

A leap into digital life

Tamil Nadu is pioneering the use of AI and blockchain to help the state provide better service to citizens, writes **TE Narasimhan**

Students turning up late is a common problem in government schools in Chennai. With students meandering in at various times of the day, teachers waste a lot of time checking attendance during different periods. Now, in a pilot project at a school in Triplicane in Chennai, the moment pupils arrive, an AI-enabled facial recognition system marks their arrival and the time. The school has seen an 85 per cent fall in stragglers.

A brainchild of the Tamil Nadu e-Governance Agency or TNeGA, the pilot, tested in several schools, will now be implemented in 3,000 government schools across Tamil Nadu.

Tamil Nadu has also started rolling out an AI-based crop pest detection and mitigation solution to help farmers address crop disease.

It is also exploring the use of a Predictive Services Delivery using blockchain technology to provide services to citizens when they need them, such as a reminder of a baby's first vaccination — rather than waiting till citizens seek out these services themselves.

These are just a few examples of the innovative solutions that TNeGA is pursuing for a digital future and backing the efforts is Chief Minister K Palaniswami's decision to increase the budget for e-governance initiatives from ₹25 crore last year to around ₹400 crore.

"Low cost, indigenous, scalable solutions for improved governance is our motto," said Santhosh K Misra, CEO, TNeGA and commissioner of e-governance. An IAS officer and an IIT Kanpur alumnus, Misra is leading a team of a dozen professionals at the new Centre of Excellence in Emerging Technologies which is developing these new systems.

Their mandate is simple: Use every new age technology ranging from AI, machine learning, blockchain and the Internet of Things to help the government perform better. Part of this involves steering the government towards evolving policies that are based more on data and analytics than on unproven assumptions and guesswork.

While TNeGA is working on many ideas, some have already been implemented, such as the facial recognition system for student attendance.



A school in Triplicane, Chennai, where the moment pupils arrive, an AI-enabled facial recognition system marks their arrival and the time

This indigenously developed solution costs only ₹3,000, including the hardware. So far, it has shown 99.5 per cent accuracy.

"It is saving nearly an hour every day that used to be wasted by teachers doing periodic attendance checks and freeing up that extra time for the core educational activities in schools," said Misra.

Identifying pests in 24 hours

The Pest Identification System developed by TNeGA aims to mitigate agricultural losses by offering farmers faster pest diagnosis and solutions. The interface of the system is an app called Uzhavan. A farmer can photograph a pest-infected crop on his mobile phone and upload it through the app.

The system at the backend processes the picture using an AI-enabled image processing algorithm to identify the pest or disease. A message is sent to the farmer suggesting what he can do to get rid of it in less than 24 hours.

Every day about 500 farmers post

requests on Uzhavan for help. The app is currently being used by over 500,000 farmers. Its usefulness is huge given that nearly 70 per cent of Tamil Nadu's population depends on agriculture.

As to the rest of the country, its possible usefulness can be gauged from the fact that India's per hectare cereal productivity is almost half that of China and the UK (around 3,000 kg/ha vs 6,000 kg/ha) owing to crop diseases causing a significant loss of productivity.

Chat Bot Anil

One of the first things that TNeGA did was to try and understand why citizens did not access government services digitally. It roped in IIM Tiruchirappalli for this purpose and the findings showed that most citizens are simply not familiar with keyboards.

TNeGA collaborated with Anna University to launch "Anil", an auto-

mated virtual assistant which can talk to people in Tamil. The smart assistant guides people step-by-step on how to apply electronically for birth, income, or community certificates. In the future, TNeGA hopes to make the process voice-based.

Getting futuristic with blockchain

One of the state government's most futuristic projects is the Blockchain Backbone infrastructure to improve the efficiency of e-governance services. TNeGA has earmarked ₹40 crore to build this blockchain platform which will be offered to all government departments.

Known as Nambikkai Inaiyam (which roughly translates to Trust Link), the platform is a state-wide infrastructure that can be leveraged by all government departments for intra-department exchanges and for providing services to citizens.

Alongside this, TNeGA is also cre-

ating a Zero Knowledge Proof-Based Predictive Services Delivery platform for all government services. The idea is to provide these services in advance of when citizens are likely to need them, obviating the necessity of applying for them.

"For example, when a child's birth certificate is issued, the system at our end will send the vaccination information through an SMS when she becomes six months old. Likewise, when she turns five, her parents will be alerted through mobile message to create her Aadhaar card," said Misra.

The application software used for issuing certificates will be suitably modified so that the document issued will electronically hit the *makkal* number (citizen number) already created by TNeGA for 70 million people in the state and electronically reach a 'Citizen Vault' — a kind of storage folder — to be alerted for each resident.

People can view their certificates or documents in their "vault" using their mobile number and user ID. From birth to death and all the other documents a person needs in between these two events — proof of education, caste, income etc — a system on blockchain will, without human intervention, prompt the software of each department to issue the relevant document as and when appropriate.

"The state's mission is very clear. As a government, we have to offer citizens convenient procedures and services that ease their life and not make them run from pillar to post seeking essential certificates or documents," said Misra.

The state has allocated a budget of ₹90 crore for the Predictive Services Delivery project which is presently in the blueprint stage but is likely to take concrete shape over the next year.

Vittal Raj, founder and senior partner at Kumar & Raj and an expert on cyber security and business technology, praised TNeGA's work. "A good governance model, technology architecture and human capital are amongst the critical success factors for successful e-governance, not to forget the need for political and administrative will," he said.

Raj added that TNeGA's plans for Nambikkai Inaiyam which will digitise all services on a blockchain backbone-based trust platform, was a classic example of how emerging technology can be applied to lay a "robust foundation to achieving visionary goals for good governance".

Still more ideas are being formulated such as using technology to detect internal bleeding from CT scans, a blockchain-based solution for tamper-proof preservation of registration documents, and an Internet of Things-based monitoring of the drinking water supply in rural areas.

Budgeting for the future of tech



KRANTI NATION

PRANJAL SHARMA

focus on technology includes agriculture, textiles, urban renewal, ports and healthcare.

Phrases like Internet of Things and machine learning, which were alien to the government, are now part of official lexicon.

This is an important shift for governments since it must counter the perception that higher use of technology is at the cost of employment and job creation.

"The new economy is based on innovations that disrupt established business models. Artificial intelligence, Internet-of-Things, 3D printing, drones, DNA data storage, quantum computing, etc., are re-writing the world economic order. India has already embraced new paradigms such as the sharing economy with aggregator platforms displacing conventional businesses. Government has harnessed new technologies to enable direct benefit transfers and financial inclusion on a scale never imagined before," the Budget says.

The Budget has also announced investment in the future. It has promised to set up data centre parks and a National Mission on Quantum Technologies and Applications with a fund of ₹8,000 crore for a five-year project. "Quantum technology is opening up new frontiers in computing, communications, cyber security with wide-spread applications. It is expected that lots of commercial applications would emerge from theoretical constructs which are developing in this area," the Finance Minister announced.

The government has also provided a much needed ₹6,000 crore boost to provide rural regions with Bharat Net fibre-to-home connectivity.

Realising the importance of artificial intelligence in

managing data, the government is now ready to deploy analytics for official statistics. A new policy on official statistics would use AI for data collection, integration, assessment and dissemination. Hopefully the archaic, flawed and poor data collections systems would be replaced rapidly with new AI-led processes.

India is a laggard in investing in new technologies. Government bodies and private enterprises have not invested enough in developing and enhancing emerging technologies. Small and smart start-ups are doing a better job of developing and deploying such technologies. But it is better late than never in this field where there is a breakthrough almost every six months.

Focus on local development is important. Hindustan Aeronautics, for instance, is moving to manufacture unmanned combat aerial vehicles with an Israel Aerospace Industries.

Linked to the use of emerging technologies is the oft-repeated need for revamping education. Instead of obsolete four-year degrees, the government must consider a life-long learning approach for students and professional. Short courses that are linked to market needs and breakthrough technologies will be far more useful than degrees that are outdated from day one. Perhaps the better encouragement of technology is its usage. Even as the government allocates billions for development, it must also change its rules so that it can utilise the services of young tech companies.

Government rules still focus on legacy, size and precedence for granting work to private companies. As the delivery of government services depends increasingly on technology, the government will have to consider ways of involving small and smart companies. Such changes should be done before the rollout of high-speed connectivity promised by 5G mobile services. China's investment in technology has outshone even the US. India has a responsibility to protect its interests by investing, encouraging and deploying emerging technologies.

The Budget announcements are a good start and will bear fruit for the country once related efforts are made simultaneously.

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ALGO RHYTHM

EYE ON THE OPERATING SYSTEM

Recently, as US-China tensions escalated, a tech company got caught up in the storm. Chinese firm Huawei, the world's biggest telecom equipment maker and a leading smartphone maker, was barred from using Google services. The result: It had to forgo Google Android operating system and develop its own.

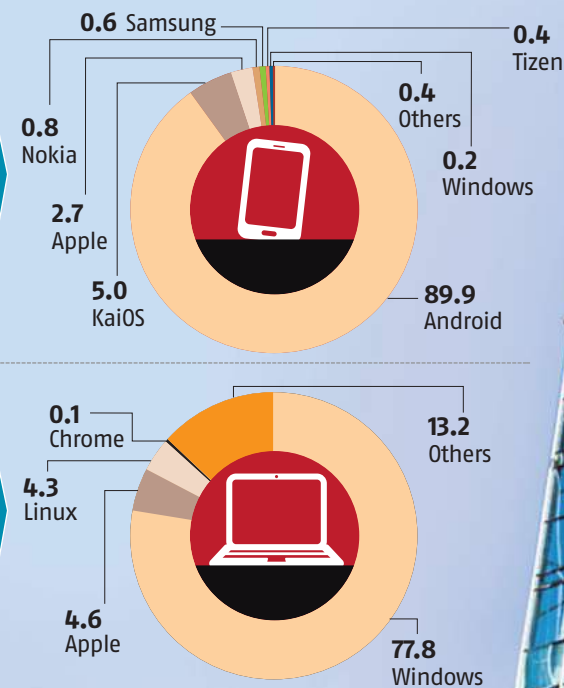
Pulling the plug on Android is a big blow to Huawei, as Android (with 90 per cent market share in India and similar share across the globe) is the dominant mobile operating system and a funnel for all other mobile services (through app store). Though Apple, which locks its users in its own operating system iOS, is the only other dominant force in OS, a few Indian startups are working to end this duopoly. Indus OS, a start-up from Bangalore, has an Indianised operating system for mobiles, used by phone makers like Karbonn and Micromax, among others. Another player on the block is Total, which is developed by social media company Hike.

Not just with new launches, OS itself is changing the way it is served. Recently, InMobi, a mobile advertising network, struck a deal with smartphone companies to show its content on users' lock-screens. In time, this lock-screen will become a place to feature entertainment content, news as well as ads.

COMPILED BY: YUVRAJ MALIK

MOBILE OPERATING SYSTEM MARKET SHARE IN INDIA (%)

DESKTOP OPERATING SYSTEM MARKET SHARE IN INDIA (%)



Source: Statcounter

Sebi embraces new age tools to prevent market manipulation

The regulator will use data analytics to scrutinise what it finds in its 'data lakes' and monitor information on social media, writes **Samie Modak**

Heard of Black Edge? In her famous book on the hedge fund industry which has the same title, Sheelah Kolhatkar describes Black Edge as the "most valuable information of all" in that it is proprietary, non-public, and certain to move markets.

No doubt, securities regulators around the world are putting in huge efforts to prevent the flow of such information, as well as to punish those making illicit gains using these insights. But it is not as easy as it may sound in an era when WhatsApp, Instagram, LinkedIn, Facebook and Telegram have almost become primary mediums of communication.

Given this, Indian market regulator Sebi (the Securities and Exchange Board of India) is going all out to embrace new age tools and technologies to analyse large-scale data to prevent market manipulation such as insider trading.

Sebi has drawn up a four-year roadmap for beefing up its technological prowess with a ₹500 crore budget. It is looking at building a "data lake", a vast repository of both structured and unstructured data, and creating data modelling and analytical capabilities on

top of it through the use of AI and Machine Learning. A tender to this effect was launched last November.

Presently, several industries including e-commerce, telecom, banking, and financial services are using data modelling by leveraging new age tools and technologies to gain business insights and make faster and smarter decisions.

Several global regulators across the banking and securities markets have also started using data analytics extensively to stay ahead of the curve when it comes to unscrupulous activities.

"By creating a data lake architecture, Sebi can use analytics to identify a pattern to detect instances of market manipulation. Using a combination of these can make the analysis sharper and bring actionable insights," said Kunal Pande, partner, KPMG India.

Getting access to the data and acquiring the ability to harness it, he added, will boost Sebi's confidence. At present, Sebi's surveillance

architecture is designed to act on what is called "structured data", that is, the data obtained from market intermediaries such as stock exchanges, brokers, depositories and mutual funds.

It also has access to 'semi-structured data' in the form of bank statements and income tax filings which are also relatively easy to process. But where Sebi lags in the handling of "unstructured data" which could be blogs, videos, and even random chatter posted online.

"Structured data analysis is not helping much and manipulators are using all kinds of techniques to evade them," said Sebi chairman Ajay Tyagi. "The analysis of unstructured data and language processing is a must in addition to analysing changes in prices and volumes. We intend to acquire new technology to do this."

Gaining access to information posted on social media is also a key part of this strategy. There have been several orders issued by Sebi which have established links through matrimonial apps and



Facebook or through using in-house technology. However, industry players say that in the absence of a data modelling platform or analytics tools, Sebi's capabilities could be limited.

At present, a huge amount of stock market-related information is shared and distributed by individuals as well as companies on social media and discussion forums. Monitoring the flow of this information is critical to prevent

insider trading and ensure transparency. The implementation of data lake capabilities will arm Sebi to scrutinise such data. This ability, combined with Sebi's traditional surveillance tools, can act as potent tools to catch violators.

For example, scores of alerts on stocks that see unusual volumes or price movements are generated by stock exchanges daily. While these alerts draw Sebi's attention, it has to establish if any

participant made unlawful gains.

By leveraging the "data lake", Sebi will be able to comb through social media, news websites, discussion forums, videos and podcasts, to find any potential pattern. If, for instance, the results show that a company insider passed key information illegally, Sebi can hold the company accountable.

Also, listed companies are supposed to disseminate sensitive and credible information on the stock exchange platform in order to ensure all investors get uniform access to it. However, some companies tend to give out information on Twitter or television news channels which could be prohibited under the law.

A famous example was Telsa boss Elon Musk's tweet in August 2018 that the company had secured funding to go private. The US market regulator, the Securities and Exchange Commission, later pulled up Musk for giving information without authorisation. The case was settled last year after Musk agreed to follow Twitter usage guidelines in future.

Industry players say such instances are possible in India as the use of Twitter is on the rise. Regulators will need to deploy technology to ensure that information that is passed on is not in violation of disclosure norms.