she said.

"I wasn't the ballerina type, and I didn't get offered a place in the company," she said. "The fact that I was a choreographer, and had won the school's choreographic prize, didn't make a difference, whereas I think for a man it probably would have."

Instead, she joined the Zurich Ballet in Switzerland, later moving to companies in Lucerne and Bern. She continued to make dances and in 2001 returned to Britain, determined to focus on choreography. There she created "*Ghosts*," her first full-length work, in 2005.

"*Ghosts*" led to an offer to direct the Bern Ballet, where she worked from 2007 to 2013, choreographing more than a dozen works, but also commissioning pieces. It was, she said, "a huge wake-up call about what it means to be a director."