आज़ादी का अमृत महोत्सव

Smart City
MISSION TRANSFORM-NATION

सत्यमेव जयते
Ministry of Housing and Urban Affairs
Ministry of Electronics and Information Technology
Government of India

भारतीय विज्ञान संस्थान

IUDX
INDIA URBAN DATA EXCHANGE

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Compendium of Use Cases

Scope

The objective of this document is to share a compendium of use cases, which acts as a repository of valuable information related to the conception, implementation and technical overview for driving creation of citizen centric DataSmart solutions in the urban governance domain.

Intended Audience

- **Smart City Officials** to implement these DataSmart use cases that best suit their city
- **Use Case Partners** who are willing to build these citizen centric DataSmart solutions
- **Data Providers/Consumers** to check on the scope and usage of data for various data driven use cases

Abbreviations

Abbreviation	Definition
ATCS	Adaptive Traffic Control System
IUDX	India Urban Data Exchange
TVDS	Traffic Violation Detection System
ANPR	Automatic Number Plate Recognition System
RLVD	Red Light Violation Detection
VA Mode	Vehicle Actuated Mode
LPU	Local Processing Unit
ICCC	Integrated Command & Control Centre
HVD	High Value Datasets

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Power of Data

The world has become increasingly digital and the applications in smart cities, townships and various sector like healthcare, agriculture, industry, e-commerce etc are generating good quality electronic data.

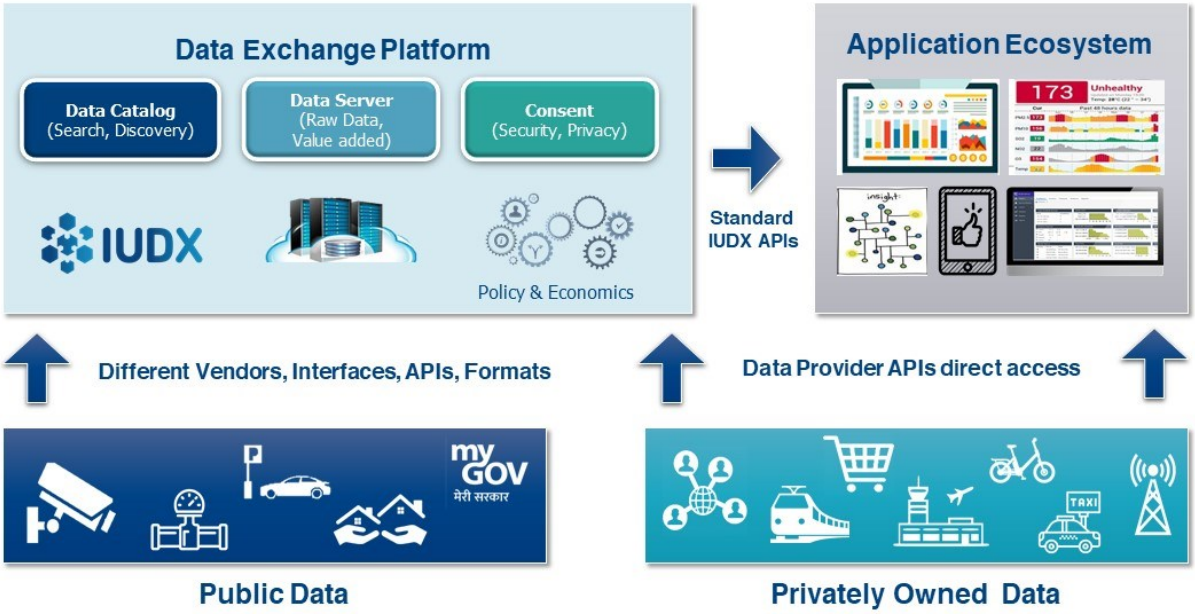
Data till now has mainly been used for deriving information, insights, trends and managing the services. However, the power of data lies in its combinatorial possibilities when multiple datasets come together and help create innovative applications for service delivery efficiency and end user convenience, making the best use of AI/ML technologies, which makes data the “new oil” of the digital economy.

India Urban Data Exchange (IUDX)

Data in most cases remain in respective application domain silos with different systems representing data is different ways, making sharing of data difficult and complicated. Lack of policy frameworks is also non-conducive for data sharing. Easy and efficient exchange of data among disparate urban data silos through a secure platform and policies to enable data sharing from multiple entities are important to facilitate open innovation.

India Urban Data Exchange (IUDX), initiated and funded by the Ministry of Housing and Urban Affairs (MoHUA) and supported by Ministry of Electronics and Information Technology (MeitY) and NITI Aayog is developed and deployed as a fully open-source cloud-based platform to enable easy and secure sharing of all types of data.

IUDX and Data, Application Ecosystem



IUDX provides a way for accessing data in a unified, common format and enables data sharing and monetization between different entities, opening it up for the internal departments as well as external agencies to create innovative applications with new business/revenue models aka data marketplace.

Public and privately owned datasets of urban governance, mobility, healthcare and citizen security are being exchanged through IUDX. These datasets are being taken by the industry/start-up ecosystem to build applications for traffic management, public transport, prevention of disease spread and healthcare infrastructure management, emergency assistance, solid waste optimizations, flood warning, citizen safety etc.

This document details out various analytics/AI/ML induced use cases grouped under various sectors, targeted for service delivery efficiency i.e., cost reduction of services or end user convenience i.e., increased use of services. The datasets used in such use cases are considered High Value Datasets (HVD) since they create high socioeconomic impact.

The use cases can be categorized under various sector heads viz. Mobility, City Utilities Optimisation, Environment & Disaster Management, Education and Healthcare.

Mobility

Urban mobility is a very critical component in every city, and finding ways to improve it by reducing congestion, pollution and accidents is a common challenge.

Some of the high impact data driven use cases addressing urban mobility challenges are outlined below.

2.1 Multimodal Transport Application

In an urban set up, there are many modes of transport viz. buses, trains, taxis, rideshare, bikes and of course walking. It would be convenient for the commuters if all these services are integrated into one single application. The application could provide multiple travel options based on individual preferences and real time availability of the services to commute from one place to another against the commuter opening individual applications for each service and doing it manually. Of course, a single payment for the entire journey will add to the convenience.

This application also has the potential to promote eco-friendly mobility options like walking, cycling and use of public transit systems amongst citizens by providing information about the health benefits and carbon footprint savings.

Datasets Required

Below are few of the required datasets covering as many transit providers available in the city.

Dataset Categories	Dataset Details	Remarks
Walk Paths and Cycle Paths	Location, Route	**Mandatory**
Bus, Train, Ferry	Schedules, Routes/Stops, ETA, Occupancy, Fare	**Mandatory**
Taxis, Rental bikes, Rideshare	Availability, Fare	Good to get these services also on the app
Traffic Data	Traffic density	Good to have it for better routing
Citizen security	Safety Index Map	Good to have it to provide safer options considering the safety of places

Key Performance Indicators

1. Cover most of the public and private travel modes/options in a city
2. Promotes safe and environmentally friendly travel
3. Increased commuter satisfaction and usage of public transport

System Illustration

This application would consume the data from all transport services, walk/cycle paths, safety index of places and suggest all the possible travel options based on the commuters' preferences.

Business Case

Beyond benefits like reduced congestion, pollution, carbon footprint and safe travel, such added convenience and benefits to the citizens could increase the revenue share of all transport services by 1.5 to 2%.

The application also could monetize its services in the following methods

- Subscription fee from the commuter
- Advertisements on the application
- Monetization of the generated data about the commuter patterns and preferences

Of course, a share of it has to be passed back to the transport services for providing their data to facilitate it. A win-will for all the participants and stakeholders.

2.2 ETA and Occupancy Information

One of the biggest impediments for using public transport is its uncertainty. Expected Time of Arrival (ETA) is an important driver for the commuter satisfaction. However, it is quite disappointing when after waiting you realize there are no seats available, or the bus is overcrowded. Covid 19 also drives the need for social distancing and the statutory requirement to avoid a crowded situation. Knowing the occupancy levels in the public transport will greatly help the commuters to make alternate arrangements.

This use case is to inform the occupancy levels along with the ETA of buses. The occupancy information will also help the bus operators to advance/postpone the next bus to maximize the occupancy and also the bus availability. This will also help to increase the revenue through increased commuter satisfaction and also reduction in operational costs.

Datasets Required

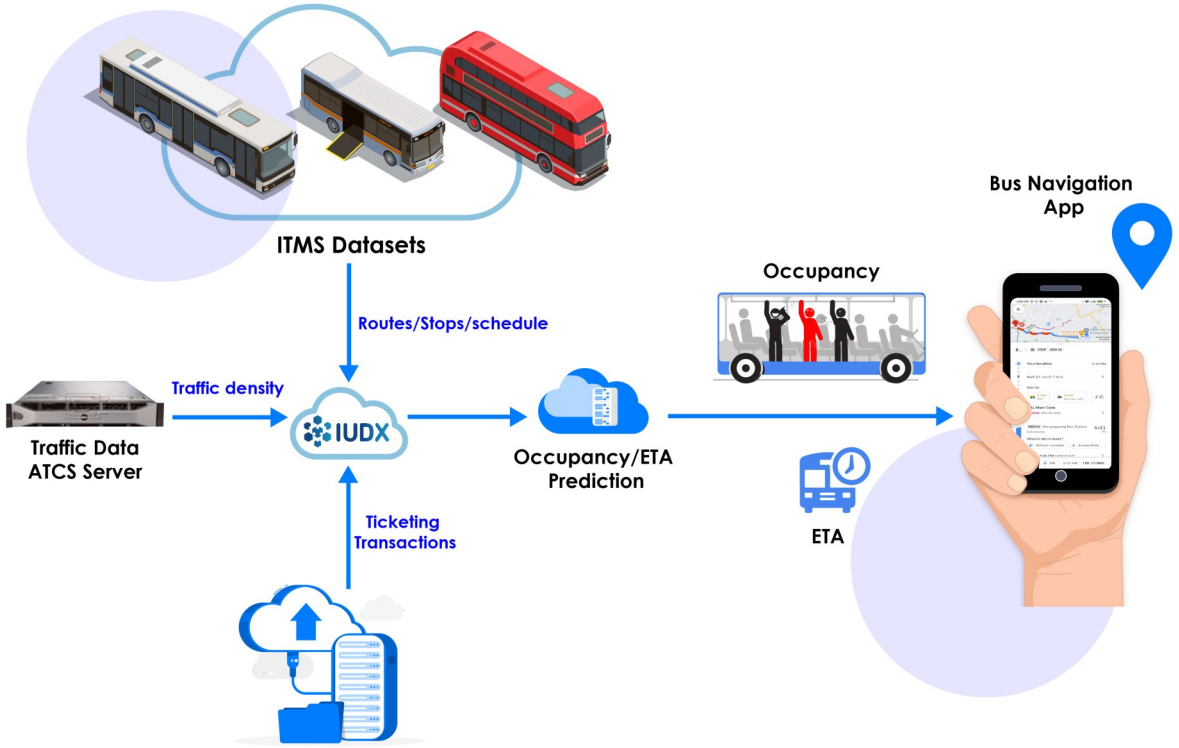
Dataset Categories	Dataset Details	Remarks
ITMS Data Sets	Live GPS location of Buses, Route, Direction, Stops, Schedule	**Mandatory**
Automatic Fare Collection System (AFCS) data	Ticketing Transactions	**Mandatory**

Key Performance Indicators

1. **Increased commuter satisfaction in using of public transport**
2. **Reduction in operational costs through efficient fleet utilization**

System Illustration

Real time bus location coordinates, planned schedule, routes/stops coupled with ticketing information will calculate the bus occupancy status without installation of any new additional sensors or cameras.



Business Case

Studies suggest that information like ETA and occupancy metric can result in 1-2% increase in ridership. Also, there can be further reduction in operational costs because of fleet optimization based on real time ridership information.

For example, Surat City (India) – where 800 plus buses serve the needs of citizens- can potentially increase its revenue from approximately 1-2% ridership increase. This increase is expected to be driven by providing occupancy information in addition to ETA availability. Further, as per estimates, this would also lead to reduction in operational expenses in the range of 5 - 15% through better fleet optimization, making the Surat bus transport more profitable.

2.3 One Parking / EV Charging App

As per studies, 30% of the traffic in cities is because of drivers looking for a parking space and 20% of the plans are dropped due to unavailability of parking places. This also leads to loss of commuter's time, increased congestion, fuel consumption and of course pollution.

Smart parking solutions are implemented in public parking places and also privately owned buildings to communicate the available parking information including fares, navigation to the parking place etc. Integrating information of all such parking places into one application can further enhance the ease of finding a parking space, optimum utilization of resources and effectiveness. The private parking places of the offices, residential buildings, educational institutions etc. also can be integrated based on their availability, for e.g., after business hours, holidays etc.

Similar concept could be adopted for integrating all the EV charging stations too.

Datasets Required

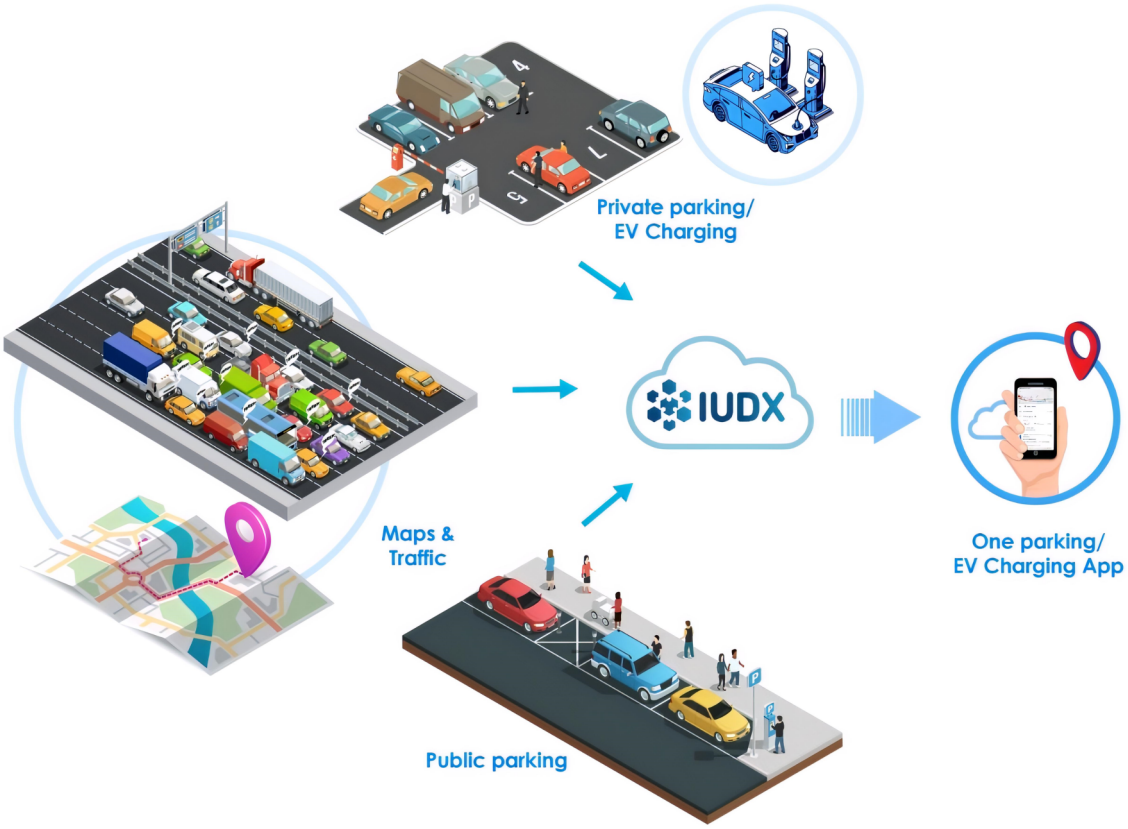
Dataset Categories	Dataset Details	Remarks
Parking/EV Charging Stations	Location, Capacity, Availability, Charges	**Mandatory**
Traffic Systems	Traffic Density	Good to integrate for enhanced suggestion on parking/EV station

Key Performance Indicators

1. **Increased convenience to commuters and reduction in traffic congestion woes**
2. **Increased parking revenue**

System Illustration

Aggregate all parking locations/EV charging locations, traffic conditions and customer preferences to recommend the best parking option for all type of vehicles.



Business Case

This use case provides citizens satisfaction and also helps minimize the traffic congestion by conveniently and efficiently making the EV/parking spots available.

The application can monetize its services by charging a commission from parking/EV charging providers/commuters.

2.4 Green Corridor for Emergency Vehicles

Emergency assistance like ambulance, fire and rescue services are vital in improving city life. However, these services get heavily impacted due to traffic resulting in increase in number of deaths, increase in property loss or loss of viable organs for transplant. As per studies, more than 50% of heart attack cases reach hospital late, which can be due to unavailability of ambulances and also because of ambulances getting stuck in traffic congestion.

This use case suggests a Green Corridor Application, which consumes real-time location of emergency vehicles and interacts with traffic signals to establish a congestion-free movement of emergency vehicles in traffic junctions. It brings in automation, efficiency, and effectiveness to the process, which is currently manpower intensive.

Datasets Required

Below are the datasets required to realize this use case:

Dataset Categories	Dataset Details	Remarks
Emergency Vehicle Systems	Real-time Location, On call duty indicator	**Mandatory**
Traffic Systems	Traffic Junction Coordinates, Traffic Density	**Mandatory**
Navigation System	Maps & Routes	Good to have to support for navigation.
Hospital/Care Unit Details	Location co-ordinates, Service details and availability	Good to have, when appropriate health care facility has to be chosen based on Infra and Service availability

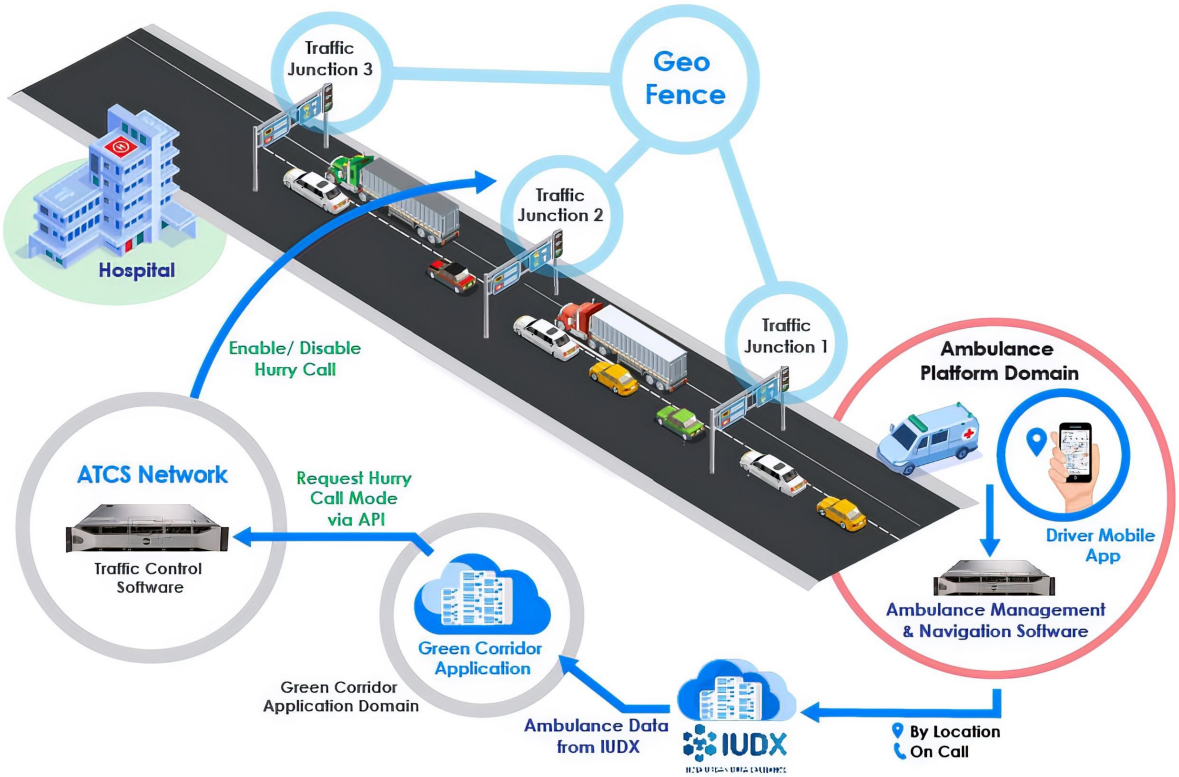
Key Performance Indicators

1. Reduction in time taken for emergency vehicle to travel from one point to another
2. Reduction in support staff that facilitate creation of manual green corridors
3. Reduction in the intensity and duration of traffic ripples due to changes in signal patterns and traffic flow

System Illustration

The application consumes the real-time location coordinates of emergency vehicles to enable/ disable a forceful mode and change the traffic signal at the junction being approached by the emergency vehicle to green.

As an extension to the use case, the Green Corridor System, apart from enabling/disabling junction operations, can also consume the health facilities/navigation data in real time and come up with appropriate plan for nearest and best available health facility for the patient.



Business Case

Apart from saving lives, this use case can also reduce congestion and pollution and also the manpower requirements for manual green corridor operation.

Environmental & Disaster Management

Disaster Management activities aim to minimize potential losses in the event of disaster. The government along with various government/non-government agencies and personnel has undertaken multiple initiatives to reduce the impact of disasters, both natural and man-made, on affected populations and assist people in recovering. While these efforts are need, it is extremely important to come up with data driven application which can learn, predict and manage the scenarios in advance.

3.1 Flood Analytics and Management System

Floods, both urban and rural, cause extensive damage to life and property. However, there is a stark difference in the two types of flooding. Urbanization leads to developed catchment areas, which increases the flood peaks from 1.8 to 8 times and flood volumes by up to 6 times as per studies. Consequently, flooding occurs very quickly due to faster flow times (in a matter of minutes).

Urban flood prediction and management is a complex problem in India because every city is different in topography. For e.g., floods in Chennai occurred because of tidal surge, in Gujarat due to dam water discharge, in Mumbai due to poor storm drainage, Assam due to river embankment breach and in Uttarakhand due to cloud burst etc.

This use case aims to integrate the hydrological parameters and AI/ML algorithms to predict the natural disasters like flood. It considers the varying root causes in different cities and takes appropriate actions by involving concerned departments for rescue. However, this use case implementation is primarily driven by datasets specific to a given city and is expected to optimally predict the flood scenario at highest possible resolution.

The idea behind this use case is to create urban flood models using sensor measurements and hydrological datasets and drive predictions using the best of AI/ML technologies.

Datasets Required

Below are few of the dataset details required for this use case:

Dataset Categories	Dataset Details	Remarks
Hydrology Data Sets	High Resolution Digital Elevation Model (DEM)/LiDAR Maps, Storm water drainage network, River works/Hydraulic Structures (Weirs/Culvert/Bridges/Pumps)/Riverbed Slope/Encroachment Information, Catchment Shape file of Rivers or downstream water bodies, Latest Bathymetry Data, Tidal Data sets, Inundation Map of Past flood events	**Mandatory:** DEM, Drainage network, River channel and catchment area datasets are the least and mandatory for the flood effective prediction.
Sensors Data Sets	Rainfall Sensors data, Water level/flood sensors data, Water level monitoring camera alerts, Historical Data set from Sensors	**Mandatory:** To build statistical models for appropriate precipitation prediction

Key Performance Indicators

1. **Advance prediction of flood inundation scenarios and increase in time available prepare for managing the upcoming flood**
2. **The reduction in loss of lives during floods**
3. **Provide inputs for urban planning/rainwater harvesting techniques**
4. **Accurate information on encroachments on water flow networks, stormwater/city drainage blockages, illegal constructions, inappropriate land use, impervious surfaces, all of which act as blocker for the rainwater flow**

System Illustration

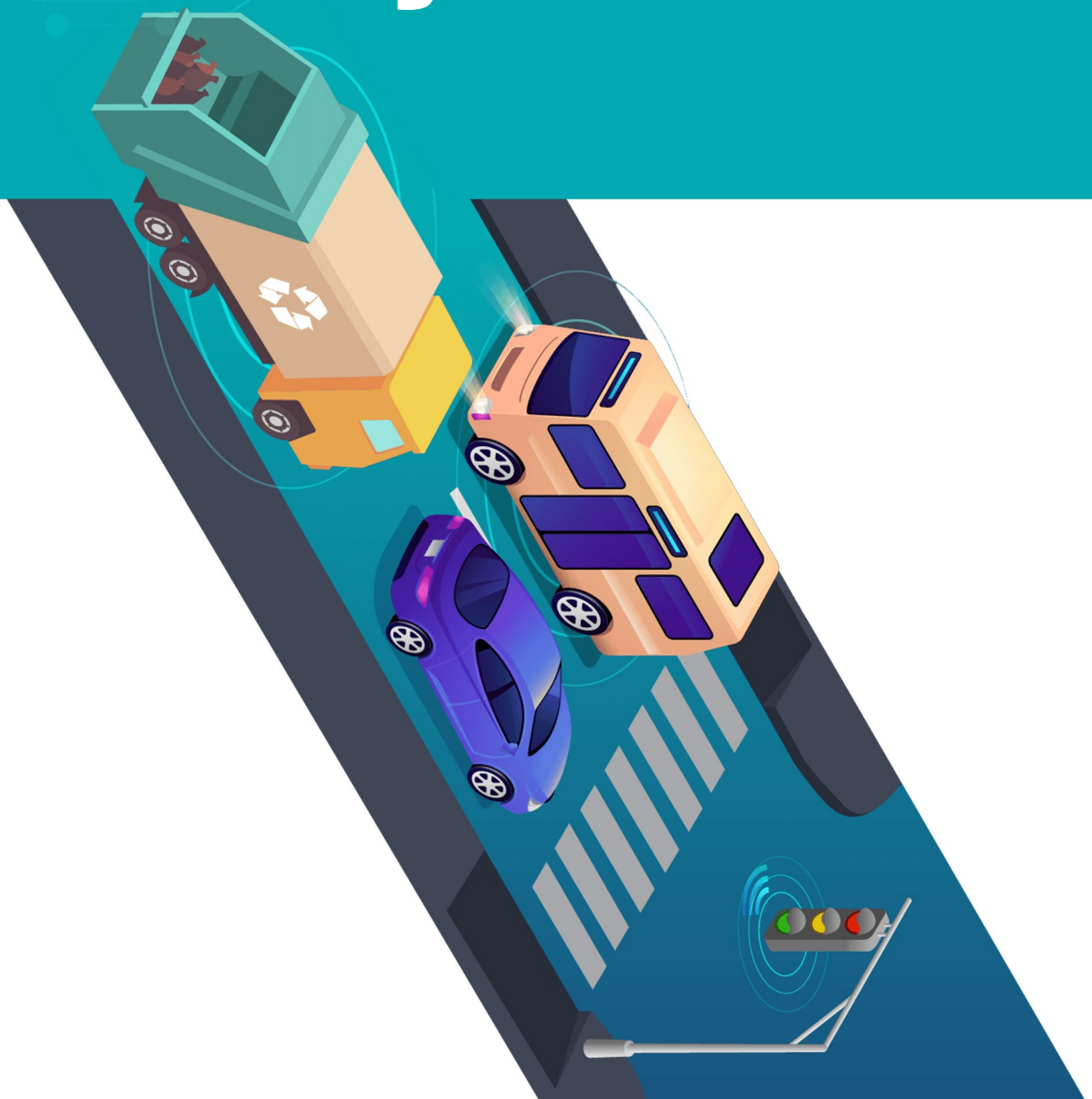
This system uses hydrology datasets to creates the urban flood model. Based on historical and current sensor datasets for rain, stream flow and water level, it predicts the water level at every location in a city with resolution in meters.

The above prediction has to be converted to action items and streamed to desktop/mobile applications, for citizens, city administration and disaster management authorities.

Business Case

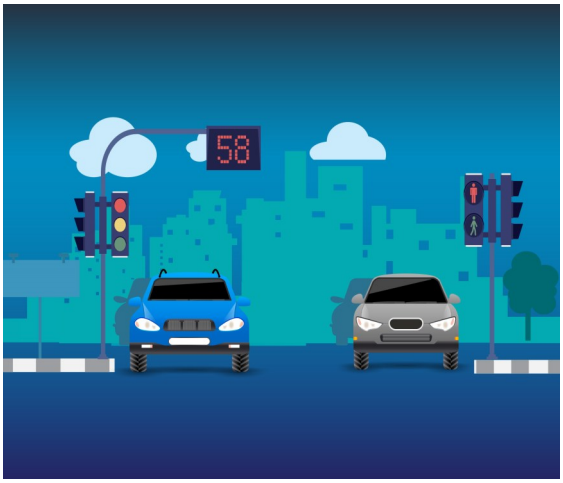
As per studies, floods have cost India INR 4.7 Lakh Crore in the last six decades, which is approximately INR 8000 Crore loss in terms of monetary value per annum. Predicting the flood in advance and having more time to respond could reduce the losses by a considerable amount along with saving lives. Additionally, the automation will bring about a considerable reduction in disaster management manpower making the whole process more efficient. The data about the flood prone areas and the patterns could also be monetized in the real estate business.

City Utilities



There are various city utilities like water supply, solid waste management, traffic systems etc., which are there to add to the ease of living of the citizens. Below mentioned use cases focus on this very aspect and provide support in building robust city utilities infrastructure.

4.1 Integration of Conventional Traffic Junctions with ATCS



Traffic management has been a big problem in urban India. It makes a severe impact on our environment and adds to the pollution, commute time increases drastically with vehicle average speed being as low as 6 to 8 km/hr and even emergency assistance takes a considerable amount of time.

According to studies, India's bigger cities would be losing up to INR 16,603 Crore annually to traffic congestion. On an average, a person traveling in tier 1 cities like Delhi, Mumbai, Bengaluru and Kolkata spends 1.5 hours more on daily commutes as compared to tier 2 cities.

Adaptive traffic signaling could reduce the traffic congestion and also increase the average traffic speed. However, while the recently deployed traffic signals may be adaptive, close to one third of the total traffic signals are conventional and do not support adaptive traffic optimization.

For optimum traffic management and performance, it is indispensable to have as many signals running under one Adaptive Traffic Control System (ATCS) network. One of the ways to do this could be to replace all the conventional traffic signals with adaptive setup, but that would come at a very high cost and would also disrupt traffic because of the amount of civil work involved.

As an alternative, this use case suggests reuse of existing smart elements deployed at traffic junctions to measure the traffic density and integrate conventional traffic signals with the existing ATCS networks and make all signals ATCS.

Datasets Required

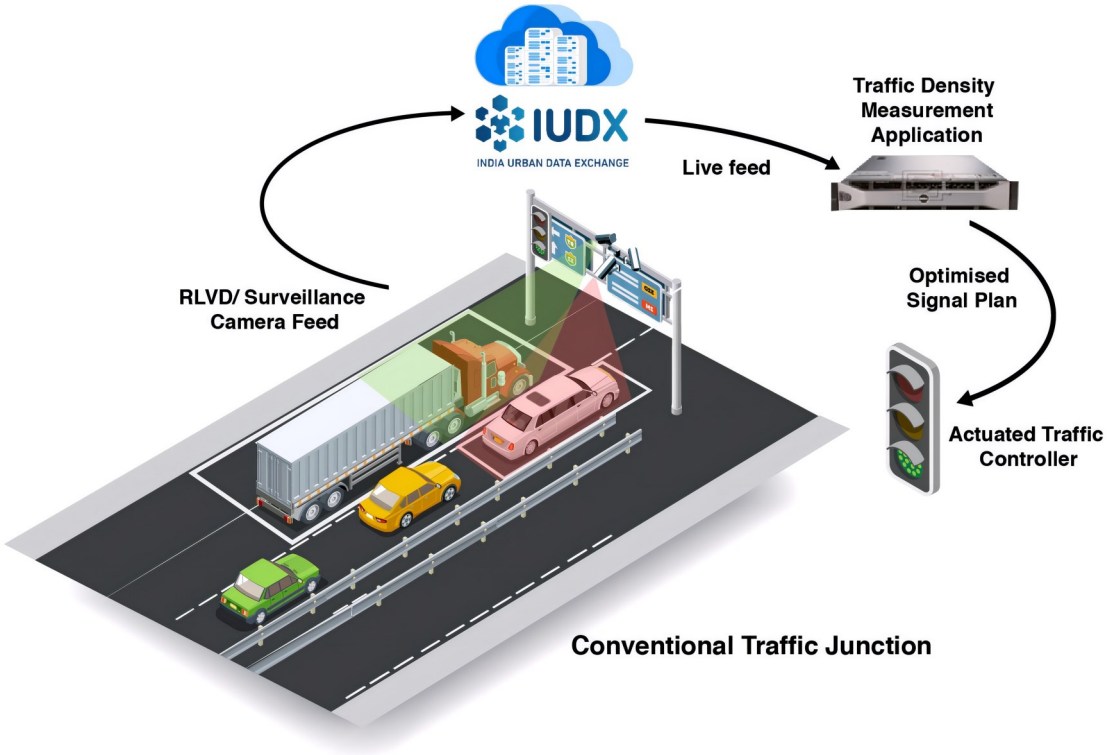
Dataset Categories	Dataset Details	Remarks
RLVD Surveillance Cameras at the Traffic Junction	Video Streams	**Mandatory**
ATCS Data Set	Status, Mode, light duration, Traffic Density	Good to have datasets from working and near-by junctions, which can be used as feedback into the software for more accuracy

Key Performance Indicators

1. Increase in average traffic speed
2. Reduced efforts to create green corridor for emergency vehicles

System Illustration

Many cameras are installed at traffic junctions to detect traffic violation and also for video surveillance. Infrastructure like power supplies, fiber network, network switches etc. are also available. This use case takes the feed from these cameras and performs video analytics over an edge machine or on cloud to determine traffic density in a lane. It then provides the signal plan as a service or passes on the density flag to backend ATCS software for appropriate time plan generation.



Business Case

Adding intelligence to the conventional traffic lights using the information derived through the existing RLVD/surveillance cameras will have a major cost benefit in addition to savings from no civil works, minimal signal down time, no traffic disruptions etc.

A conventional traffic light can be integrated with ATCS network at half the cost of an equivalent new ATCS installation. Typical ATCS signal costs around INR 20 Lakhs, while this method would cost only INR 7.5 Lakhs, hence saving INR 12.5 Lakhs. Of course, no civil works, minimal signal down time, no traffic disruptions etc. are additional benefits.

4.2 Revenue Leakage Detection

Property Tax evasion has been a ubiquitous problem in the country. The tax is improperly administered in many cities with cases like poor assessment of properties, inefficient tax collection and widespread exemptions. The charges for utilities like electricity, water etc. are also linked to property type and hence also the loss compounds of the properties are not rightly measured and classified (Residential/Commercial).

On average, approximately 37% of the property tax demanded is collected and that too might come with revenue leakage issues caused by various miss interpretations. Based on IUDX estimates, by fixing these issues the revenue collection could increase 10 to 20% depending on city's context and ecosystem.

This use case suggests data driven approach to spot revenue leakage by correlating relevant datasets from various departments like property classification, trade licenses issued, utility service category etc.

Datasets Required

Dataset Categories	Dataset Details	Remarks
Property Tax Data	Tax Receipts	**Mandatory**
Trade License Data	Usage of Property	**Mandatory**
Electricity Board Data	Connection Line Type, Energy Consumption Pattern	**Mandatory** for utility bill leakage detection as an extension in second phase to make the correlation stronger
Water Bill Payment Data	Water Consumption Pattern	**Mandatory** for utility bill leakage detection as an extension in second phase to make the correlation stronger
GIS Land Use and Building Plan Data	Land Use Data, Built Up Area	Good to have to gauge the adherence to land use norms, built up area.

Key Performance Indicators

1. **Detects the anomalies in the property classification, tax and utility bills**
2. **Increased revenue from property tax and utility services**

System Illustration

This application will take data on property classification, tax, trade licenses, utility bills etc., and correlate them for anomalies and make recommendations to fix them.

Business Case

This use case helps in fixing the financial drain at ULB level by spotting one of the most fundamental sources of income, revenue leakage and also highlights the critical loopholes to fix in the current property tax collection system.

4.3 Solid Waste Pickup Route Optimization

The management of solid waste in India continues to be a challenge not only because of enormous quantities of waste generated every day, but also the humongous effort, money and coordination required. We need an optimal and efficient solid waste collection mechanism and data driven AI/ML based application to tackle the challenge of solid waste collection in the urban context.

This use case is expected to address the challenges through monitoring, prediction, instant communication, data -driven decisions and automation to bring efficiency and effectiveness across the solid waste management life cycle bringing convenience to the citizens and a cleaner, healthier environment.

Datasets Requirements

Below are few of the datasets required for this use case:

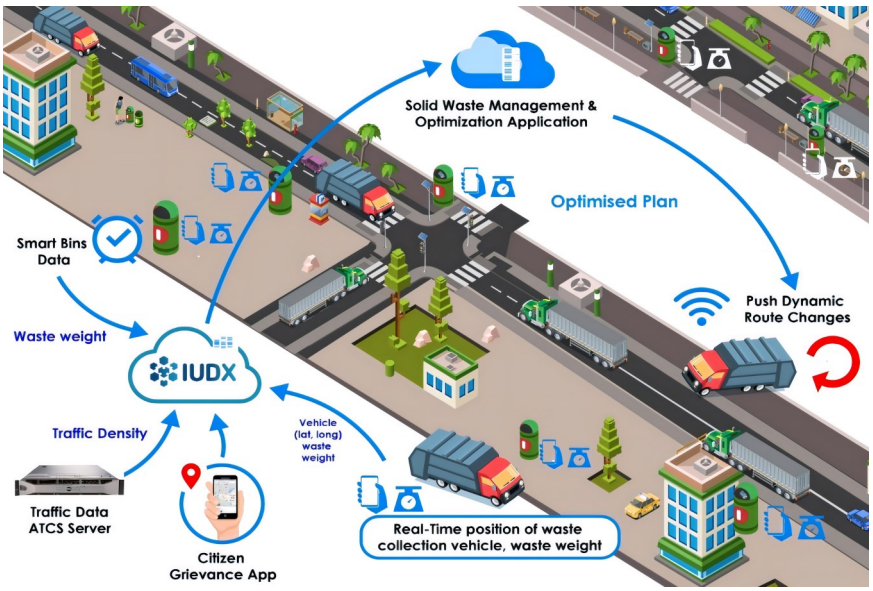
Dataset Categories	Dataset Details	Remarks
Solid waste management system	Waste Weight Data, GPS Location of Waste Collection Vehicles	**Mandatory**
Traffic Systems	Traffic Density	Good to have for route suggestion when considering real-time traffic condition
Citizen Engagement App/ Grievance App	Grievance Information (say, dead animal to be picked up on priority, scattered waste dump etc.)	**Mandatory**

Key Performance Indicators

1. **Reduction in citizen grievances and a cleaner city**
2. **Reduced cost of operation, traffic and also pollution**

System Illustration

The system consumes data associated with the weight of waste at a location, citizen grievance and location and fill status of the waste collection truck to create efficient routing plans, effectively utilizing the trucks and personnel deployed.



Business Case

Solid waste pickup route optimization cuts operational costs by 30% on an average in a city. Added benefits are faster waste pick-up with reduced traffic, lesser pollution and higher citizen satisfaction. Given the high impact, this solution has a huge potential for monetization.

4.4 IUDX Powered ICCC

ICCC is considered as the 'brain' of the city which brings together datasets from all the smart solutions deployed under various domains viz. transportation, citizen security, public safety, utilities, smart governance etc., and manage the city through data driven insights and trends.

One of the most time and manpower intensive tasks of any ICCC deployment is bringing the data from the city solutions to ICCC, a task that can easily be performed by the IUDX platform.

Hence it would be easier, faster and cost effective if ICCC platform takes the data from IUDX APIs, which also offers secured data access in standard data format. Since IUDX abstracts vendor APIs and provides standard API to access the same data the ICCC could be deployed across cities without changes if integrated on top of IUDX. This also gives the possibility of running visualizations on the IUDX data in case the ICCC is down which adds redundancy in city operations.

Datasets Required

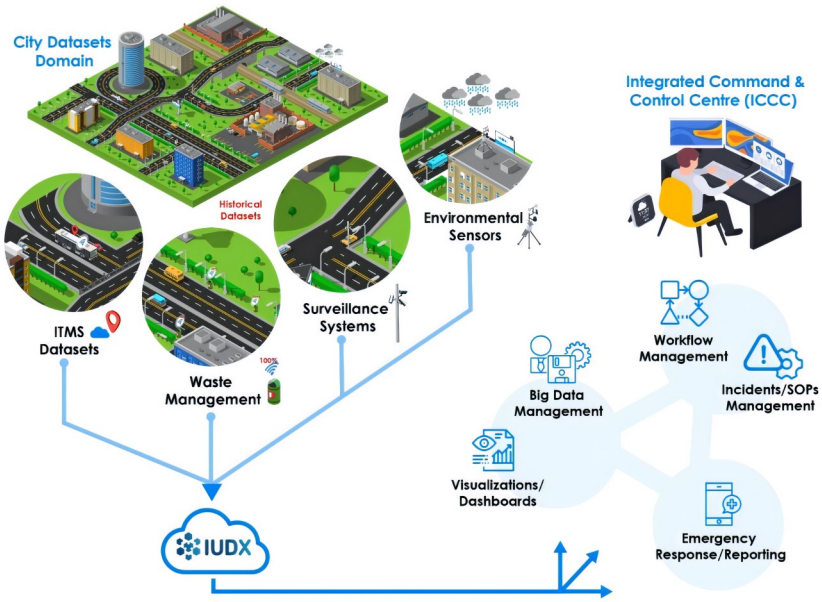
Data from smart solutions like traffic, transport, parking, citizen security, AQM, SWM etc.

Key Performance Indicators

1. **ICCC platform is able to adapt to new cities with minimal intervention**
2. **Incorporates most of the datasets from IUDX, relevant to city operations**

System Illustration

ICCC application will consume data from IUDX via standard APIs and perform its usual function of data, workflow and incident management and visualization along with reporting.



Business Case

ICCC built on top of IUDX will incur reduced efforts/cost to integrate the solutions with a cost saving of 15 to 20% depending on city's context and ecosystem.

Further, this comes with the flexibility to choose any ICCC for the new contracts and renewals with no vendor lock-in.

4.5 Tourist Guide Application

Tourism contributes immensely towards the growth of any economy and is vital for India as well. The country offers vast geographical diversity and its rich heritage and is ranked 34th at in travel and tourism competitiveness report published in 2019 by World Economic Forum.

As per estimates, tourism in India generates INR 16.91 lakh crore per annum, which contributed to 9.2% of India's GDP in 2018 and supports 42.673 million jobs, which is 8.1% of its total employment.

It will be pivotal to have a unified application that would facilitate the tourists with all the required information like navigating across places, sites and monuments, integrated payment systems, safety and security, help desk, emergency assistance etc.

Datasets Required

Below are few of the datasets required for this use case:

Dataset Categories	Dataset Details	Remarks
Tourist Places	Location, Description, Category (Religious/General), Operating Timings & Holidays, Rating of the place – Crowdsourcing, Ticket counters, Eateries, Special Markets, Offers, Promotions and Coupons	**Mandatory**
Security & Emergency Call Agencies	Police aid posts, Hospitals/Clinics/ Emergency support, lost & found	**Mandatory**
Mobility Data	Streets/Walk paths, Bus Stations/ Railway Stations, Banks/ATMs, Shopping Areas etc.	**Mandatory**
Safety Score Map	Safety index of places/streets	Good to have to provide features related to safety

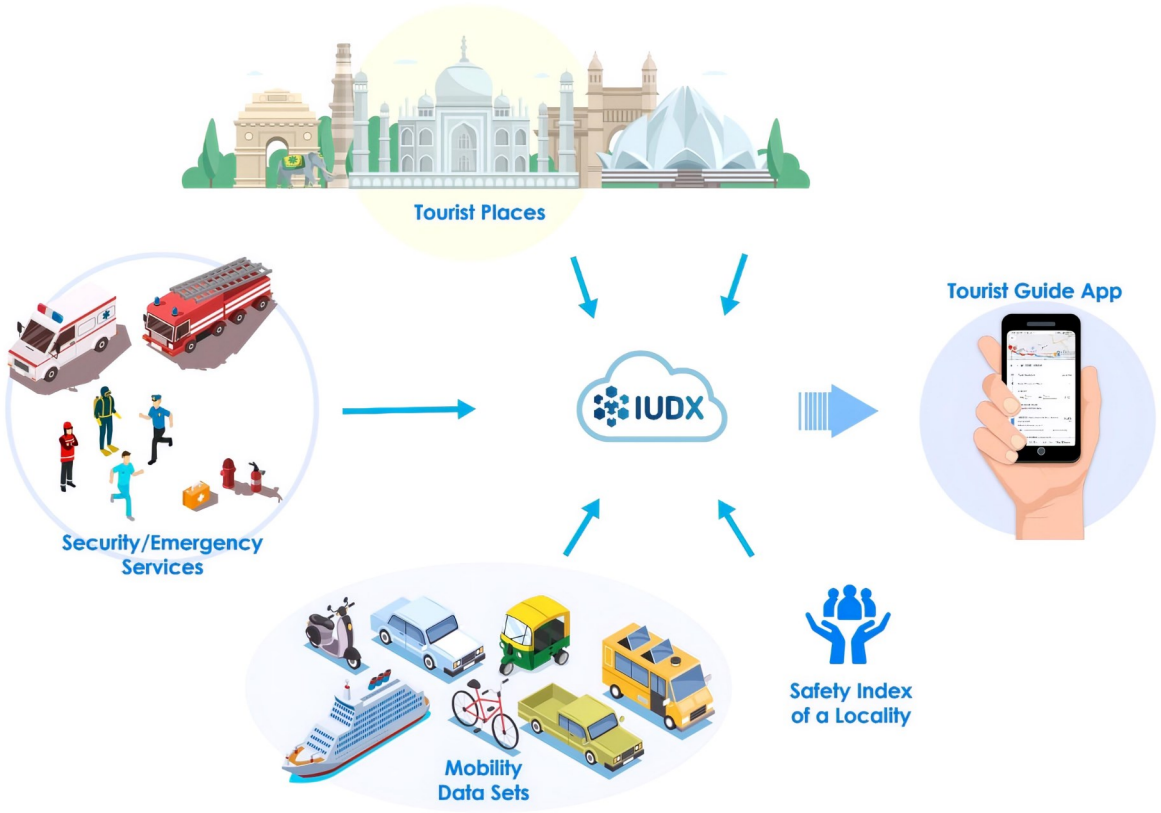
Key Performance Indicators

1. Increased number of tourists, application usage and in turn revenue collection for tourist sites

2. Reduction in number of crime cases against tourist and travellers

Systems Illustration

Take the tourist spot information, ratings, safety index of streets/places, user preferences (duration, budget) and provide required guidance to the tourists in the city, along with a unified platform for ticketing.



Business Case

By providing information, options, recommendation, navigation and payments all at one place through a mobile-based application would help the tourists in having a better experience. This would in turn improve the country's prospect as a tourist destination and help increase revenue for the sector.

4.6 Safe Route to Travel in the City

Citizen security especially for women and children has always been one of the major concerns in the urban setting. As per the report released by National Crime Records Bureau in 2017, a total of 3.8 lakh cases of violence against women were reported in that year. The number of cases reported had increased as compared to 3.38 lakh cases of crime against women in 2016 and 3.2 lakh cases in 2015.

It is important to mark safe and relatively unsafe areas of the city based on parameters like streetlights, visibility, security, public transport, psychological feeling etc., to help the citizens to take informed choices for their travel needs. Also, authorities can use the same information to improve infrastructure and support in the areas marked as less safe.

This use case targets to develop an application to enable the citizens to choose safest possible route from point A to Point B within the city. It also provides opportunity to them to provide recommendations and feedback on safety index of places.

Datasets Required

Below are few of the datasets required for this use case:

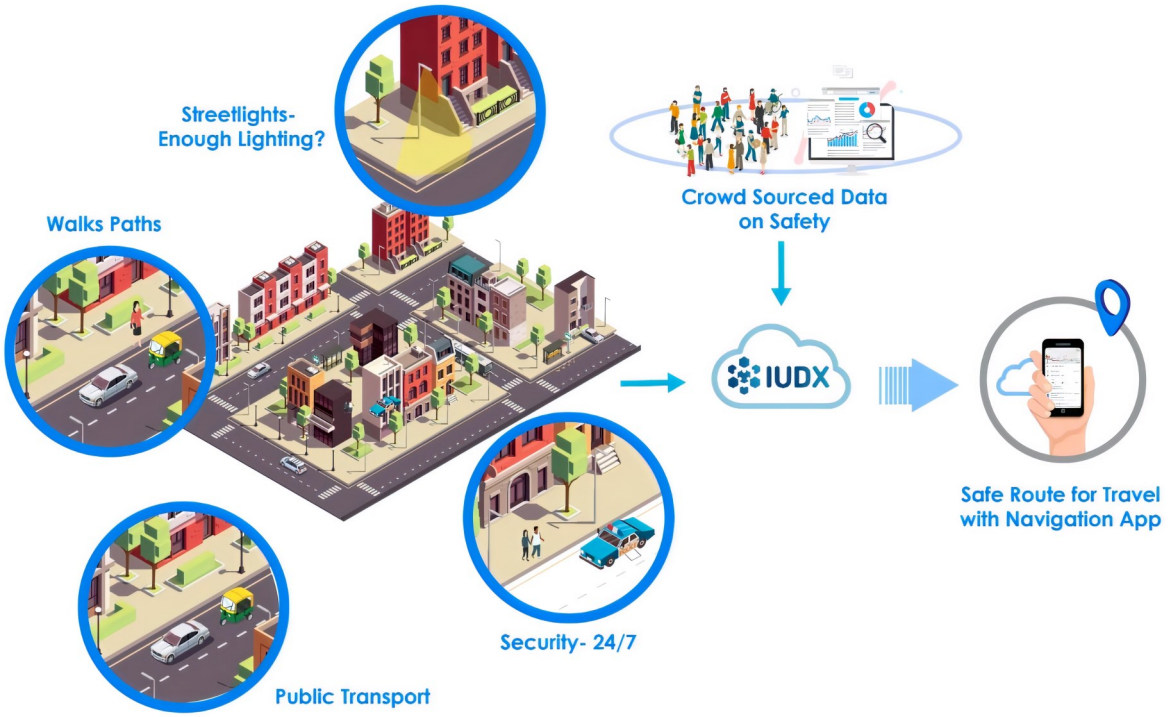
Dataset Categories	Dataset Details	Remarks
Safety Parameters of places	Lighting, Openness, Visibility, Security, Walk Path, Public Transport, Gender Usage, Feeling	**Mandatory**
Help/Emergency assistance	Help Centers, Police stations, Hospitals, Emergency support	**Mandatory**
City Infrastructure	Camera Feeds, Street lights	Good to have to create safety index based on videos, lightings etc.

Key Performance Indicators

1. Safe travel across the city and less citizens grievances on safety and security
2. Overall decrease in crime rate
3. The safety score mappings are used by applications like journey planner, tourist guide app etc.

System Illustration

Based on the city safety parameters, the application grades the safety index for the streets/places and suggests the safe route for travel. The system should accept scores by crowdsourcing for a given place and also consider various infrastructure parameters viz. abundant lighting, open area, proximity to security personnel etc and make recommendations for safe travel.



Business Case

This use case would help in not just saving lives and property but would also lead to reduction in crime. Data like safety index, patterns of travel could be shared to applications for tourist guidance, journey planner etc. and also be monetized.

Healthcare Use Cases

Prevention is better than cure. The digital era provides tremendous possibilities to manage the disease outbreaks through insights, trends and predictions. The current Covid 19 pandemic has proven the relevance of latest technologies in the healthcare space. It is all the more critical for the densely populated countries like India, where there are frequent outbreaks of diseases like Malaria, Dengue, Chikungunya, Filaria, Kala-azar etc.

5.1 Health Management Information System

Many lives are lost every year due to disease outbreaks. Poor tracking and management of the outbreaks in the early stages in one of the predominant reasons behind increase in the number of affected people. Each year many people suffer from Chikungunya and Dengue, leading to increase in average socio-economic burden for families, driven by increase in direct cost associated with medical expenses and indirect costs in terms of loss of production.

It is extremally crucial to proactively detect and predict such outbreaks in advance in order to curb the disease before it spreads amongst a larger population.

This use case targets to build Health Management Information System, which would monitor, track and predict and manage disease outbreaks.

Datasets Required

Dataset Categories	Dataset Details	Remarks
Healthcare Facilities/Centres	Hospitals, location, Clinical Equipment, Doctors, Lab, Dispensaries, Telemedicine	**Mandatory**
Patient Information System/ Records	Locality, Age, Illness/Symptoms, Treatment History, Recovery results	**Mandatory**
Environmental Data Sets	Air Quality Sensors data, Green Cover Data Sets	Optional

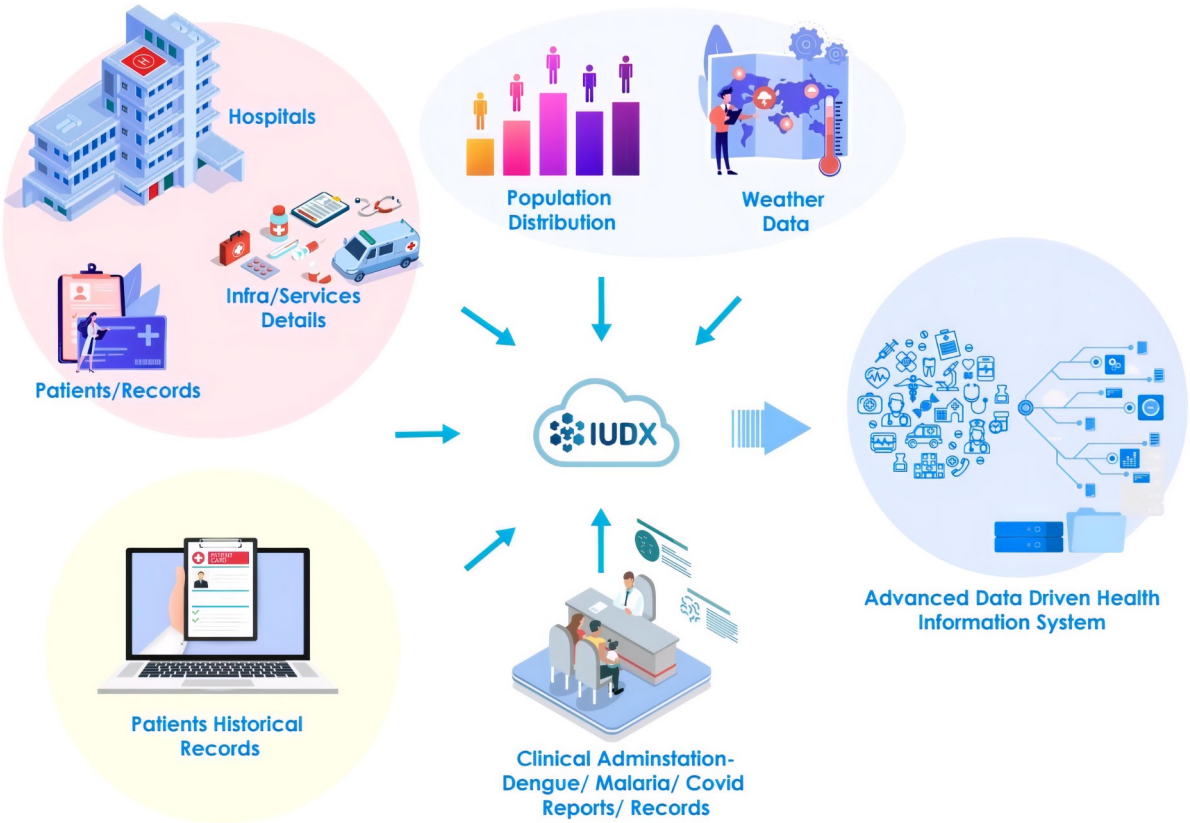
Key Performance Indicators

1. **Reduction in citizen grievances and a cleaner city**
2. **Increases utilization, effectiveness and efficiency of healthcare infrastructure and manpower**

System Illustration

The application will consume data from various sources available on IUDX viz. health facilities, doctors, telemedicine options and correlate them with the patient information systems data like origin and locality of patients, age group, symptoms etc. and highlight the patterns to capture any likely outbreaks.

Further, the application can overlap environmental datasets like air quality, green cover data to make the results more accurate.



Business Case

Apart from the intangible benefit of saving lives, this application will bring in huge cost savings in terms of prevention and management of disease outbreaks.

Education

Education is considered as one of the most indispensable and vital sectors, which is full of potential for improvement everywhere in the world. In India, education sector clocks around INR 6.9 Lakh Crore as estimated in FY18 with close to 500 million people in the age group of 5-24 years.

6.1 School Information System

Clarity in education system processes and timely availability and reliability of data are critical parameters for the students, parents and also the authorities to make the best use of available resources.

This use case, School Information System, is primarily targeted at parents and students to provide them with all the relevant information on best option of schooling/private coaching considering the factors of budget, quality education, facilities and commute time etc.

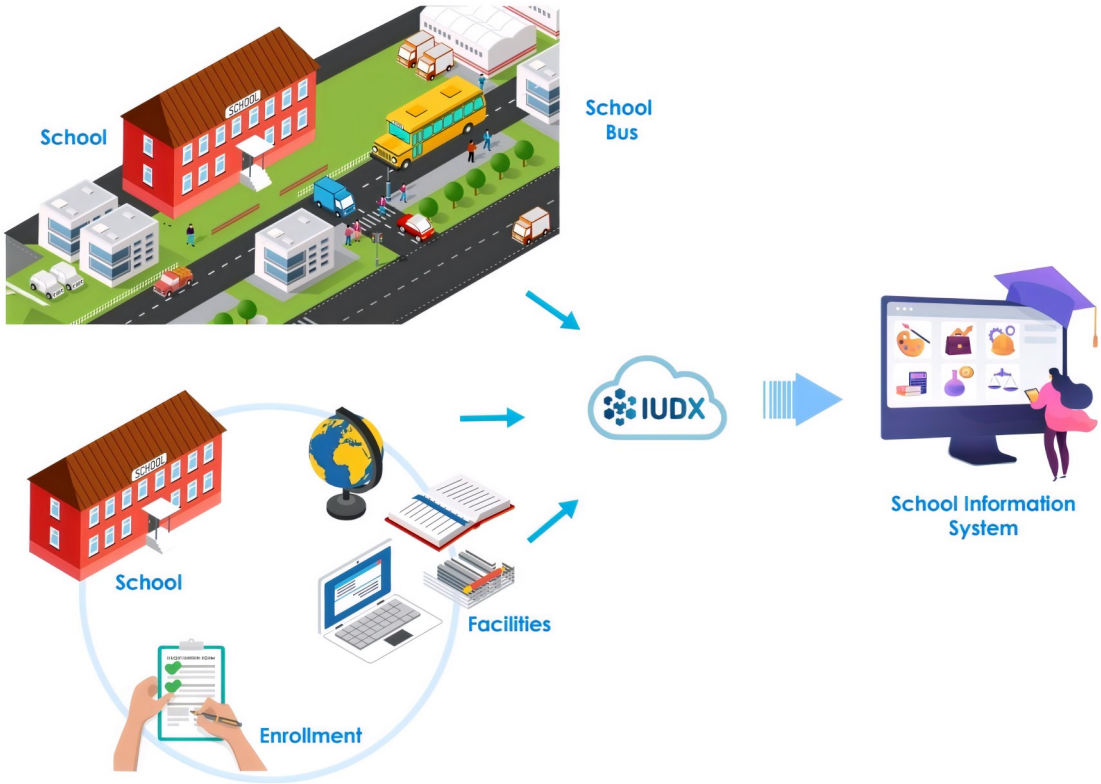
Datasets Required

Below are few of the datasets required for this use case:

Dataset Categories	Dataset Details	Remarks
School/Education Facilities	Location, Enrollment Details/Facilities/ Infrastructure, Diversity/Student-Teacher Ratio, Private coaching centers, offered courses/programs, Mode of education (online/offline) etc.	**Mandatory**
Accessibility	Travel & Connectivity, Commute time	**Mandatory**

Systems Illustration

This application would consume data from schools/tuition facilities, commute options etc. and provide the options and recommendations to the students/parents. The app can also be used by business decision makers to improve the infrastructure.



Business Case

This use case would provide comprehensive information for parents seeking school admission for their children and also helpful for the business and decision makers. Further, the services can be monetized for relevant advertisements, though a certain percentage will have to be paid to the data providers.

Summary

As discussed throughout the document, there are many innovative and impactful use cases being thought of, planned and in execution phase in many cities, firms and by respective stakeholders. The number of use cases will continue to advance in future considering the inclination towards building data driven products.

These use cases, categorised under various sector heads viz. Mobility, Disaster Management, City Utilities are primarily targeted for public domain and will make the lives of citizens of a city easier, safer and healthier, with excellent business cases for partners and firms. Further, there are various use cases which have the intangible benefit of saving lives at huge scale and preventing property damage like Flood Analytics & Management and Green Corridor for Emergency Vehicle etc.

Since these use cases are mostly data driven, acquiring data from various data providers for relevant and quality datasets and hosting it back to the consumers in a standard and secure form is always a tough grind. IUDX lifts the responsibilities of a data exchange between data providers and consumers, hence, use case implementation gets masked by the hassles of data collection, data quality and standardisation.

It's time for the public/privately owned data providers, industry/start up ecosystem, government departments and academia/research (a real quadruple helix) to collaborate with innovative business/ revenue models, exploiting the best of AI/ML technologies to unlock the full potential of data and create impactful applications.

Let us do it together!

IUDX

INDIA URBAN DATA EXCHANGE

Unleashing the power of data for public good