**City AI Engine : Reimagining Cities with AI**

Anchor: [*Vishnu Shashank*](mailto:vishnu@peopleplus.ai)

**The Problem**

Urban development is hampered by outdated planning processes and a disconnect between policy and implementation, leading to inefficient infrastructure, environmental stress, and limited public engagement. The absence of real-time data integration and a citizen-centric approach in city planning, administration and governance is the challenge of creating sustainable and resilient cities.

Summarising, the general problem

A good planning and service delivery mechanism requires seamless flows of people, material, energy and information within cities. (Water, traffic, sanitation, etc) . Apart from the spatial aspect, city planning is all about designing these flows in a manner to enable growth. Lack of urban planners and planning plus the increasing dynamism due to people moving from rural to urban areas requires us to reimagine how we plan, manage and administer our cities. Key question that we are asking is how can we reimagine urban planning to enable planning and management of cities at scale in India leveraging AI and seamless information flows between agencies.

**Key Questions**

* How can we enhance the process of digitisation of government data and citizen's assets and records
* How can we enable standards based approach in creation of city databases and easy information generation, sharing and exchange
* Can we make this approach more dynamic and not static?
* Can citizens use and access this data and information to know their cities better

**Envisioning a Solution**

Imagine a system, a City Engine for each settlement with a bunch of modules and plugins, built on core mathematical systems approach to city planning and governance. The core functionality of this engine would be to take any sort of data and put it on a map. On the backend by treating organisations, projects, assets and services like a system with causal loops enabling seamless information exchange between organisations, citizens and public service entities, irrespective if their daily operations . This can help intensify interactions within the urban framework by leveraging geospatial repositories ( synthesised with the power of AI) , thus facilitating better urban management through enhanced interoperability. The envisioned future includes the ability to access comprehensive city information across thousands of cities, enabling a deeper understanding of their unique attributes and challenges, and make informed desicions at a departmental level, at scale

**Objectives of this approach :**

* To potentially integrate disparate data sources from various city departments into a single, accessible platform.
* To build a digital twin of the city that mirrors real-life conditions and simulates the impact of potential decisions.
* To improve transparency and engagement with the public through interactive and informative visual tools.
* To develop an AI-driven analysis system that can predict trends, detect anomalies, and provide strategic insights.
* Promote Data-Driven Decision-Making: Utilise real-time data analytics to inform urban planning, infrastructure development, and service delivery, ensuring adaptability to changing urban dynamics.
* Empower Informed Governance: Equip city administrators and policymakers with actionable insights derived from cross-departmental data analysis to enable informed decision-making and policy formulation.

**Key capabilities of proposed engine:**



* **Data Collection and Synthesis**: This system collects data from a variety of sources, including IoT devices and traditional methods that can be digitised and enhanced with OCR and NLP, to create a comprehensive urban dataset.
* **Data Synergy and Tie-Up:** It integrates data using location-based identifiers, creating a unified, map-based view of city information for precise decision-making.
* **Adaptive Reuse of Information:** it enables the dynamic use of data, allowing for feedback loops between related urban systems, such as water and energy, to optimise resource management.
* **Copilots for Government Officers**: It provides government officers with predictive analytics and decision support, aiding in efficient urban management and policy implementation.
* **Service Delivery for Citizens:** The system streamlines form submission, public grievance redressal, and service delivery, making interactions with urban governance straightforward for citizens.

**Plan of Action - Way Forward:**

Establish a Standardised digital infra framework

1. Digitize urban standards and regulations. Aggregate comprehensive city data across demographics, infrastructure, and environmental metrics.
2. Develop and Deploy Interactive Digital Tools: Create GeoDatabases and APIs to make urban data interactive and accessible. Establish the architecture for a single-window platform for streamlined urban planning processes.

# **What does success look like?**

Develop and Deploy prototypes - that could be go-to ground pilots, Potentially Prototype 1 with a government at a scale of sub district or a city and Prototype 2 with Citizen action groups.

But the ideal and ultimate value could be unlocked when both prototypes can work together. For more information Refer to **Possibilities to Unlock** section in [City AI Engine - The Foundation - Working doc](https://docs.google.com/document/d/1bCwj7xjZbc8hPDIJC73ddn19fQTPiMlw21UEHACz5zs/edit)

#### **Prototype 1: City Profiling Tool**

**Objective:** Develop a city profiling tool that sources data from multiple sources to create a comprehensive profile of a city's infrastructure, demographics, and operational metrics.

**Components:**

1. **Scraping and Data Sourcing:**
   * **Level 1 Data (Publicly Available):**
     + Census Data: Demographic and socioeconomic data.
     + Annual Reports: PDFs from municipal bodies outlining achievements, budget allocations, etc.
     + Operational Reports: Documentation of city operations, including utility usage, public transportation stats, etc.

#### **2. Data Integration and Standardization**

* **Standardised Formats:** Convert collected data into standardised formats such as GeoJSON or GeoXML to facilitate easier manipulation, analysis, and integration.
* **Data Cleansing and Synthesis:** Use AI algorithms to cleanse and synthesise data, identifying patterns, predicting trends, and highlighting areas of concern.

#### **3. Digital Twin Creation**

* **Real-Time Digital Replica:** Construct a real-time digital **Quantitative replica** of the city using the synthesised data. This model (backed by predetermined systems approach links)l will incorporate AI-generated insights to reflect current and future urban scenarios.

#### **4. Visualisation and Interaction**

* **User-Friendly Interfaces:** Develop intuitive and user-friendly interfaces for city planners, policymakers, and the public.
* **Visualisation Tools:** Create heat maps, coverage diagrams, interactive dashboards, and other visual tools to make data accessible and understandable.
* **Interactive Features:** Enable users to interact with the data, such as zooming into specific areas, filtering data by category, and overlaying different datasets for comparative analysis.

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### **User Profiles**

**User Group 1: Bureaucrats and High-Level Decision Makers**

* **Use Case:** Monitoring city operations, compliance tracking, and strategic decision-making.
* **Functionality:** Access to high-level dashboards summarising key metrics and trends, ability to generate detailed reports, and tools for scenario analysis and forecasting.

**User Group 2: Everyday Operations Officers**

* **Use Case:** Daily management and decision support.
* **Functionality:** Real-time data access, operational dashboards for monitoring specific services, and decision support tools for managing resources and responding to issues.

**User Group 3: Civic Action Groups**

* **Use Case:** Data collection and analysis for advocacy and community projects.
* **Functionality:** Tools for crowdsourced data submission, access to detailed datasets and analytical tools, and platforms for visualising and sharing findings with the community.

**User Group 4: Citizens**

* **Use Case:** Engaging with city services and participating in urban governance.
* **Functionality:** User-friendly interfaces for reporting issues, tracking service requests, and accessing information about city operations and initiatives.

### **Prototype 2: Footpath Quality Assessment Tool**

**Objective:** Develop a tool that assesses the quality of footpaths across the city using computer vision and citizen submissions. This tool will help city officials and maintenance crews identify, prioritize, and address issues related to footpath conditions, ensuring safe and accessible walkways for all citizens.

### **Key Components**

#### **1. Data Sourcing**

* **L1 Data (Publicly Available):**
  + **Operational Reports:** Documentation of footpath maintenance schedules and service reports from municipal bodies.
* **L3 Data (Synthesized):**
  + **Footpath Quality Assessment:** Utilize computer vision to analyze photographs or videos of footpaths to identify issues such as cracks, uneven surfaces, obstructions, and overall footpath conditions.

#### **2. Data Integration and Standardization**

* **Standardized Formats:** Convert collected data into standardized formats to facilitate easier manipulation, analysis, and integration.
* **Data Cleansing and Synthesis:** Use AI algorithms to cleanse and synthesize data, identifying patterns and generating new insights.

#### **3. User Interface**

* **Web Interface to Contribute to the engine:** Develop platforms for citizens to submit photos and videos of footpaths and view the status of their submissions.
* **Dashboard for City Planners and Maintenance Crews:** Create a centralized dashboard to view, manage, and prioritize footpath quality data.

#### **4. Visualization and Interaction**

* **Visualization Tools:** Implement tools such as heat maps to show the quality and condition of footpaths across the city.
* **Interactive Features:** Enable users to report issues, track the status of their submissions, and view overall footpath conditions.

**User Group 2: Everyday Operations Officers**

* **Use Case:** Daily management and decision support for footpath maintenance.
* **Functionality:** Real-time data access, operational dashboards for monitoring footpath conditions, and decision support tools for managing maintenance schedules and responding to issues.

**User Group 3: Civic Action Groups**

* **Use Case:** Data collection and analysis for community projects.
* **Functionality:** Tools for crowdsourced data submission, access to detailed datasets and analytical tools, and platforms for visualizing and sharing findings with the community.

**User Group 4: Citizens**

* **Use Case:** Engaging with city services and reporting footpath issues.
* **Functionality:** User-friendly interfaces for reporting footpath issues, tracking the status of submissions, and accessing information about footpath conditions and maintenance schedules.

Resources

* Read the Introduction Doc here : [City Truth Engine - The Problem and the Need](https://docs.google.com/document/d/1fNi1wUzMQmDq2VF8Sy8lYFFU9erFlBjrL6oier-N8AQ/edit)
* Read the foundation here : [City AI Engine - The Foundation - Working doc](https://docs.google.com/document/d/1bCwj7xjZbc8hPDIJC73ddn19fQTPiMlw21UEHACz5zs/edit?usp=sharing)
* Find the pitch deck here : [City Ai - Hackathon Deck](https://docs.google.com/presentation/d/1c81--6XaRg-RINqNLRba-fMP9zgmAlYN9-nonqcWRx8/edit#slide=id.g2ffcfe9f88c_0_20)
* To learn more or collaborate : please reach out at [Vishnu Shashank](mailto:vishnu@peopleplus.ai)

And reach out to us at : <https://peopleplus.ai/volunteer>

* Link to the demo : https://www.loom.com/share/1a2f65d500f5449bbf409281e2f1afbb