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Introduction

Proto-Indo-European language recorded the first words related to technology, followed by the Greek language, from which '*Tekhne* - art, skill, draft in work' + '*Logia* - a speaking, discourse, treatise, doctrine, theory, science' formed '*tekhнологia*' - systematic treatment of an art, craft or technique'. This English connotation later evolved into '*Technology*', bringing under its fold a wide range of practices, thereby producing innumerable definitions of the word across the world.

With the ongoing Industrial Revolution 4.0, a boom is currently being witnessed in the evolution of technology, specifically digital media. This boom has facilitated the provision of various complex services to common people in an easier manner and has changed almost all the dynamics between humans, their relationships with other living beings, society, and nature at large. Right from improving accessibility of basic services to enhancing human potential, advances in tech have equipped our spaces with world-class information dissemination systems and ever-expanding service and recreational choices.

Technology has always played an integral role in shaping our urban environments. Today, however, when it comes to urban planning, a quick and smooth transition to digital modes of operation specifically has started to seem like the obvious approach for cities to get smarter and free themselves from the clutches of its persisting problems. The gadgets and apps made available to us by technology remain oblivious to the social markers set by humans themselves and in turn facilitate the process of 'becoming' for everyone taking its recourse.

Technology is a coin too, with both boons and banes. If it is the reason for the improvement in the quality of life of the masses, then it is also the cause of many being marginalized. Beyond the romanticized notions of the relationship between humans and technology, the cons of technology have time and again been explored by popular culture. Though the visuals explore spine-chilling situations and evoke fear for the future, do they then downsize our zeal vis-a-vis the potential of the technology? Even if they do, the pursuit of exploring more, accompanied by our instinct to remain heedful and navigate better, overcomes our fear, something that the newsletter explores through various perspectives. All the quarters of the newsletter elaborately pan out the efforts being made to develop our cities.

The *ISCF Digest July-September* is the second volume of the official newsletter of the *India Smart Cities Fellowship Programme 2020*. It moves beyond the polemics of addiction and detoxification of technology and elucidates the inquiries and reflections of the ISCF fellows concerning the role of technology in urbanism.

The Team

Editorial Team

Nabamalika Joardar

Indian Smart Cities Fellowship Manager

Anupama Bhardwaj

Monica Thakur

Sai Varsha Akavarapu

Zia Ul Haque

Design Team

Rohitaash Debsharma

Srinidhi Ravishankar

Subarna Sadhu

Syed Mohammad Hamza Abdullah

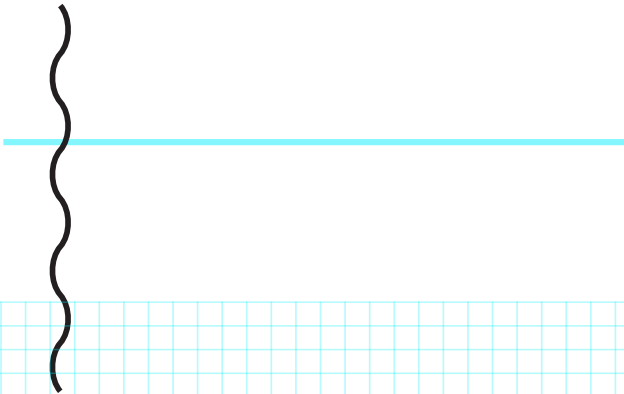


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1 Techonomy: A Paradigm Shift?

India is known around the world for her prowess and technical know-how in software products and services, holding a comparative and competitive advantage in the technology service sector that is currently valued at USD 180 billion. Information Technology (IT) and Business Process Management output alone contributes to 7.9% of India's Gross Domestic Product, employing over 4.1 million professionals in more than 31,922 IT companies.

However, the question that remains is, "How much of this advantage we have, is truly leveraged by the government to increase public welfare and efficiency of public services?"

India has half a billion internet users, and this number is expected to hit 639 million by the end of 2020. By May 2020, the number of internet users in rural India exceeded the users in urban India by 10%. The nation might foresee the internet user rise by 40%, doubling the number of smartphone users, making India the second-largest and fastest-growing market for digital consumers.

To Fear or Not to Fear Tech

Introducing automation has led to major labour market transitions, wherein there has been a polarizing effect lately towards high-skilled and low-skilled jobs. On one hand, unemployment triggered by automation sows fears in the minds of people, while on the other it creates new opportunities forming a new category of jobs in the labour market. Short-term technology can be disruptive to the labour market which, however, can be mitigated by smoothening the transition by upskilling labour to co-ordinate the demand-supply disequilibrium.

Data-driven organizations are twenty-five times more likely to acquire customers, six times more likely to retain those customers, and nineteen times as likely to be profitable as a result. Research and Development (R&D) in the IT sector can enable productivity growth,

efficient allocation of goods and services, production of higher quality goods, and enable the economy to run at full capacity. India is currently making 100 million digital transactions a day, having an approximate volume of 5 trillion rupees, which is 5 times the value in 2016. The Department of Electronics and IT in India has been sponsoring R&D projects in the IT sector and academic institutions via the Center for Development of Advanced Computing, and through initiatives such as Digital India, Make in India, and Startup India.

Technology for Whom?

It can be said that the rise in technology on the demand and supply side does not make sense if it cannot be used adequately by the marginalized sections. Disparities exist in the consumption of technology in terms of gender, caste, and Persons with Disabilities. 62% of internet users in urban India and 72% in rural areas are male. The use of the internet has important economic, educational, and social benefits - women from poorer families face challenges adjusting to changing technologies. Even though the enrollment of women in technical institutes has risen over the last few years, women continue to be concentrated in back-office jobs that require basic skills, while men dominate managerial positions with specialized requirements (Das and Das, 2016).

While Information and Communications Technology (ICT) in the form of mobile phones and the internet has reached people irrespective of the caste barriers in the society, a large group of Dalits who are a part of the informal sector and are involved in menial jobs are still miles away from using this very technology for their benefit. The middle-aged groups, however, do not consider the internet as a platform they can use, as most of them remain technologically uneducated. Moreover, even though technological advances have been made in all sectors, these technologies have not yet been deployed to sectors that are traditionally considered to be done by certain sections of society only. For example, agricultural activities continue to be carried out by Adivasis and traditionally agrarian

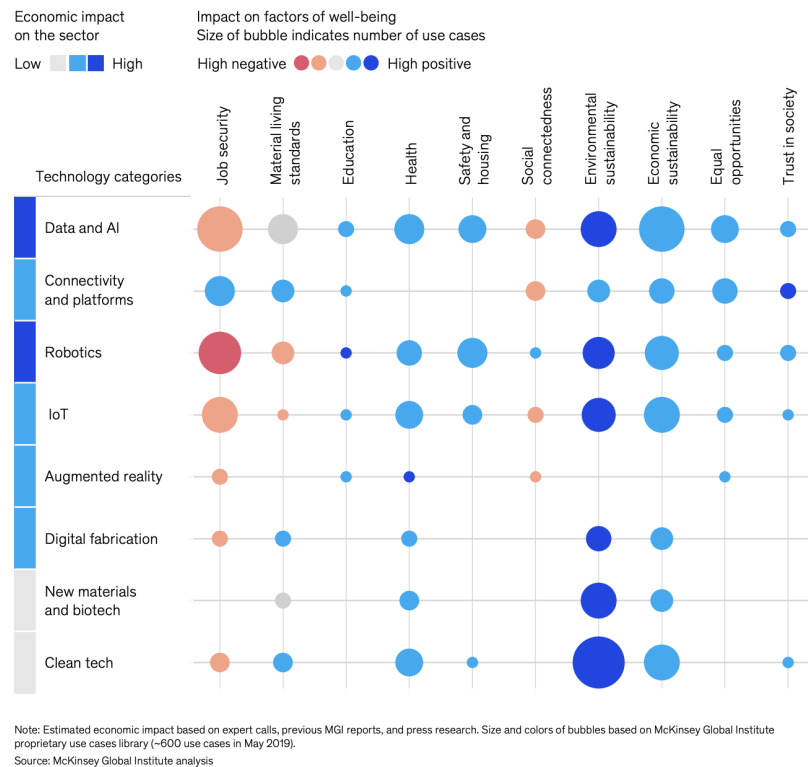


Image 1: Tech for Good - A large proportion of the use cases that create value for businesses also have a positive impact on many well-being factors

families, though a slow shift is being observed. On the other hand, even though manual scavenging is banned in India other than exceptional emergencies, it is still practiced majorly by Dalits across the nation.

Technology involving ICT, especially websites, books, mobile phones do not have the same usability to Persons with Disabilities (PwDs) as compared to those without any. For instance, in the case of visually challenged people, they have none. Out of all information published, only 1% is released in alternative sources accessible to PwDs. Lack of technological infrastructural solutions meant to facilitate access to services for PwDs leads to the creation of technological barriers, hindering work processes and thereby affecting the chances of PwDs in securing jobs as infrastructure in office spaces do not support them.

Technology for the Public Good

Technology has been used for improving the lives of people across India. Tata Trust started four supplementary rural learning centres for adolescents in Murshidabad in West Bengal in 2017. It has then been scaled up as a - 'Technology in Education' program across rural areas and later in the urban slums. In Assam and West Bengal, this very program by Tata Trust has been successfully conducted in all-girls schools, helping students from marginalized communities in becoming digitally literate. Technology has been used by these

students to raise awareness about losing culture and environmental damage within the community.

Many social enterprises are using technology that will help marginalized sectors make a difference to their livelihoods. For example, Hand in Hand India organization provides women and farmers with training in IT-enabled services and automotive and electronics so that they can be securely employed. Haqdarshak Empowerment Solutions Pvt. Ltd. trains women and people from marginalized communities to become entrepreneurs and information providers enabling them to empower others in the community and themselves.

Citizen initiatives also go a long way in adopting technology for the public good. For example, in Favelas, slums in Rio, the community took the help of solar energy and their love for football to generate electricity. The football field is kept lit by six LED lights that are powered by 200 kinetic tiles buried under an astroturf. While people play football on the pitch, the activity causes electromagnetic induction generators in the astroturf to generate electricity. In Dharavi, an urban slum in Mumbai, there are 15,000 single-room factories, employing 250,000 people to recycle waste, altogether earning about one billion dollars each year. 80% of the waste generated in Mumbai is sent to Dharavi to be recycled, generating employment for slum dwellers.

Way Forward

It is pertinent that we embrace change and technological advances with a sustained objective of using it for the welfare of society. Government has an important task to promote and undertake practices for upscaling and leveraging the technological know-how to be used for public welfare. Industry 4.0, the Fourth Industrial Revolution presents a unique opportunity to India, one that it can very well leverage if adequately equipped with the right policies and actions. This includes taking steps towards supporting innovation and R&D activities. Education, health, transition management, and providing employment leveraging the technological know-how to be used for public welfare. Industry 4.0,

the Fourth Industrial Revolution presents a unique opportunity to India, one that it can very well leverage if adequately equipped with the right policies and actions. This includes taking steps towards supporting innovation and R&D activities. Education, health, transition management, and providing employment opportunities are some of the important areas that need the adoption of technology. Creating ecosystems conducive for innovation spillover and common data-sharing agreements would support the cause of using technology for the public good. The comparative advantage that India holds can be anchored if appropriate steps are taken by the government by way of policies and incentives to move up to R&D activities

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Aman Singh Rajput



Radha Karmarkar



Vivin R Nair



2 GIS and its role in Flood Risk Management

Disasters are catastrophic events that disrupt the day-to-day patterns of life where people are plunged into suffering, and, as a result, require food, shelter and other necessities of life, and protection against extreme environmental conditions. Though it is often caused by nature, disasters can have human origins. Various studies conducted across the world by the UN Office for Disaster Risk Reduction, International Disaster Database, and International Monetary Fund, also suggest that the intensity of such events would continue to rise owing to the changing climate and rapid urbanization. Among the various natural hazards of the world, a flood is probably the most devastating, widespread, and frequent. With the increasing urbanization of riverbeds and other water channels, the intensity and impact of the flood have increased over time. These disasters cannot be prevented completely but the impacts can be reduced with proper early warning systems, mitigative measures, and pre-disaster planning.

In the age of modern technology, the integration of information extracted through Geographical Information System (GIS) and Remote Sensing (RS) with other datasets provides tremendous potential for identification, monitoring, and assessment of flood disaster. Geospatial technologies provide a wide range of applications for mapping hazards, vulnerability, and risk assessments for risk planning, developing early warning systems, etc. The current development in Geographic Information Systems and Remote Sensing has made it possible to identify the regions that are more vulnerable to natural disasters, thereby making it easier for public authorities to come up with proper planning to limit damages and organize rescue operations before the occurrence of such events.

Additionally, the rising number of Earth observatory satellites provides comprehensive and multi-temporal coverage of large areas, such as the real-time mapping of flood extent, which requires rapid acquisition, processing, and analysis of the current flooding scenario to fulfil the requirement of fast supply of data during floods. The increase in the instant availability of

such data supports the planning of emergency relief and helps the coordination of the response activities of various decision-makers.

With hazards here to stay, we would be compelled to rely on geospatial technologies to not only monitor severe events in real-time but also systematically study disruptive events to reduce their impacts on life and infrastructure. With the continued increase in cloud computing capabilities and availability of higher resolution data, we could improve the accuracy of similar such studies and establish a decision support system to tackle these crises effectively. Several international organizations and countries have developed indigenous Flood Warning Systems such as USGS Flood Information, Australian Flood Risk Information Portal that integrates real-time monitoring using satellite data along with sensor-based IoT technology. Few systems that are operational in India are hosted by ISRO, Central Water Commission, etc. which are often inadequate, inconsistent, and non-transparent. The flood forecast system of the Central Water Commission depends on 325 flood stations to monitor flooding scenarios of the entire nation. There is a need to increase the granularity of this data, however, until then it would be wise to rely on satellite data for mapping flood extents as it would cost only a fraction in setting up and maintaining such a system.

One such technology that improves flood monitoring systems is the use of microwave remote sensing that falls in the electromagnetic (EM) spectrum ranging from approximately 1mm to 1m. Because of their long wavelengths, compared to the visible and infrared, microwaves have special properties that are important for remote sensing. Longer wavelength microwave radiation can penetrate through cloud cover, haze, dust, and all but the heaviest rainfall, as the longer wavelengths are not susceptible to atmospheric scattering, which affects shorter optical wavelengths. This property allows the detection of microwave energy under almost all weather and environmental conditions so that data can be collected at any time using Microwave Remote Sensing. Due to the

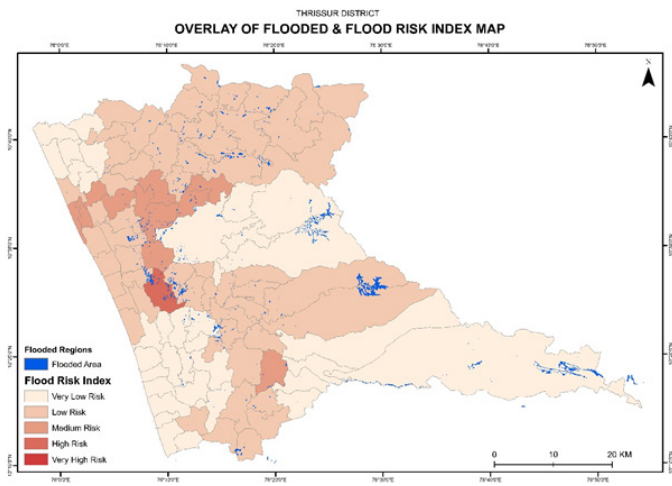


Image 1: Overlay of Flooded and Flood Risk Index Map

cloud penetrating property of microwave, Specific Absorption Rate (SAR) can acquire “cloud-free” images in all weather that makes it widely used in flood monitoring systems.

In August 2018, the southern state of India, Kerala experienced a devastating flood due to unusually heavy rainfall during the south-west monsoon season. Over 400 people died and more than 33,000 people were rescued all over the state. The 2018 flood was the largest flood that occurred in Kerala after the 1924 flood. I was fortunate enough to select this as my dissertation topic for my Masters and got the opportunity to closely work with the Thrissur Corporation in identifying the flood inundation regions in the district during using time series analysis of a high-resolution dataset from the period. I too decided to use the weather and time-independent Sentinel 1 SAR data to demarcate the newly inundated regions due to the flood. The pre-processing of the Sentinel-1 data and the calculation of the temporal median image for the study area are done in the Google Earth Engine platform. Flooded zones within the study area are identified using segmentation algorithms based on the difference in

backscatter intensity of inundated surface and elevated parts and the area affected are calculated based on the results of segmentation. From the results, it was found that Chalakudy taluk of the district is the most affected during the floods and verified the same with a field survey.

India too has recognized these necessities and acted by launching SAR-based high-resolution Radar Imaging Satellites (RISAT satellites) providing all-weather surveillance. Even with such rich satellite data, it is observed that several of these data sets are not available in open platforms and hence researchers are forced to use alternate open-source datasets provided by NASA or ESA. This disconnect between data sources and users in India will prove harmful and needs to be addressed urgently. If such databases are available openly they would be widely used for integrating with such systems to further improve the accuracy of such models. With ever-growing computational capabilities and open-source data, the time where Smart City dashboards provide an Automated Risk Information and Management System to tackle varying hazards is not far away.

However, apart from the lack of open-source data, the effectiveness of all such systems relies on how we plan and implement development. These Geospatial technologies would be meaningless unless we incorporate their findings in our planning strategies and develop our cities with sufficient Green Infrastructure such as adopting Ecosystem-based Disaster Risk Reduction strategies that could act as a buffer in case of a hazard. Nevertheless, this would require some compromises in our present development plans that do come at a cost, which compared to the potential risk would be far less.

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Image 1: Abby Varghese, Overlay of Flooded and Flood Risk Index Map, Identification and Flood Zonation Mapping of Thrissur District using Time Series Sentinel 1 SAR Data, May 2019, Retrieved from the Author



Abby Varghese



3 **ICCC: A Neurocentric Approach to making Cities More Responsive**

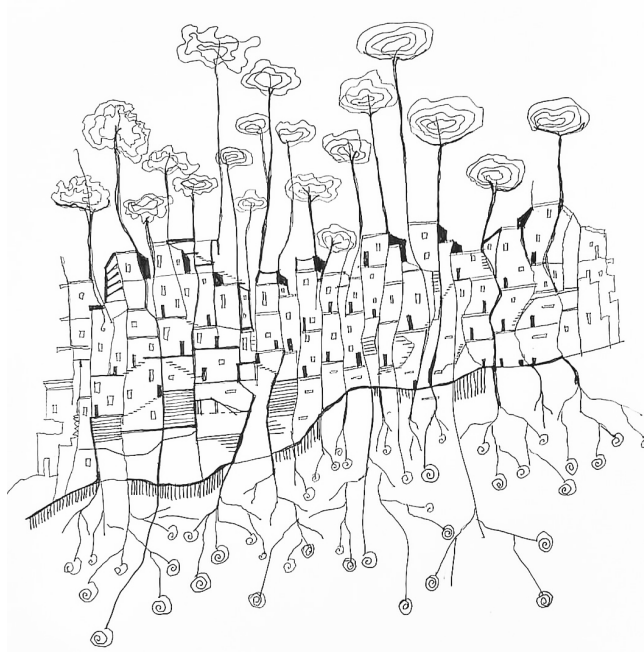


Image 1: A City's Brain and Senses

When the concept 'Smart Cities' is discussed, people usually imagine a smoothly run city, with a heavy veneer of technology as a solution to every issue. The fact is that technology may or may not be the solution to every urban woe, but it could be the central nucleus integrating the existing issues to be simplified. As human beings, we are built to respond to every adverse situation we face. We know how to come up with customized responses to the varying predicaments we deal with in our day to day lives. This response is sent from our central nervous system, the centre of which is our Brain. Our brain sends out responses to the rest of the body in an automated manner to resolve a scenario at hand. Multiple commands are coalesced and processed through the brain, and the feedback signals are sent through the nerves to the sensory organs. The human body and the functioning of its brain linked by the nervous system is a classic example of coordination witnessed. History has innumerable examples of technology drawing similarities from nature; be it the invention of aeroplanes or drawing analogies between the human body and different aspects of society by the philosophers. As quoted by the famous British anthropologist Mary Douglas, "The human body is always treated as an image of society." Now, for a city

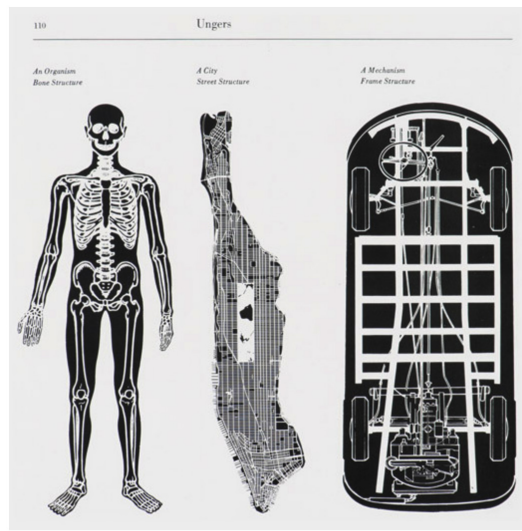
to maximise its efficiency, it needs to work like a human body where various activities happening within the cities need to be surveilled, monitored, and resolved from a central system.

The Brain of a Complex City

The metaphor that 'A city is a body consisting of various functional organs' has been explored in the architecture and city discourse, contributed extensively by Richard Sennett, a sociologist and Manfredo Tafuri, an architectural historian. The Integrated Command and Control Centre (ICCC), an integral part of a Smart City, can be viewed as the brain for the city to handle its everyday operations.

"...[t]he Integrated Command & Control Centre (ICCC)... is a 24x7 operational facility that has provided the citizens Ease of Living to the citizens every day".

*- Durga Shanker Mishra,
The Secretary,
Ministry of Housing and Urban Affairs (MoHUA),
Government of India*



Oswald Mathias Ungers, *City Metaphors*, 1976. [© Ungers Archiv für Architekturwissenschaft UAA]

Fig. 1: Analogy between the Human body and a City Plan

Our eye receptor sends visual signals to our brains, similarly, the sensors and other Internet of Things (IoT) devices will send real-time data to the ICCCs for it to be processed into useful information. The brain has pivotal components that are responsible for the proper functioning of our body. In the same way, the maturity of an ICCC function depends on four main pillars: functional, technology, governance, and citizen engagement and outreach. An analogy between the components in the brain of the city and the human body must be explored.

Neurocentric Components of the City

A city's daily functions are highly complex, the ICCC receives these complex signals and datasets to process the information required to run the city smoothly. This

complexity can be compared to our bodily functions which are controlled by the four main lobes; frontal, parietal, occipital, and temporal lobes. These four lobes play crucial roles to achieve specific functions and only when they integrate does the human body work properly. Similar is the case with the ICCC, it is important to assess the maturity level of the city's ICCC on their functional, governance, technology, and citizen engagement aspect.

The Functional component almost works like the frontal lobe of the ICCC. A human body's motor function, problem-solving capabilities, and responses are controlled by the frontal lobe. Likewise, the functional component is important to assess the basic functionalities in the city vis-a-vis civic services, mobility, safety issues, and crisis management. All the primary

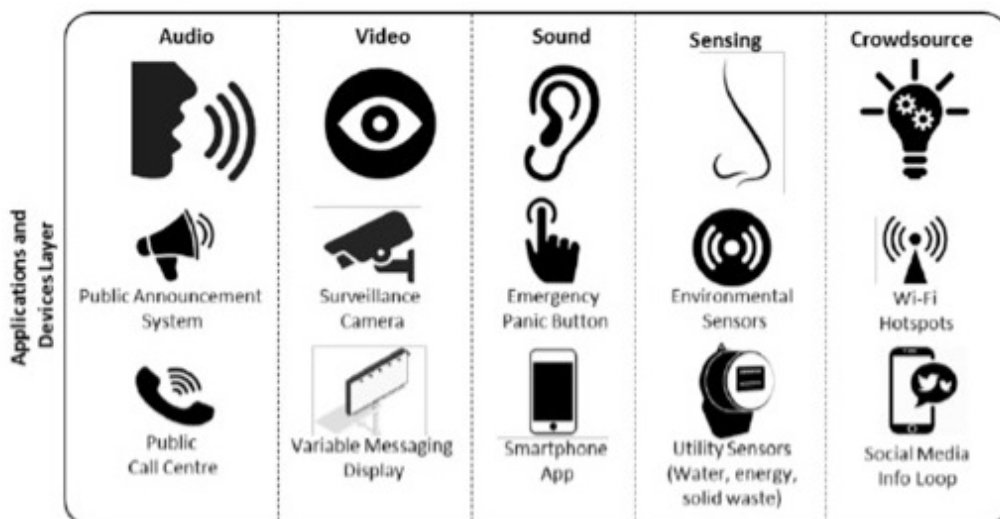


Fig. 2: Analogy between the Neurocentric Components of the Human Body and a City

services need to be integrated and monitored for the smooth functioning of the city.

The Technology component provides support to the Functional component by assessing the maturity of the individual components of the ICCC. Technology helps in getting real-time data to the brain centre of the city and facilitates the analysis of this data to take necessary actions. Various sensors that are deployed in the city for data integration, categorization of data, insight generation, predictive analysis, visualization, and many more are aided by the technology component. We see streaks of functions of all the four lobes of the brain here viz., the occipital lobe helps in visual processing, the parietal helps in integration and interpretation of sensory information, the frontal lobe helps in predictive analysis and the temporal helps in auditory perception.

It is not enough if the lobes are present in silos. For this, the cerebral cortex in the brain plays the role of holding all these lobes together. This role belongs to the Governance pillar of the ICCC. Once the functions and technology are put in place, it is important to lay down policies and frameworks to sustain the operations. Periodic monitoring of the performance, reviewing service level agreements, policy updating, and capacity building of the staff are few KPIs that fall under the governance facet. The final component which completes the body of the city is the Citizen Engagement and Outreach aspect. Citizens are the nerve cells of the city and they transmit the feedback for

various functions that will be processed from the ICCC. The maturity for this aspect will be assessed based on how much the citizens are connected to the functions of the city through the ICCC.

Criticalities of the Neurocentral System

With lacking efficient brain coordination, desired movements do not happen as intended. Steps can be staggered, or outstretched arms may not eventually reach the intended spot and likewise, with other organs. In such cases, even though the person individually has intact limbs, the efficiency and maturity of the organs are not attained to their maximum capacities. Similarly, in the case of a city, with all the infrastructure being invested on and launched, the coherence in holistically running a city can only be achieved by proper coordination from a single integrator platform i.e. 'The Brain of the City - The Integrated Command and Control Centre'. Otherwise, separate infrastructure in place will be just like those limbs, which individually might seem perfect but without any coordination, will not adhere to the bigger purpose.

Way Forward - A Holistic Development

Cities and citizens need to associate themselves as physical and psychological response feedback systems to the ICCC. The quality of a system can improve and evolve only by nurturing the idea of integration and responsiveness. Assessment, understanding, and

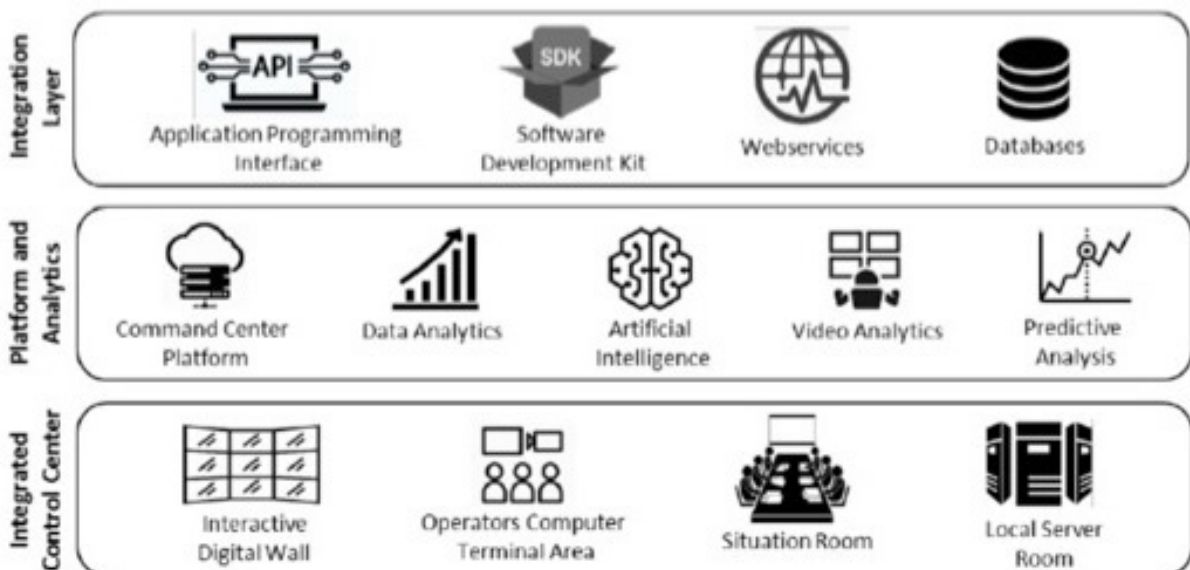


Fig. 3: Comparative functional components of ICCC and the human brain

acknowledgement of one's strengths and weaknesses are the preliminary steps to overcome the hurdles to keep improving. The ICCC Maturity Assessment Framework (IMAF) as initiated by the Smart Cities Mission is a good benchmarking exercise to understand the maturity levels of cities at a national level. Evolution is a continuous process in this maturity assessment. The

individual citizen of the city ecosystems should be a part of this evolutionary process, only then can wise decisions be taken in smart planning and further development. Equity and equality for all while establishing high levels of quality of life is the way forward in a mutually assertive environment.

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Fig. 1: Analogy between the Human body and a City Plan Oswald Mathias Ungers, *Morphologie: City Metaphors*, 1982, Retrieved from: <http://socks-studio.com/2011/04/25/o-m-ungers-city-metaphors/>

Fig. 2: Analogy between the Neurocentric Components of the Human Body and a City

Sarbeswar Praharaj, *Development Challenges for Big Data Command and Control Centres for Smart Cities in India*, January 2020, Retrieved from: https://www.researchgate.net/publication/334172302_Development_Challenges_for_Big_Data_Command_and_Control_Centres_for_Smart_Cities_in_India

Fig. 3: Comparative functional components of ICCC and the human brain Sarbeswar Praharaj, *Development Challenges for Big Data Command and Control Centres for Smart Cities in India*, January 2020, Retrieved from: https://www.researchgate.net/publication/334172302_Development_Challenges_for_Big_Data_Command_and_Control_Centres_for_Smart_Cities_in_India



Shilpa Shashidharan



Srijita Chakrabarty



Zia Ul Haque



4 Tech-Capitalism



Image 1: 'Can the Tech Giants Be Stopped?'

The past few decades have seen enormous growth in tech inventions bringing nations and people together. Today, technology is credited to be changing the world swiftly and for the better. And rightly so, there have been amazing innovations in the past few years that have changed the way we, as humans function on a day-to-day basis. For instance, 56 crore people in India, the second-largest population in the world, are currently availing internet services in the sectors of information dissemination, remote connectivity, safety and security, and many others. This has led to a boost in these sectors which is enhanced greatly due to advances in technology along with our usage interlinked. There is no doubt that technology has made things increasingly accessible and simpler than they used to be, empowering humans individually and as well as in groups.

Despite the increasing accessibility, technology also has an adverse side that is either not comprehended or is simply ignored. The average screen time has increased manifold, with more and more population having access to mobile phones all of us are stuck spending our time in silos, in the company of laptops, computers, tablets, mobiles, and other gadgets. This, in turn, is creating a huge and hopefully not an endless digital footprint. In this process, little do we realize that we are gradually being conditioned to behave in a certain manner and

are slowly losing control of what we put out for public consumption. Users are hardly aware of any terms, conditions, policies, and permissions they give out through the internet. Thus, the idea of privacy is being overridden and powered by limited or zero awareness.

Tech Giants and our Tech Dependence. Is there a Connection?

Technology has triggered some irreversible behavioural changes in humans. We are conditioned to believe it's all positive, and for the easier and faster functioning in each field. But, are we able to see the whole picture? Do we realize that we are being controlled by a few capitalists sitting across the world in another continent? As users, we are often myopic and can be easily blinded by low hanging fruits. We are getting accustomed to a lifestyle someone asked us to subscribe to. Our choices, language, everyday functioning, dependency on gadgets, social media are all being orchestrated and manipulated gradually.

However, the idea of technology and data has become extremely capitalistic. The early movers in the field had the maximum advantage and were successful in wiping out or buying out the competition (such as Facebook, Google, Amazon, Apple, and many others) and becoming extremely powerful owing to our dependency

on their products/services. Few companies' net worths are more than the economy generated by some countries in the world.

These tech giants began around the 1980s with the advantage of being early movers. We often read about violations of data usage by Facebook, Zoom selling/leaking users' data, and other similar news. Recently, the tech giants in the USA were summoned to court for the immense market monopoly that provided them with the ability to crush competitors by amassing customer and user data to ensure sky-high profits.

The technology market has relatively low barriers to entry, such as the absence of the requirement for patents or intellectual property rights. This translates into more and more start-ups choosing to explore, identify a gap, and prepare a product. However, there is no assurance that the market would remain welcoming or not. As soon as there is traction for a certain product, there would be immense pressure to scale up as fast as possible. Where scaling up is concerned, the current market scenario serves most of the start-ups with two options; i.e. either to sell their initiative/majority equity or be prepared for their businesses to be crushed by the leading entrepreneurship through a competitive product provided at lower prices. To not lose out on time and money, these start-ups sell equity, often losing the maximum shares and control over the board.

The induction of technology into sectors such as manufacturing, retail, engineering, etc. through software development has enhanced businesses around the world. It became a formula to success since anything online often witnesses high chances of growing, sustaining, and earning. Most unicorns from the past few decades are technology-based due to its low barrier and volatile nature. It is significantly easier to raise seed funding from venture capitalists in these circumstances where they are showing fast-growing estimates. However, it's easily replaceable and exhibits a fad nature where as soon as the users get a better option, they change their usage patterns.

It is extremely difficult to define user behaviour in the online space, and retaining users in competitive spaces calls for all these extreme measures to sustain position in the market. The gamification tactics used by tech giants in their marketing strategy influence the user experience greatly, creating demand for products/services that were previously non-existent. It's turned into a chicken-and-egg situation.

Repercussions of Tech Exploitation

All of us are subjected to technological exploitation by tech giants with its repercussions becoming prominent now. Web series such as Black Mirror and movies like the Social Dilemma, have given us a glimpse of the adverse consequences we will face in the foreseeable future if we continue to leverage technological inventions for our greed. Long term impacts would involve significant damage to the foundations of human rights and democracy. These are already evident as there have already been multiple instances where illegal/ unexplained activities have been called out.

Some drastic behavioural changes that are/would be attributed due to technological exploitation are as follows:

- A generation would be dependent on social approval for the simplest of acts/ tasks.
- Influenced rational thinking, i.e. people conditioned to believe what they see and hear in mainstream media by the virtue of its loudness and popularity rather than truth, facts, and logic.
- Lack of capacity to absorb and reflect instead of immediate half-learned response.
- The decentralization of power has provided everyone with a platform to express without the necessity of being accountable.
- The pattern of time allotment to each activity/ distraction is resulting in increased screen time on social media.

It is important to understand these points and take a step back to realize how we have been wired to think and act. Apart from this, the tech giants also have control over news generated by different media platforms that we consume and consider to be true. It can distract, influence, and replace our judgment without the truth ever surfacing.

There is no accurate method to quantify or qualify our tech/platform dependency, however, it wouldn't be an exaggeration to say that we all are socially handicapped and exhibit an orchestrated behaviour expected and specifically tailored for us.

Data Collection and Usage Accountability

There is a distinction between technology itself and the tech giants who drive/control how technology is used. There's no doubt that technology offers

endless possibilities for development. It is evident in the seamless online work transition taken up by a lot of sectors in the pandemic-led lockdowns across the world, without any significant disruption. But, the exploitation of technology by capitalist tech giants is also an undeniable fact which needs to be addressed immediately with a multi-tiered policy framework to protect users and regulate tech giants.

India has the second-largest population in the world and it is now even more attractive since China has a complicated administrative system and many barriers to entry, being a communist state. Our country can offer a maximum share of users to each tech giant and in turn create massive revenue streams. The interest in the Indian market is natural owing to the population, which directly translates into more consumers. The country needs to strengthen its awareness and policy quotient. Have we ever wondered, 'Why does India not have a tech giant as evident in the USA?' The answer is simple, Indians do come up with a lot of start-ups but end up selling majority shares to the USA or China-based venture capitalists, owing to scaling up capital required.

It's difficult to pinpoint one single item or regulation that violates our privacy and/or ethical norms. There

is no binding regulation since the beginning of this tech space, hence there is total private ownership and capitalization. We as a society do not understand the problem and its expanse well enough to take a position and resolve it. However, there is an urgent need for intervention before it gets worse and out of control with significant adverse effects.

Therefore, it is time for some regulatory framework to be placed. There needs to be accountability for all the data that is extracted from users. It may be implemented in the form of data anonymization and keeping it open-sourced, or shared with the government. However, there needs to be a check over our dependency on existing and upcoming tech giants along with the creation of a nurturing environment for the alternatives to survive. A shift in our thought process, an awakening, awareness and acceptance that somehow our behaviour is dictated by the tech giants is required. It is necessary to be able to understand the true requirements instead of mindless consumption of technology, to experience things for their true nature rather than for a memory to be posted on social media to ultimately realize and ignore our tech dependency.

Let's be responsible and conscious of the digital footprint we leave back.

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Aarsi Desai



5 Revive: A Step towards Smart Water

Water covers 70% of our planet, but this statistic is deceiving as only a mere 3% of it is freshwater and about two-thirds of it is trapped in glaciers or unavailable for our use. Over 1.2 billion people, i.e. one-fifth of the world's population lives in water-scarce areas and another 1.6 billion people face economic water shortage. It is estimated that urban water demand will increase by 80 per cent by the year 2050. Along with these, the increased pace of climate change has disrupted the traditional timing and distribution of water thereby creating uncertainty, especially in parts of South Asia that are densely populated and highly dependent on rain. The UN special rapporteur on human rights and extreme poverty warns us of a 'Climate Apartheid', with climate change threatening to push more than 120 million people into poverty by 2030.

India is in a deplorable situation too. The continued rate of growth in India's urban population has led to an increased demand for water, particularly in comparison to rural areas. In 2015, India had about 377 million living in its urban areas and by 2050, this number is projected to go up to 590 million. According to the National Sample Survey, only 47% of urban households in India have individual water connections, and about 40% to 50% of supplied water is reportedly lost in the distribution system due to various reasons.

The rapid expansion of cities and the rising population has put mounting pressure on water sources. When distribution has become a challenge to most of the urban local bodies in the country the easiest workaround for authorities and common people alike, is to tap into the groundwater. According to a study by the Centre for Science and Environment, 48% of urban water supply in India is met from groundwater. Groundwater exploitation for commercial and domestic use in most cities is leading to a reduction in groundwater level. The industrial development along the fringes of the urban centres in India extract groundwater using deep boring techniques for their operations that further worsen the water crises. Such

unchecked development has also ranked India at a low ranking of 120 among 122 nations in the Global Water Quality Index Report, revealing that almost 70% of the water is contaminated in the country.

However, even as the quantum of precipitation has not changed significantly, climate change has increased the variability of rainfall, meaning intense precipitation over a shorter period. This explains why most of the Indian states are facing the problem of urban flooding. Flooding alone has cost India Rs. 4.7 lakh crore in the last 6 decades. The irony is that rainwater, the major source of potable water; is wreaking havoc in most of the major Indian cities like Chennai and Mumbai. To understand the same, we need to revisit our development model, where cities often expand by unsustainable conversion of land use, encroaching water-sensitive ecosystems. This has drastically reduced the capability to manage stormwater runoff often leading to flooding in low lying areas.

Countries across the globe have recognized the significance of water and have been adopting strategies to ensure a water-secure future for urban areas. Intelligent metering, Urban water demand forecasting, Urban water modelling, urban stormwater model, sustainable urban water management, etc are often contextualized to suit the requirements of the city. However, with several countries adopting smart water technologies, India too has chosen to adopt smart water management solutions to address the aforementioned issues.

It is a necessity for the country to have a dynamic decision support system that not only monitors the distribution of water and its efficiency but also taps all potential methods of capturing and diverting rainwater to reservoirs. Such a system could turn to be a valuable asset, especially while implementing green infrastructure projects such as Ecosystem-based Disaster Risk Reduction strategies (Eco-DRR) to reduce impacts of disaster while also solving the issues related to climate change in the region.



Image 1: Revive - Integrated Tool for Urban Water Management

After assessing the slips and lacunae of the water sector within the country, Team Revive of ISCF 2020's Integrated Urban Water Management (ITUWM) project proposes to comprehend and analyze the water-related ecosystem of the city to boost the water harvesting capacity and aid in disaster risk reduction planning activities. The tool attempts to tackle the aforementioned issues in the water sector by developing a Dynamic Decision Support System

(DDSS) that not only acts as a base for smart water solutions for Urban Local Bodies (ULB) but also guides the stakeholders in identifying the potential sites for Eco-DRR initiatives. To achieve this, the tool intends to develop a water index in conjunction with the Pressure-State-Impact-response framework developed by the European Environment Agency in 1999 to effectively evaluate the current water scenario of the city to map water stress, the efficiency of water usage, water quality, identification of sites at risk due to sudden onset of disasters, etc by processing over 40 indicators. Through an extensive assessment of the water scenario in the city, the tool aims to address the delimiting factors within the existing water systems such as intelligent metering, urban water demand forecasting, and urban water modelling strategies by combining them with sustainable urban water management.

The toolkit is proposed to emerge as a standalone tool for context-specific data-driven water management for a given city. Apart from providing the capability of monitoring water scenarios, a natural resource map focused on water and allied ecosystems along with a dynamic mass balance tool would be added, which could help assist ULB's to evaluate their urban water management strategies and adopt measures by considering the geographic conditions prevailing in the region. The tool would also help the ULB in mapping and monitoring water sources and supply routes and identify flood-prone zones to recognize the regions at risk. Additionally, a citizen specific dashboard will be developed, where the citizens will have access to understand the potential of rainwater harvesting of their particular location/building, the predicted capacity, and a knowledge bank of best practices to sensitize themselves to save water.

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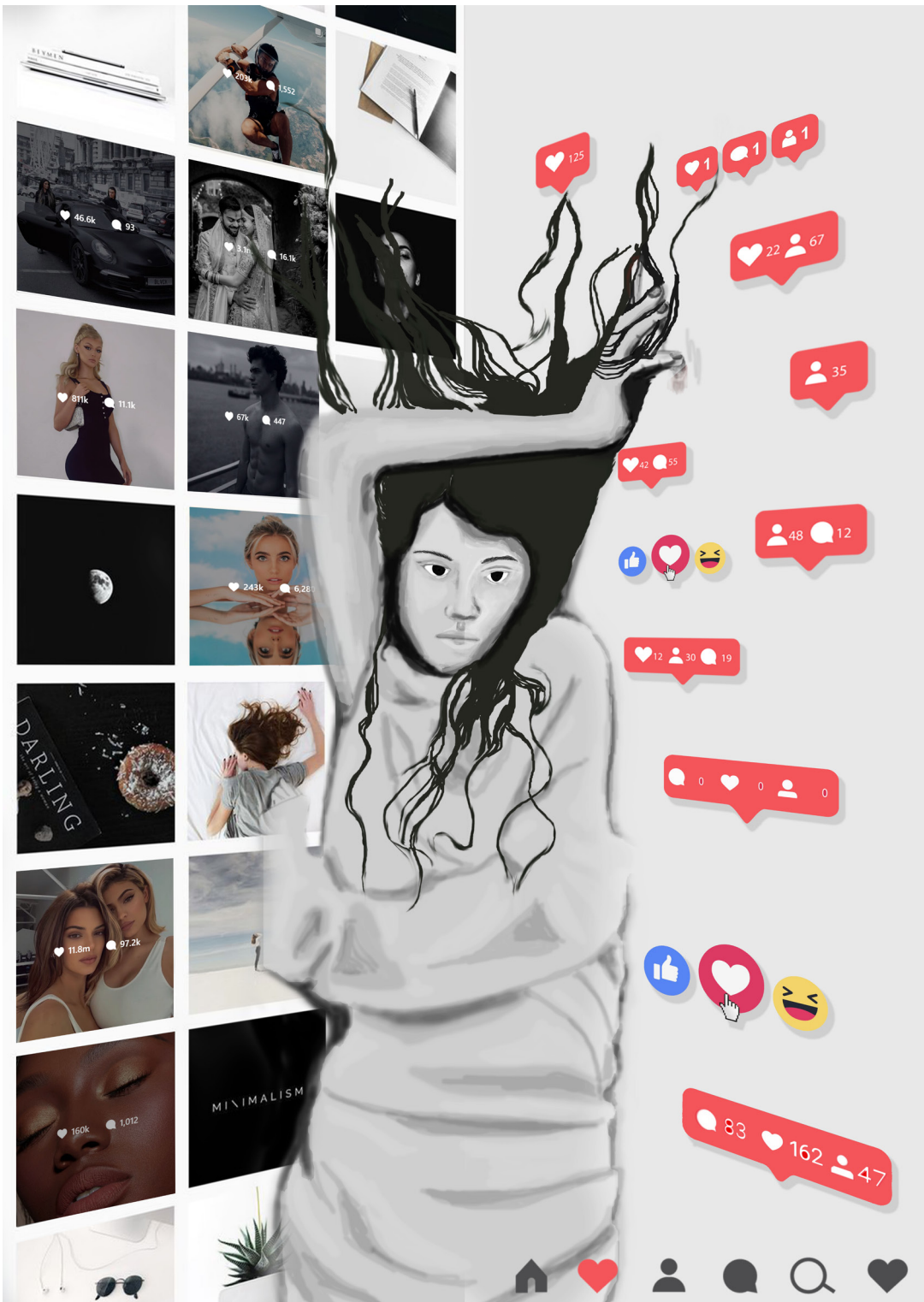
Abby Varghese



6 Claustrophobia

We mindlessly scroll through social media apps. Unconsciously picking up points of perfection. In our head comparing our flaws and wishing for perfectionism.

Perfect hair. Perfect body. Perfect skills. Perfect moves. PERFECT. Suffocatingly perfect. Or is it even perfect?



Subarna Sadhu



7 Background Check

8 Master & Maa-Stu

7

BACKGROUND CHECK ✓

shishh your brother's class is going on!!

But Ma'am, you will see my BACKGROUND too!!!

Teacher- 'All of you please switch on your videos now!'

Team Saksham



Abhisikha Das



Anupama Bhardwaj



Zara Hasnain

8

Master & Maa- Stu

Maa teacher is mad at us and asking us to upload our homework by 8 pm tonight.

Maa I am done. Now its Your turn to do your task... I am gonna watch The Simpsons now. yaay!!

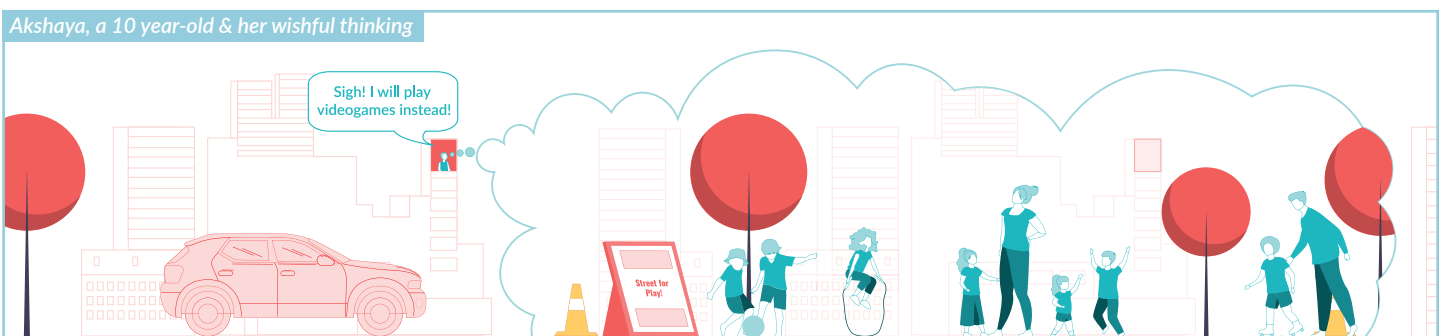
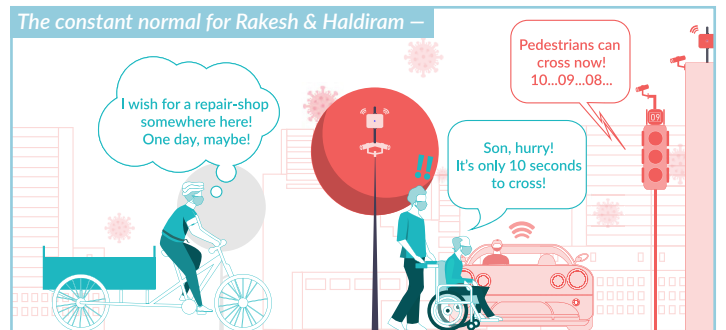
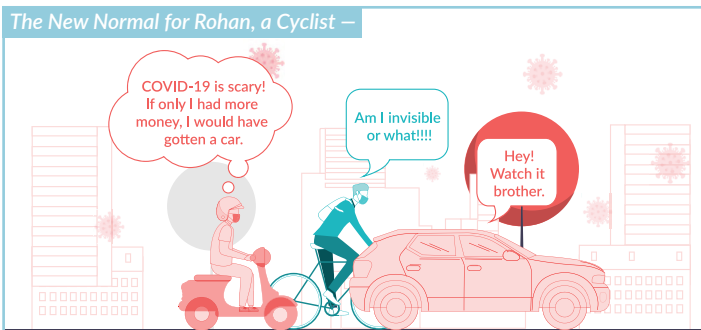
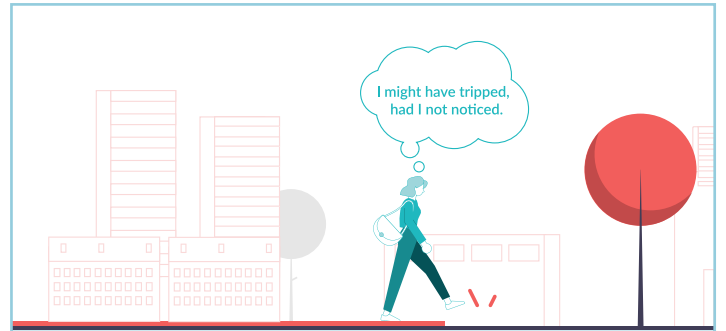
Hai Bhagwan! That's absolutely terrible!

I should probably look it up on google.

How to upload homework on ZOOM



9 Street Smart before Smart Street



“ How to create cities that make humans the focal point of everything?!

Being street smart is all about looking beyond what technology itself can do, towards how it enables us, the humans to aspire and achieve.



Srinidhi Ravishankar



Hamza Abdullah



10 Climate-Centric Cities: Re-imagining the Blues and Greens

Urban agglomerations are a claim asserted by humans on an ecological territory in and around a metropolitan region. Productive agricultural fields, natural resources, and other areas that constitute both blue and green spaces often get depleted during this entire process of urbanization at regional scales.

The question is, is there a way to bring back the lost natural ecosystems by leveraging technology? Is there a way to restore or revive our natural environment?

What are the best possible ways to conserve, enhance, and preserve our natural ecosystems along with the development of cities?

The Climate-Centric Cities initiative is illustrated in the form of an urban pattern where Brown, Blue, and Green spaces that are the indigenous natural elements grow along with developing built environments. It is an approach that promotes the inclusion of nature and ecology for sustainable and smart growth.



Zia Ul Haque



11 Pravega: A Sectoral Dashboard for Urban Mobility

As Fellows in the India Smart Cities Fellowship Programme, we have been provided with an exclusive opportunity to participate in the AMPLIFI Urban Data Challenge 2020. The AMPLIFI portal is a pioneering initiative by the Ministry of Housing and Urban Affairs (MoHUA) to assess and monitor over 700 datasets across urban sectors in over 130 Indian cities. The sectors covered under the AMPLIFI portal include education, energy, environment, health, housing, mobility, and solid waste management. For the Urban Data Challenge 2020, we were assigned the task of analyzing the datasets available on the beta version of the AMPLIFI portal and presenting our

considerable number of missing data points and invalid entries. With just a few days to go for the submission deadline, the lack of a robust dataset for urban mobility seemed like an insurmountable challenge for our team. Unsure of our next steps, we returned to the drawing board and looked for ways to overcome this setback.

Connecting the dots

With our thinking caps on and sipping several cups of hot chai, we spent the next two days brainstorming for out-of-the-box ideas to create a robust and holistic urban mobility dashboard. We realized that for a comprehensive analysis of the urban mobility sector, it was imperative to include datasets from other sectors on the AMPLIFI portal and generate cross-sectoral insights. Therefore, before we could analyze the data and design the dashboard, it was essential to pre-process all the datasets available on the AMPLIFI portal. We carried out a series of operations to remove anomalies and outliers from the data apart from extracting numerical data points from the strings. Following this, we applied statistical normalization techniques to bring the various features to the same scale. Additionally, we also filled in the missing data using simple interpolation techniques.

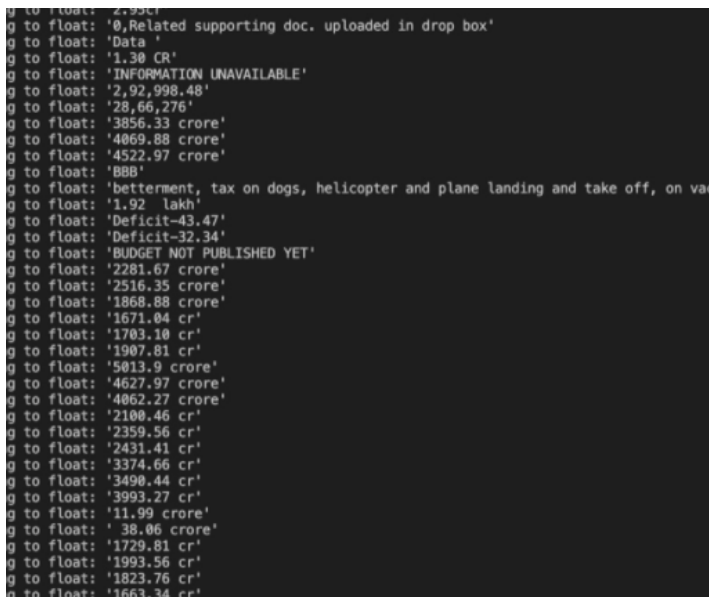


Fig. 1: Pre-processing over 700 Datasets on the AMPLIFI Portal

results in the form of a digital dashboard.

With less than a week to accomplish this demanding task, we set out to explore the datasets on the AMPLIFI portal. As urban mobility was our area of research and implementation for the India Smart Cities Fellowship Programme, we decided to build a sectoral dashboard to monitor, assess, and plan for mobility in Indian cities. From our initial review of the AMPLIFI portal, we realized that only 27 datasets were listed under the Mobility sector. Moreover, these datasets contained a

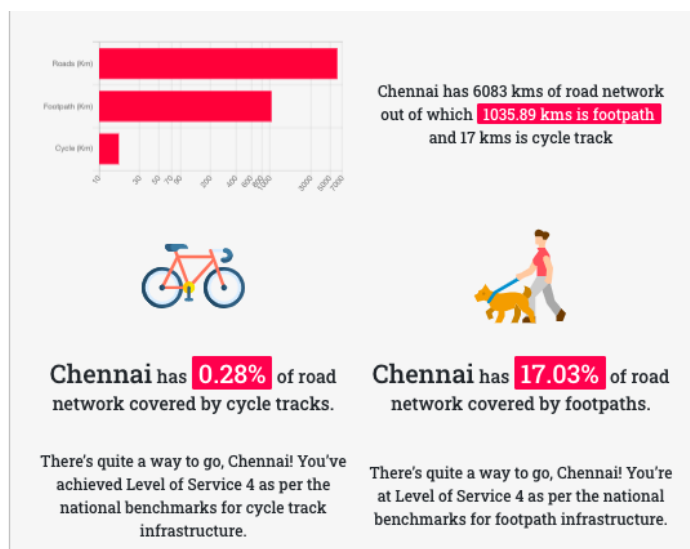


Fig. 2: Pravega - A Sectoral Dashboard for Urban Mobility

Next, we spent an entire day reviewing all pre-processed datasets and identifying meaningful insights that could be inferred from the data. After long hours of discussion, we shortlisted just over 75 datasets from a diverse range of sectors linked to mobility that could be used to generate insights on three themes - 'City on the Move', 'City for All', and 'Watchful City'. The first theme, 'City on the Move' focus on the interlinkages between urban mobility, public health, and air pollution. Infrastructure availability for active mobility through cycling and walking was gauged through data points on the length of footpaths and cycle tracks in each of the cities. The same data on footpaths and cycle tracks were also correlated to the average annual health expenditure per household to understand whether opportunities for an active lifestyle led to significant savings in health expenditure. Finally, we correlated the infrastructure availability with air pollution levels in each city to ascertain if the additional infrastructure for active mobility led to a decrease in air pollution and fossil fuel consumption.

Through the second theme, 'City for All', we tried to compare the affordability and availability of public transport across the cities. By correlating datasets on average total daily ridership on public buses and average annual household consumption expenditure in each city, we attempted to compare the affordability of public transport for the average urban citizen. Further, with the correlation of datasets on total seats in public transport buses and the total number of people residing in slums, we tried to generate insights on public transport supply for low-income groups in the city.

Finally, the last theme, 'Watchful City', focused on two datasets related to road safety i.e. road accidents and street light coverage. We calculated the street light coverage in the city with the help of datasets on road length provided with streetlights and total road length. Further, using the datasets on total fatalities recorded due to road accidents and the total number of death registrations in the city, we were able to calculate the percentage of deaths that occurred due to road accidents.

Building the Dashboard

Once the numbers were crunched, we regrouped to brainstorm the look and feel i.e. the interface design of the dashboard. We realized that our potential audience, made up of city administrators, urban development practitioners, transport industry professionals, start-ups,

and everyday citizens, was incredibly diverse in terms of their ability to understand the results of statistical analysis and technical knowledge of the working of transport systems. Therefore, to effectively convey the valuable insights generated from our extensive data analysis to the most number of people, it was essential to design the dashboard as lucid and succinct as possible.

We chose to present the entire dashboard in an interactive dialogue format with intriguing questions setting the context for each of the themes. For instance, the first theme of 'City on the Move' was introduced with the question - "Is your city built for active mobility?". Next, a personalized storyline was woven around each city's performance on various indicators within the three themes. For example, we calculated that Bhopal's cycle tracks covered merely 34% of the roads in the city. Therefore, we coded the dashboard to display a customized message for the city - "There's quite a way to go, Bhopal! You've achieved Level of Service 3 as per the national benchmarks for cycle track infrastructure".



Fig. 3: Pravega - A Sectoral Dashboard for Urban Mobility

Once we had developed the preliminary version of the dashboard, we felt that we were still missing one final piece of the puzzle. While the dashboard successfully presented unique insights and comparative analyses, it missed out on the opportunity to nudge users towards the best course of action to improve their city's performance. Therefore, along with the customized messages on a city's performance, we decided to add excerpts as well as links to significant policy papers and

government guidelines that would help the city prepare a roadmap for the future.

After a long weekend of meticulous data analysis and website design, we were ready to present 'Pravega - A Sectoral Dashboard on Urban Mobility' to the jury and our peers. We chose to make the code for the dashboard open source to encourage collaboration and co-creation in the future. Pravega is presently hosted at <https://upperwal.github.io/data-challenge/#/>. We hope that Pravega provides an opportunity for data-driven decision making while also building trust through transparency and accountability.

The AMPLIFI Urban Data Challenge reinforced the need to break down academic silos and work together to solve complex problems. It pushed us to think creatively while also teaching us to ground our ideas in what could be realistically achieved within a limited timeframe.

Despite our project not being chosen for the final shortlist, building Pravega made us realize that when we worked together as a team, the creative possibilities were nothing short of infinite!

Pravega - The Sectoral Dashboard for Urban Mobility in India

The Urban Mobility sectoral dashboard covers over 25 different indicators from across 10 sectors to present a holistic picture of mobility in 117 cities across India. Apart from providing an overview of the key mobility indicators, the dashboard also brings together cross-sectoral insights linking mobility to public health, equity, safety and overall quality of life in your city. Further, based on these insights, the dashboard suggests certain essential policy recommendations from the Government of India.

To learn more, select your city from the dropdown

Ahmedabad

Ready, set, go! Here's the rundown on Ahmedabad

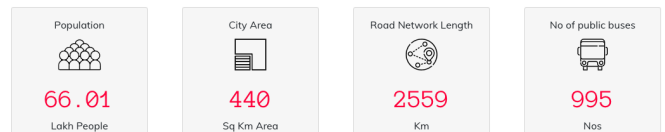


Fig. 4: Pravega - A Sectoral Dashboard for Urban Mobility

Fig. 1: Pre-processing over 700 Datasets on the AMPLIFI Portal, 27th July 2020, Retrieved from the Author

Fig. 2, 3 and 4: Team Mobilize, India Smart Cities Fellowship, Pravega: A Sectoral Dashboard for Urban Mobility, 18th September 2020 Retrieved from: <https://upperwal.github.io/data-challenge/#/>. Screenshot by Author



Abhishek Upperwal



Aparna Ramesh



Manuel Diego



12 Finding XaHoX

Floods in Assam are the inevitable result of the mighty Brahmaputra and Barak rivers, whose aftermaths on people and their livelihoods are normalized by stating it as a “geographical reality”. The effects of a disaster are intensified when the hope of people affected dwindles into nothing. Assam, my home state, was moving towards a similar fate. COVID-19, an added affliction, did not help either. Due to the pandemic-led lockdown and the work-from-home situation, I was spending the ‘Flood Season’ in Assam after a long time, due to which I witnessed the havoc caused by floods this year more closely.



Image 1: Floods paralysing daily life in Dhemaji District of Assam

What was heartbreaking was to look at the majority of India’s national news media houses not bothering to cover the hardships being faced by the people in the face of floods. The drowning of one-horned rhinoceros in Kaziranga National Park finally woke up these media houses to the devastation being caused by the floods in Assam.

In a bid to help in every possible way, I along with the other alumni of my alma mater i.e. Tata Institute of Social Sciences started to intervene in our capacity and XaHoX came into existence. XaHoX in the Assamese language means ‘strength’, something that we were trying to gather for Assam. At XaHoX, our objective is to

reach out to the affected communities ravaged due to floods with the help of local field-based organizations and ensure last-mile delivery of resources and services to them. This was done by connecting the donors directly with the organizations working on the ground to ensure that resources reach people, especially the communities that are most vulnerable.

During the lockdown, starting an initiative of this scale was possible solely due to the connectivity offered by technological advancements. Social media enabled us to reach more people and let them know about the campaigns being held for Assam. I initially connected to people in my social groups, who then spread the word about XaHoX which started a chain reaction and garnered us enormous support. It played a key role in creating awareness about the magnitude of the disaster among people living outside of Assam and for collecting funds. Local artists of Assam with their unconditional generosity came forward to raise funds by auctioning paintings which helped our group in facilitating the process. Along with this, iWoot Media, a creative agency based in Dehradun curated informative videos for us to widen our reach outside Assam. As word spread with time, Comedian Abhineet Mishra also came on-board and extended support in raising relief funds. Given the pandemic situation, services like UPI and Netbanking have proved to be extremely beneficial in both the collection and mobilization of funds. Though not every person in India today has a smartphone, many people already do, which made sending money to field-based/grassroot-level organizations working for flood relief works in a legalized manner easily and quickly. Many of the donations came in through organizing online social media quiz competitions and campaigns. These efforts resulted in donations pouring from all over India and made it possible to raise Rs.10,00,000 within seven days. This amount was used to bring home the Assamese migrant labourers stuck in Tamil Nadu. With this amount we were also able to extend our support to Sai Pallavi, a brave activist who helped many Assamese, return home with dignity.

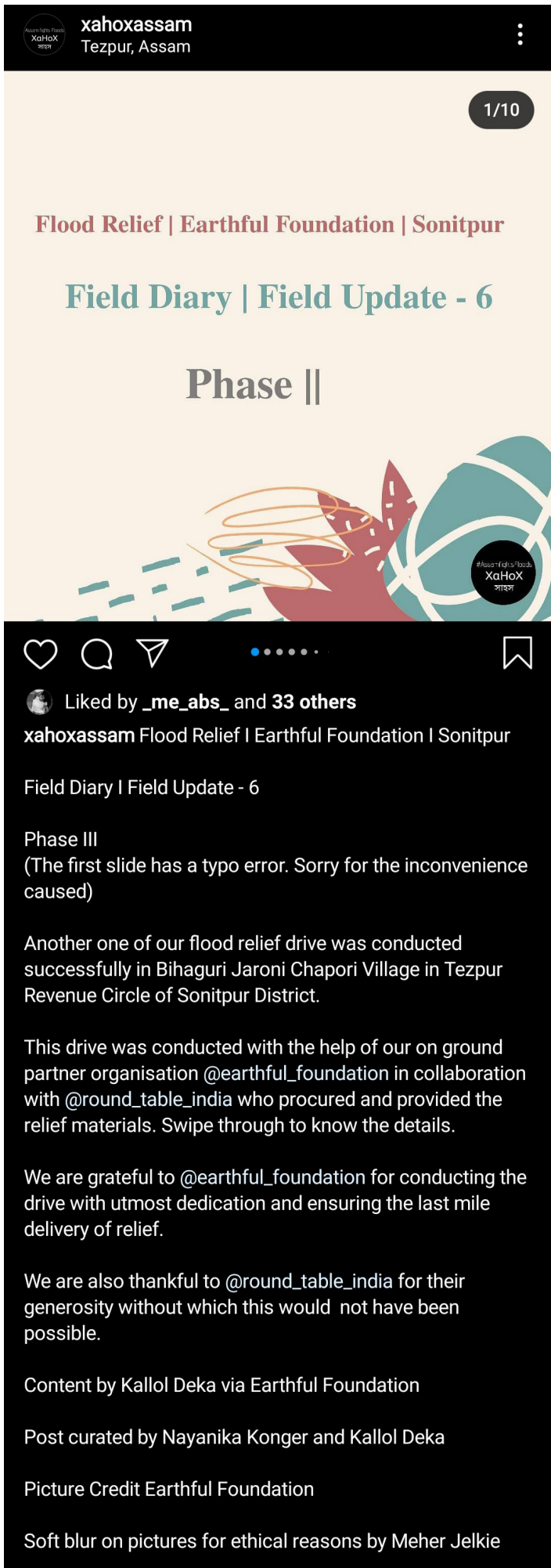


Fig. 1: Field Relief Drive Updates in Sonipat District of Assam

In the process, we documented many stories of people battling with floods via various modes (testimonials, reports, documentary films, etc.) and brought it to the notice of concerned agencies for quick and effective actions. We believe such stories, in the long run, will prove beneficial for the state to create an equity-based relief approach.

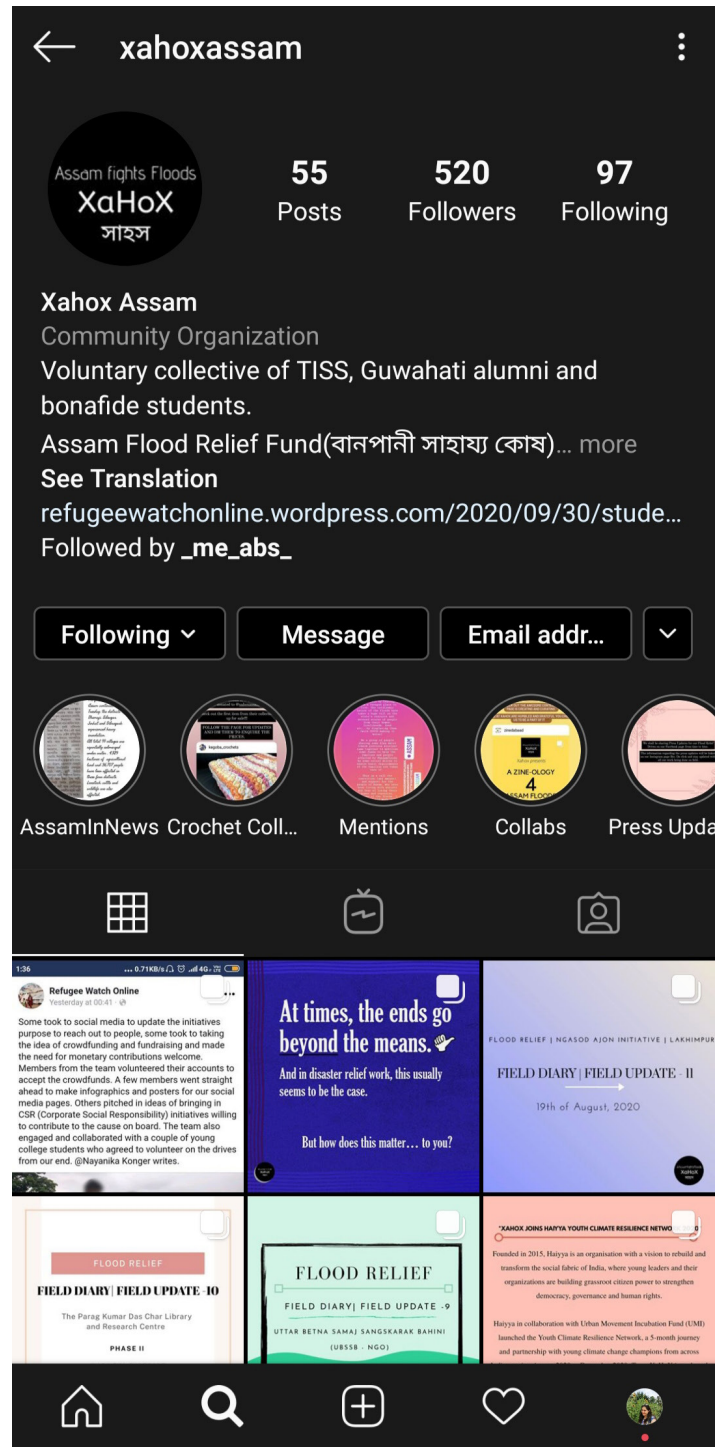


Fig. 2: Xahox initiatives Post Updates on Instagram Official Page

Currently, XaHoX is working in Dhemaji, Lakhimpur, Barpeta, Nalbari, Baksa, Morigaon, and Darrang districts. This is done by partnering with Constituency-based Organizations (CSOs) and Non-Governmental Organizations (NGOs) that are active in these districts. So far, we have collaborated with Earthful Foundation, Rural Volunteers' Center, Parag Kumar Das Char Library, and Rural Indigenous Handicraft and Agriculture. We aim to expand our reach to other flood-affected districts of Tinsukia, Dibrugarh, Sivasagar, Charaideo, Majuli, Sonitpur, Dhubri, South Salmara, Hojai, Nagaon,

Kamrup, Karimganj, Golaghat, and Jorhat.

My motivation for starting XaHoX stemmed from the plight of my home, my Axom (Assam in the local Assamese language) drowning in hopelessness. However, we are working towards developing models to sustain this initiative for a longer period. The way banpani (floodwater) recedes for this season, only to return next year, XaHoX will return too. It will keep on living true to its name for finding strength, hope and resilience!

Image 1: XaHoX, Floods paralysing daily life in Dhemaji District of Assam, 18th July 2020, Retrieved from the Author

Fig. 1: Field Relief Drive Updates in Sonipat District of Assam, 17th August 2020, Retrieved from <https://www.instagram.com/xahoxassam/>. Screenshot by Author

Fig. 2: Xahox initiatives Post Updates on Instagram Official Page, 11th September 2020, Retrieved from <https://www.instagram.com/xahoxassam/>. Screenshot by Author



Abhishikha Das

Zara Hasnain



Since the induction of the programme to the current project development phase, the Fellowship has contributed immensely to my professional and personal development. Along with work, our informal engagement sessions every Friday allow us to interact within the cohort, gradually getting us to know each other better. Apart from discussing the ongoing projects, sometimes our personal lives with the cities we hail from, we also arrange **knowledge sharing sessions** where we discuss various other topics. For instance, we discussed the National Education Policy recently which has helped us in understanding the nuances of drafting and implementing education policies that we as professionals often tend to overlook. These informal and knowledge sharing sessions have proven to be therapeutic for me in the times of the COVID-19 pandemic making me realise that problems are not halting signs; they are guidelines to improve oneself.

Gaurang Patel

The pandemic arrived without a warning, and in a situation that has re-defined our work patterns. What I am happy to say about the 2020-21 cohort is the fact that we are extremely enthusiastic to learn, to face and solve every challenge our cities are currently posing by doing whatever we can in our capacity. In the fellowship, working with my team i.e. Team Revive has been an invigorating experience and I have found myself engaged in keeping up with technological advances in the water sector. Given the fact that my team consists of people from different and **interesting educational and professional backgrounds** of Architecture, Engineering, GIS, and Heritage, it's been a wonderful experience of cross-learning and developing the project from various viewpoints. Overall it has been an enriching experience!



Ankur Negi



A week into the Fellowship, we started to work from home, which till now has worked great for me since it gives me flexible working hours, cutting down on the commute time. Although sometimes the project faces roadblocks due to the COVID-19 led uncertainties and restrictions, working with my team, i.e Team React on our project has been an **insightful and fresh experience**. Despite the Work from Home situation and the pandemic-led intrusions into our lives, we have been working as one single unit, brainstorming and exploring possible synergies when it comes to our project.

I look forward to having a fruitful fellowship ahead as well, by engaging with cities and executing our project on the ground.

Ankit Rai



One of the key benefits of being a part of the ISCF programme is the value that Fellows have extracted from each other. The Fellowship has been quite exciting and informative so far. Brainstorming with other young professionals from multidisciplinary backgrounds has **expanded my understanding of the urban** space, its planning and management. On one hand, the freedom and flexibility offered by the Fellowship foster innovative project ideas. On the other side, the engagement with officials on the ground instils the importance of keeping a project's usage and implementation potential high. Over a year, the Fellowship has diversified my experience and also expanded my understanding of the conduct of advisory and consultancy, making my candidacy more competent for such roles in my career ahead.

Ipsita Chanda

After two years of experience of working with a private organization, the India Smart Cities Fellowship Programme gave me an opportunity to work in the public sector as a part of government administration. It has given me an opportunity to understand **how the Government works**, something that we don't have an insight into while working in the private sector. Working with the ISCFP has given me first-hand experience of working with various government entities and their projects. I am extremely glad to be a part of the ISCF for it has given me a chance to be a part of something great, and help our citizens and our urban spaces directly.



Joydip Datta



I consider myself fortunate because the Fellowship has provided me with the opportunity to work towards shaping our cities and thereby our country at large for a better future. The cohort comprises people featuring work experience and education in multiple fields with diverse backgrounds such as Architecture, Economics, Geoinformatics, Data Science, Disaster Management, Planning, Sociology etc. This diversity promotes a **lot of cross-sectoral learning** amongst fellows about these fields, providing a good array of economical, social and technological views. Currently, we are working on several urban sector projects intending to ease the day to day of citizens and make our cities better places for inhabitation.

fin!



Reach out to us



[iscf_goi](#)



[iscfp_mohua](#)



fip18.mohua@gmail.com



[iscf.goi](#)



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