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Review

Unlocking AI Adoption in Local Governments: Best Practice Lessons from Smart Cities

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Abstract: In an era marked by swift technological progress, the pivotal role of Artificial Intelligence (AI) is increasingly evident across various sectors, including local governments. These governmental bodies are progressively leveraging AI technologies to enhance service delivery to their communities, ranging from simple task automation to more complicated engineering endeavours. While more and more local governments are adopting AI, it is imperative to understand the functions, implications, and consequences of AI. Despite the growing importance of this domain, a significant gap persists within the scholarly discourse. This study strives to bridge this void by exploring the applications of AI technologies within the context of local government service provision and using this inquiry to generate lessons and best practices for similar smart city initiatives. Through a comprehensive grey literature review, we analysed 262 real-world AI implementations across 170 local governments worldwide. The findings underscore several key points: (a) There has been a consistent upward trajectory in the adoption of AI by local governments over the last decade; (b) Local governments from China, the US, and the UK are at the forefront of AI adoption; (c) Among local government AI technologies, Natural Language Processing and Robotic Process Automation emerge as the most prevalent ones; (d) Local governments primarily deploy AI across 28 distinct services; (e) Information management, back-office work, and transportation and traffic management are leading domains in terms of AI adoption. This study enriches the extant body of knowledge by providing an overview of existing AI applications within the sphere of local governance. It offers insights for smart city policymakers and decision-makers considering the adoption, expansion, or refinement of AI technologies in urban service provision. Additionally, it underscores the importance of using these insights to guide the successful integration and optimisation of AI in future smart city projects, ensuring they meet the evolving needs of communities.

Keywords: artificial intelligence; local government; urban services; public services; responsible technology; technology adoption; smart cities

1. Introduction

Local government, as the closest level of governance body to the community, occupies a critical position in ensuring efficient and effective service provision (Vincent, 2015; Yigitcanlar et al., 2021a). The use of Artificial Intelligence (AI) technologies in various spheres of local government service delivery has expanded significantly in recent years (Mikhaylov et al., 2018). This adoption spans a broad spectrum of services, from disseminating information to the public, gathering community feedback, and managing complaints, to tax collection, transportation management, water and sewage management, waste collection and management, and the maintenance of the public amenities

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(Hodgkinson et al., 2017; David et al., 2023; Ye et al., 2023a). As local governments increasingly adopt AI technologies (Engin & Treleaven, 2019), thanks to the local smart city agendas (Yiigtcanlar et al., 2022), understanding their functions and impacts becomes imperative (Buchelt et al., 2024).

Understanding the nuances of AI technology is a crucial process (Criado & Gil-Garcia, 2019; Regona et al., 2024). Different AI technologies are designed to address specific tasks or challenges (Benbya et al., 2020; Jan et al., 2023). The discernment of which technology is best suited for a particular purpose enables organisations to streamline their workflows, processes, and systems, thereby enhancing efficiency and productivity (Bandari, 2019; Lins et al., 2021). As AI technologies progressively evolve and permeate across diverse domains, this understanding becomes increasingly critical for local governments navigating complex technological landscapes to realise their aims (Madan & Ashok, 2022; Habbal et al., 2024). Specifically, delving into the potential of AI technologies to fulfil service delivery objectives and enhance public welfare is of paramount importance.

Despite the rapid growth in AI adoption in smart cities and its potential for positive impact, the scholarly literature offers limited insights into the utilisation of AI technologies in local governments. Moreover, to the best of our knowledge, there exists no studies that comprehensively investigate the practical implementations of AI technologies within local government settings. As such, this study analyses 262 cases in local governments where AI technologies are utilised, employing a grey literature review technique. These instances are chosen to foster a deep comprehension of the phenomenon of local government AI adoption (Farghaly, 2018; Mohajan, 2018), and a grey literature review helps mitigate the publication bias, fostering a balanced picture of available evidence (Polanin et al., 2016; Paez, 2017). Through this approach, the study aims to develop a consolidated understanding of AI technology utilisation in smart city local government service provision, and to generate lessons and best practice for similar smart city initiatives.

2. Literature Background

AI is becoming increasingly pervasive and evolving into an umbrella term that encompasses various technological facets (Lu, 2019; Dwivedi et al., 2021; Gill et al., 2022). This technology set covers a variety of specific segmentations such as computer vision, natural language processing, machine learning (Dong et al., 2021; Zhang & Tao, 2021; Du et al., 2023; Sharma et al., 2022), deep learning, and their generative subsets (Ye et al., 2022; Bibri et al. 2024), extending its influence across a broad spectrum of domains. This broad scope has rendered the term 'AI' inherently vague, making its definition elusive (Clarke, 2019). As AI pervades diverse applied urban domains (Bibri et al., 2023a) and industrial spheres (Yigitcanlar et al., 2021b), it becomes imperative to systematically classify AI technologies (Barredo Arrieta et al., 2020; Sarker, 2022) to effectively understand their functionalities, capabilities, and implications.

Technically, AI was first introduced to the academic literature in 1943 (McCulloch & Pitts, 1943); since then, scientists, researchers and philosophers have endeavoured to conceptualise and map out the AI technologies. Notable contributions include those by Anyoha (2017) and Roser (2022), who provide insights into the AI paradigm. Anyoha (2017) delineated the history of AI over seven decades from 1930, while Roser (2022) mapped the AI history of the last eight decades and offered future predictions based on Sevilla et al. (2022).

In the meantime, the AI knowledge map, developed by Corea (2018) and derived by Nesta (2020), provides an overarching understanding of AI, its subtypes, the problem domains in which it can be applied and the capabilities of AI technologies. Figure 1 and Table 1 elucidates the positioning and definition of each technology in the broader AI knowledge realm.

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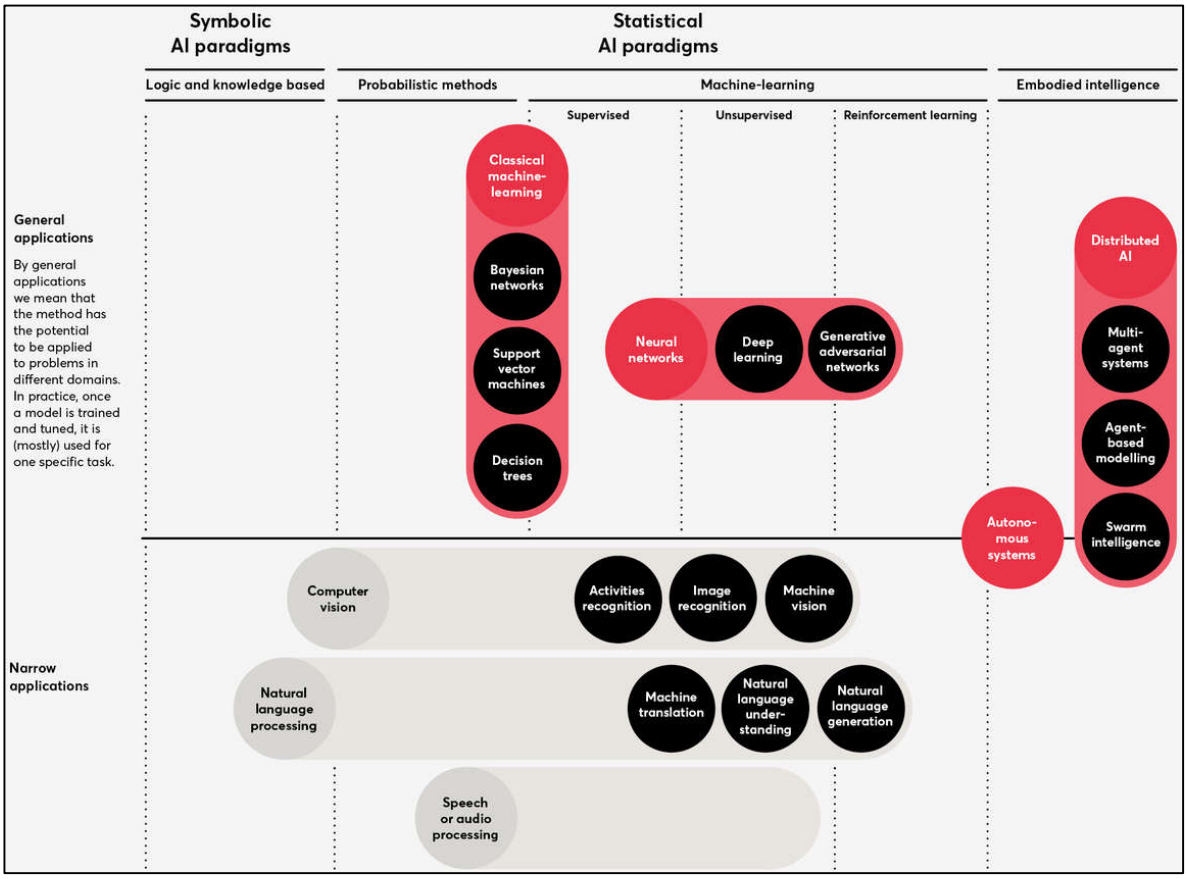

Figure 1. Map of AI knowledge realm developed by Corea (2018) and derived by Nesta (2020).

Table 1. Definition of AI technologies.

AI technology	Definition	Reference
"Inductive Logic Programming (ILP)"	"ILP uses first-order logic to represent data and hypotheses, allowing it to create logical models from real-world data to learn complex relationships"	(Muggleton, 1991; Muggleton & de Raedt, 1994)
"Robotic Process Automation (RPA)"	"RPA refers to a technology that enables the automation of business processes using software robots, typically handling repetitive tasks carried out by human workers"	(van der Aalst et al., 2018; Syed et al., 2020)
"Expert System (ES)"	"ES simulates the decision-making abilities of a human expert by employing a knowledge-based approach with rules of inference to address problems within a specific domain"	(Frank, 1990; Barredo Arrieta et al., 2020)
"Decision Network (DN)"	"DN is a type of probabilistic graphical model that can extend such as Bayesian Networks, for example, by incorporating chance nodes, decision nodes, and utility nodes, facilitating effective decision-making in uncertain scenarios"	(Zhu & Deshmukh, 2003; Caraffi et al., 2007)
"Computer Vision (CV)"	"CV enables computers to interpret visual data from the world by using algorithms that recognise patterns, objects, and environments in images and videos, mirroring human visual perception"	(Achanta et al., 2012; Russakovsky et al., 2014; Marasinghe et al., 2024)
"Natural Language Processing (NLP)"	"NLP seeks to empower computers to comprehend, interpret, and respond to human language by analysing the intricacies of language and translating them into computational models"	(Navigli & Ponzetto, 2012; Raffel et al., 2020)

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"Probabilistic Programming (PP)"	"PP is a programming approach designed for dealing with uncertainty in data, where probabilistic models are defined using programming constructs"	(Arellano-Garcia & Wozny, 2009; Bach et al., 2017)
"Neural Network (NN)"	"NN, inspired by the human brain for processing data and making decisions, consists of layers of nodes to handle information, including an input layer that receives data, hidden layers for data processing, and an output layer for generating results"	(Pal & Pal, 1993; Lecun et al., 1998; (Bengio et al., 2013)
"Affective Computing (AC)"	"AC refers to a digital setting where computational processes are seamlessly integrated into everyday objects and surroundings, becoming an integral aspect of people's daily lives"	(Savidis & Stephanidis, 2004; Sadri, 2011)
"Autonomous system (AS)"	"AS is an AI system that can operate independently without human intervention"	(Michael et al., 2020; Saenz et al., 2020)
"Distributed Artificial Intelligence (DAI)"	"DAI represents a category of technologies that fosters collaborative interactions among multiple autonomous intelligent agents, each with distinct capabilities, to solve complex problems"	(Stone & Veloso, 2000; (Hui Ni et al., 2002)
"Ambient Computing (AmC)"	"AmC refers to a digital setting where computational processes are seamlessly integrated into everyday objects and surroundings, becoming an integral aspect of people's daily lives"	(Savidis & Stephanidis, 2004; Sadri, 2011)
"Evolutionary Algorithms (EA)"	"EA, inspired by biological evolution, is an optimisation algorithm that employs biomimetic mechanisms to solve tasks beyond the reach of traditional analytical methods within a practical timeframe"	(Karaboga & Basturk, 2008; Simon, 2008)

The adoption of AI technologies within the governmental sector is rapidly revolutionising administrative processes, service delivery, and policymaking (Criado & Gil-Garcia, 2019; Engin & Treleaven, 2019). By leveraging AI technologies, government agencies worldwide are streamlining operations, enhancing citizen services, and making data-driven planning and decisions (Dwivedi et al., 2021; Gracias et al., 2023; Li et al., 2023). For example, AI-driven chatbots and virtual assistants are increasingly being used to enhance citizen engagement by offering continuous assistance and tailored support, which can help improve accessibility and responsiveness (Chaturvedi et al., 2023; Kamalov et al., 2023). Furthermore, AI technologies address a range of challenges encountered by government entities, including optimising resource allocation, handling large and diverse datasets, mitigating shortages of experts, managing predictable scenarios, and addressing procedural inefficiencies (Gruetzemacher et al., 2021; Gill et al., 2022). Concurrently, AI is being utilised for citizen inquires and information exchange, including answering questions, assisting with document completion and search, sentiment analysis, routing requests, translation services, and drafting documents (Mehr, 2017; Lovell et al., 2023; Ye et al., 2023b).

Accordingly, the exploration of AI adoption and deployment within the public sector has emerged as an increasingly important area of academic interest. Investigations in this area are wide-ranging, including efforts to understand the different ways in which different public sectors are adopting AI, as well as in-depth studies of the opportunities and challenges presented by AI deployment (Mikhaylov et al., 2018; Desouza, 2019). Scholars also examine the proliferation and trends of AI applications across different public sector domains (Sousa et al., 2019; Maragno et al., 2021), factors influencing AI adoption, and employees' perceptions of its implementation. Furthermore, research has explored the synergistic benefits of collaboration between the public and private sectors in AI use (Wang et al., 2021), ethical considerations of AI (Wirtz et al., 2018) and more.

Simultaneously, governments operate at multiple levels and each level of government has its own policy priorities, governance structures, and resource constraints (Mwisongo & Nabyonga-Orem, 2016; da Cruz et al., 2018; Sousa et al., 2019; Meuleman, 2021). Academia is interested to understanding how these disparities influence the adoption and implementation processes of AI technologies. Local government, in particular, stands out in this regard. Despite their constrained

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authority and delineated responsibilities, local governments are increasingly integrating AI into service provision (Yigitcanlar et al., 2021a). Nevertheless, research in this area remains nascent and circumscribed.

Recently, Yigitcanlar et al. (2021a) formulated a conceptual framework for responsible AI in the local government. Moreover, their subsequent studies have expanded their research to capture the city manager's perceptions in Australia and the US regarding the adoption of AI in local government contexts (Yigitcanlar et al., 2023a), as well as the public perception in Australia and Hong Kong concerning this topic (Yigitcanlar et al., 2023b). Similarly, Distor et al. (2021) explored the attitudes and perceptions of officials within the local governments of the Philippines, while Vogl (2021) analysed the challenges of adopting AI within local government services. Consequently, the findings from these studies indicate the need for further investigation into how AI technologies are being implemented and utilised in local government settings—particularly in the context of smart cities.

3. Research Design

Due to a significant knowledge gap, this study was undertaken to address the research question of 'how AI technologies are being utilised within local government settings'. Data collection occurred in three distinct stages: (a) Defining the criteria; (b) Searching documents; (c) Filtering documents (Figure 2). The search conducted in January 2024. To derive the findings, a grey literature review methodology was employed.

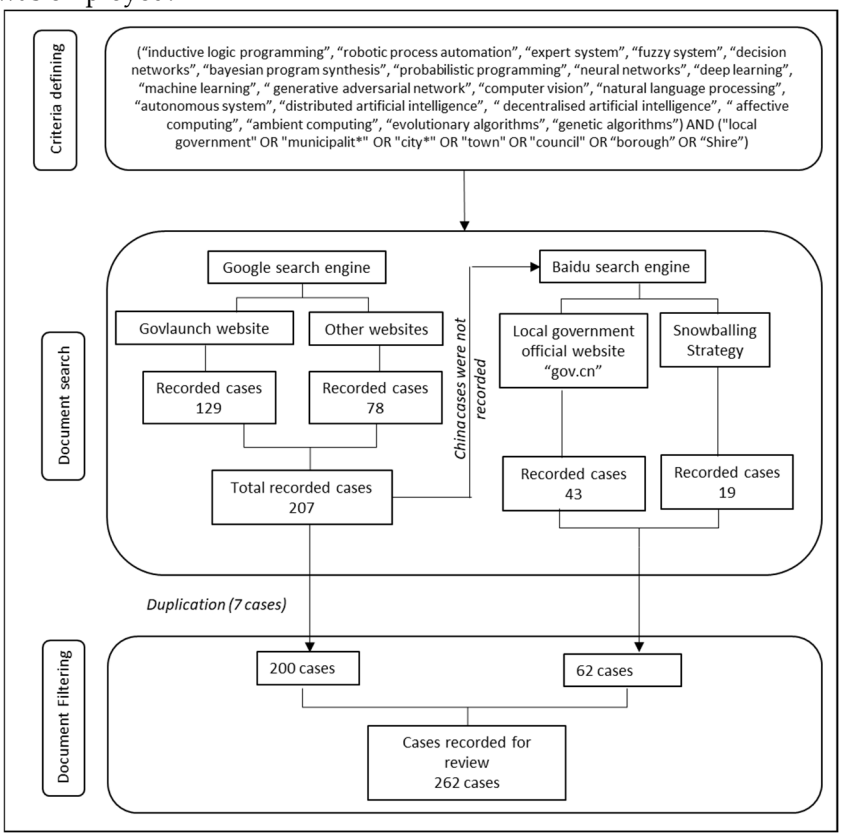

Figure 2. Data collection process.

3.1. Criteria Identification

First, the Boolean search string and inclusion and exclusion criteria were defined. The Boolean string was developed based on the AI knowledge map developed by Corera (2018) (Figure 1) and the study area key words. Accordingly, the strings are developed separately for each AI technology. For example, ("inductive logic programming") AND ("local government" OR "municipalit*" OR "city*" OR "town" OR "council" OR "borough" OR "Shire"). The used AI technological terms are, ("inductive logic programming," "robotic process automation," "expert system," "fuzzy system," "decision

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networks," "Bayesian program synthesis," "probabilistic programming," "neural networks," "deep learning," "machine learning," " generative adversarial network," "computer vision," "natural language processing," "autonomous system," "distributed artificial intelligence," " decentralised artificial intelligence," " affective computing," "ambient computing," "evolutionary algorithms," "genetic algorithms").

Next, as shown in Table 2, the inclusion and exclusion criteria were established. The information is gathered from websites and scholarly journals, book chapters, and conference proceedings have not been taken into consideration to adhere to the research aim. It is crucial that the cases concentrate on local government service delivery. This study does not consider other public sector agencies and private organisations that operate within the local government area. The timeline was left open in the search criteria for the year of publication, such that the investigation can better understand the evolution in local government AI use and adoption.

Table 2. Inclusion and exclusion criteria.

Inclusion	Exclusion
Published websites, government reports, newsletters, news releases, blogs, technical repots, interviews etc.	Academic journal articles, Books, chapters, conference proceeding
Available online	Unavailable online
Relevant to study aim/question	Not relevant to study aim
In English language	Unavailable in English
Case study: Local government	Case study: National, regional, and other departments or private organisations in local government level
Timeline: open ended	

3.2. Document Search

The principal data collection platform is the Google search engine. We employed the above-mentioned search query to search each AI technology separately. Document searches produced thousands of hits in several cases. In these situations, the search was carried out up until the Google alert stated: "In order to show you the most relevant results, we have omitted some entries very similar to the 120 already displayed. If you like, you can repeat the search with the omitted results included". A useful website employed during the Document Search stage was "Govlaunch" (https://govlaunch.com). This is a free wiki for innovative local government. Up to January 2024, the website had 8,922 instances from all around the world. From this website, 129 local government AI use-cases were identified to be included in the analysis.

3.3. Document Filtering

Each case has been systematically recorded within an Excel spreadsheet. For each case, we recorded information against seven categories: (a) AI technology; (b) Local government name; (c) Country name; (d) Comprehensive use description; (e) Year of introduction; (f) URL link to the published webpage; (g) Description of services. Subsequently, an additional Google search was conducted to identify the service offered by local governments in the concerned countries. Accordingly, five main service and 28 sub-service categories have been identified (Table 3).

Table 3. Local government services.

Main services	Sub-services
Administrative services	Information management
	Back-office work
	Community services - complaints
	Community services - interpretation
	Local tax collection
	Community feedback
Environmental management	Waste collection and management

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	Maintaining public amenities
	Water and sewerage services
	Local environmental issues
	River management
	Urban forestry
Healthcare and wellbeing services	Public health
	Financial assistance and economic development
	Leisure and recreation
	Library maintenance
	Burial grounds and electric crematorium
	Pest control services
Public safety and law enforcement	Public safety and security
	Meteorological services
Transportation and urban planning	Transportation and traffic management
	Permits granting and licensing
	Resident registry
	Housing services
	Town planning
	Building regulations
	Local road maintenance
	Planning application processing

It was found, to our surprise, that none of the local government AI use-cases from China had been documented at the 'country name' filtering phase; despite the top two countries in AI development and adoption being the US and China (AlShebli et al., 2022; Hine & Florida, 2022). Thinking the reason of Chinese local governments only sharing their information on AI utilisation in Chinese language and domestic platforms, we conducted a supplementary search task for cases in China via the Baidu search engine (Chinese search engine) to ensure the comprehensiveness of our database. To reduce the difficulty of the search task, for the case of China, we only searched for information on the local government's official website, i.e., information officially announced on the local government website—'gov.cn'. In addition, the snowballing strategy was adopted to achieve comprehensive coverage of the cases (Wohlin et al., 2022). Finally, a total of 62 cases in China were identified. Lastly, duplicate entries were removed. This leaved us with 262 AI use-cases from 170 local governments—forming a local government AI use-case dataset (see Appendix A).

4. Analysis and Results

4.1. General Observations

The local government AI use-case dataset developed through the grey literature review in documented in January 2024 encompasses 262 cases, spanning 170 local governments. Despite the existence of numerous AI technologies (Figure 1), the records indicate that only eight technologies are actively utilised within local government settings. Among these, NLP emerges as the most prevalent, accounting for 108 cases, followed by RPA with 58 cases, NN with 47 cases, CV with 36 cases, and AS with 10 cases. Conversely, AC, AmC and ILP exhibit the lowest levels of utilisation, each with only one documented use case, as shown in Table 4.

Table 4. AI technologies and local government use-cases.

AI technology	Use-case number
Natural Language Processing (NLP)	108
Robotic Process Automation (RAP)	58
Neural Network (NN)	47
Computer Vision (CV)	36
Autonomous System (AS)	10

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Affective Computing (AC)	1
Ambient Computing (AmC)	1
Inductive Logic Programming (ILP)	1
Total	262

Table 5 presents the local government with three or more documented use-cases of AI technologies. Notably, the top seven positions are occupied by local governments in China, with Changsha leading with 11 cases, followed by Hangzhou with nine cases, and Shenzhen with seven cases. Additionally, 22 local governments are recorded with two cases, while 128 local governments have one documented case each.

Analysing the distribution of AI utilisation cases in local governments by country, it is observed that more than half of the cases originate from China, the US, and the UK, totalling 160 cases. Specifically, China leads with 62 cases, followed by the US with 53 cases, and the UK is in third place with 45 cases. Australia, Sweden, and Canada also exhibit a notable presence with 22, 13, and 12 cases, respectively (Figure 3). Furthermore, the utilisation of AI technologies varies across countries. In the US, NLP emerges as the predominant AI technology with 33 cases recorded in local governments. Conversely, the UK exhibits a balanced adoption of RPA and NLP, totalling 17 cases. Notably, China predominantly utilises NN with 25 cases and CV with 16 cases as the primary AI technologies employed within its local governments (Figure 4).

Table 5. Local governments with more than two AI use-cases.

Local government	Country	Use-case number
Changsha	China	11
Hangzhou	China	9
Shenzhen	China	7
Chongqing	China	6
Shanghai	China	6
Beijing	China	5
Guangzhou	China	4
Kawasaki	Japan	4
Los Angeles	US	4
North Tyneside Council	UK	4
Adelaide	Australia	3
Buenos Aires	Argentina	3
Chengdu	China	3
Derby City Council	UK	3
Helsingborg Municipality	Sweden	3
Johns Creek	US	3
Ronneby	Sweden	3
Singapore	Singapore	3
Telford and Wrekin Council	UK	3
Williamsburg	US	3

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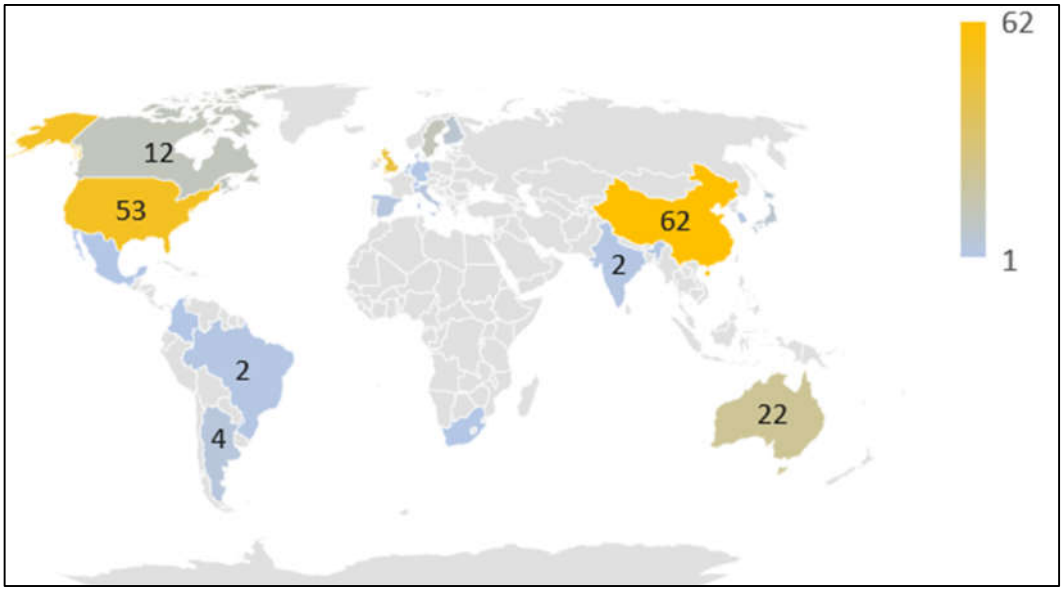

Figure 3. Use-cases by country.

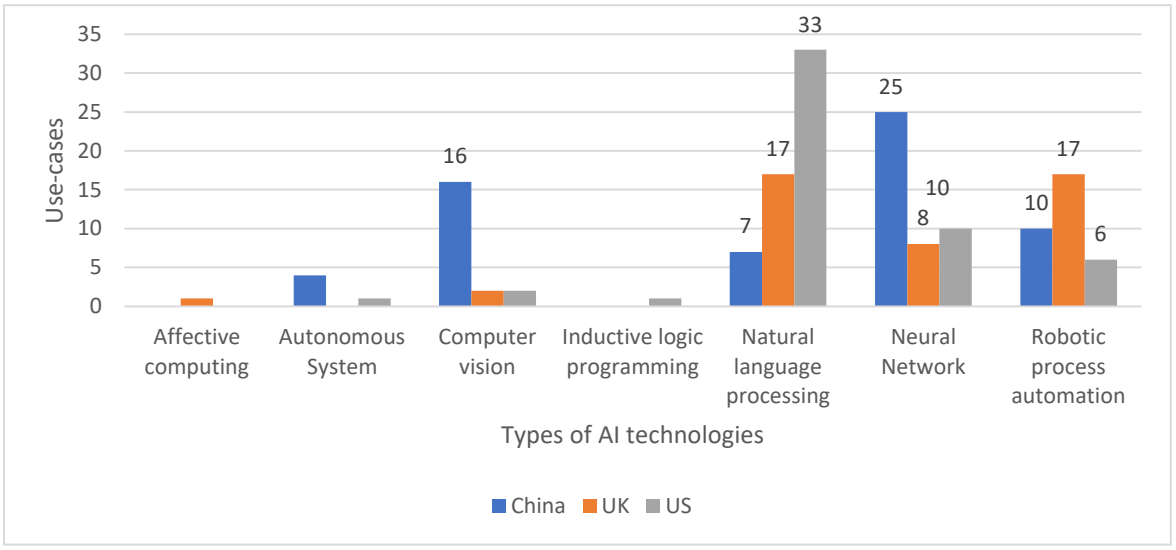

Figure 4. AI technology by US, UK, and China.

The earliest use-case was from the year 2004. However, not many use-cases were documented between 2004-2010 and 2010-2014. But a steady increase in recorded cases is observed from 2014 onwards, with a doubling of documented cases between 2017 and 2018, signifying the onset of an exponential trend of growth. Despite a slight decline in 2019 with 22 cases, there was a significant surge in 2020, with 58 cases recorded. The peak in recorded cases occurred in 2021, totalling 68 cases (Figure 5).

In terms of technology adoption trends, NLP has demonstrated consistent operational usage in local government settings from 2004 onwards, maintaining its presence until 2024. Conversely, the adoption of other technologies exhibits fluctuating growth patterns. According to recorded cases, RPA was introduced in 2015, CV and AS in 2016, and NN in 2017. Additionally, AC was introduced in 2016 and ILP and AmC in 2019 (Figure 6). It is interesting that the number of cases is dropping off across the board from 2021-2024. One possible reason behind this could be a lag behind the publication of such AI initiatives from local government.

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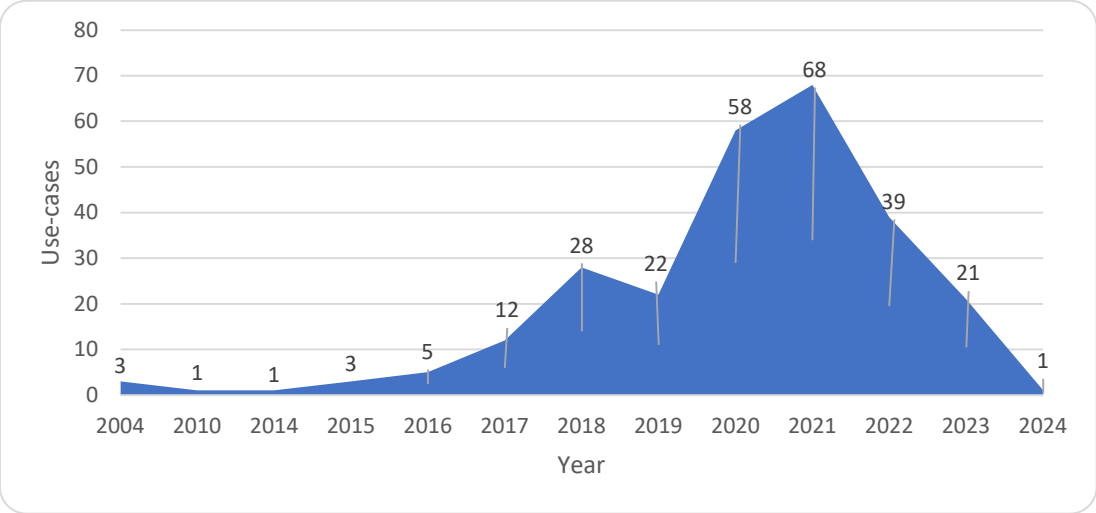

Figure 5. Use-cases by year (all AI technologies).

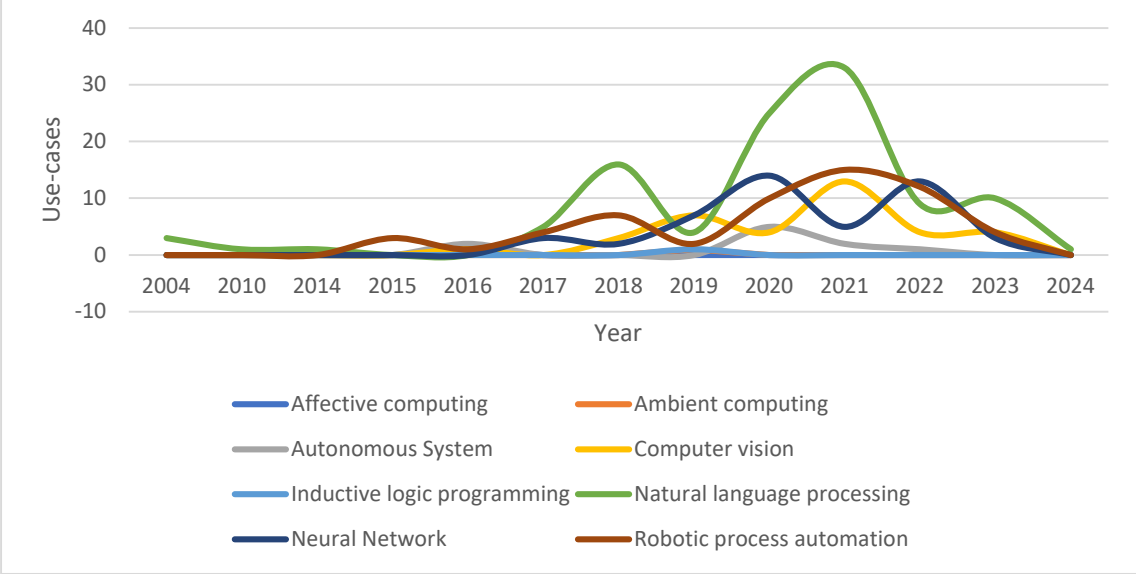

Figure 6. Use-cases by AI technology and year.

As previously mentioned, a total of 28 sub-service categories have been documented under five main services within the dataset. Notably, Information Management emerges as the most prevalent area with 49 recorded cases, followed by Back-office Work with 33 cases, Transportation and Traffic Management with 27 cases, and Public Health with 25 cases. It is noteworthy that local governments are actively adopting AI technology across a wide array of domains, reflecting a concerted effort towards enhancing service delivery effectiveness and efficiency (Table 6).

Table 6. Service by use cases.

Service	Use case number
Information management	49
Back-office work	33
Transportation and traffic management	27
Public health	25
Waste collection and management	16
Permits granting and licensing	12
Community services - complaints	10

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Community services - interpretation	9
Local tax collection	8
Maintaining public amenities	8
Public safety and security	8
Water and sewerage services	7
Financial assistance and economic development	6
Leisure and recreation	5
Resident registry	5
Community feedback	4
Housing services	4
Local environmental issues	4
Town planning	4
Building regulations	3
Local road maintenance	3
Planning application processing	3
Library maintenance	2
River management	2
Urban forestry	2
Burial grounds and electric crematorium	1
meteorological services	1
Pest control services	1

Figure 7 illustrates the distribution of years and services within the dataset. It is evident that certain years are associated with specific services. For instance, in 2018, four main branches are connected, namely back-office work, information management, permits granting and licensing, and transportation and traffic management. Similarly, in 2020, connections are observed primarily towards three main services, namely back-office work, information management, and public health. Furthermore, in 2021, links are established towards back-office work, information management, public health, and waste collection and management. Lastly, in 2022, connections are noted towards back-office work, information management, transportation and traffic management, and waste collection and management.

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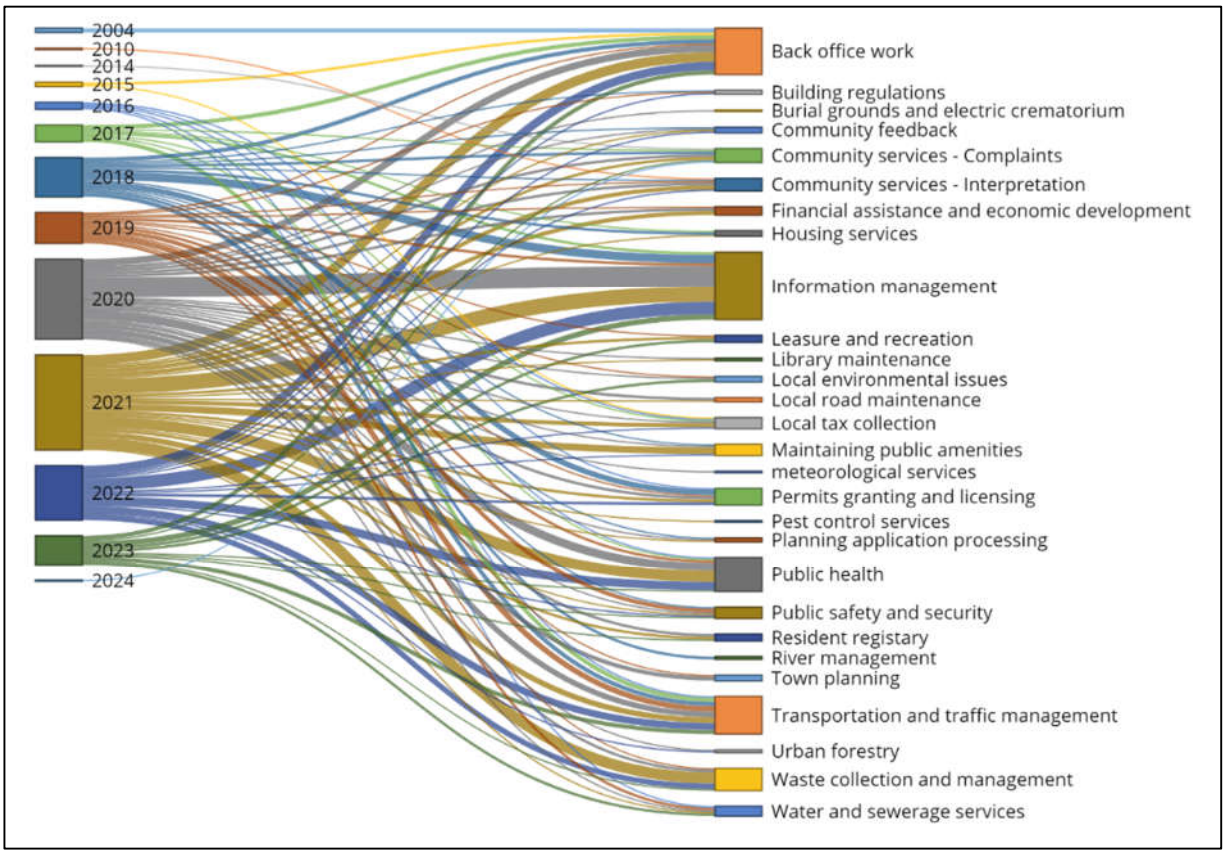

Figure 7. Local government services supported with AI by year.

4.2. AI Technology and Service Distribution

4.2.1. Natural Language Processing in Local Governments

The results of the analysis indicate that NLP has been connected towards nearly 18 services in local government. Among them, information management, back-office work, posting complaints, interpretation, and public health are the highly provided services. NLP is the technology that has been used in chatbots to understand natural human language communication (Figure 8).

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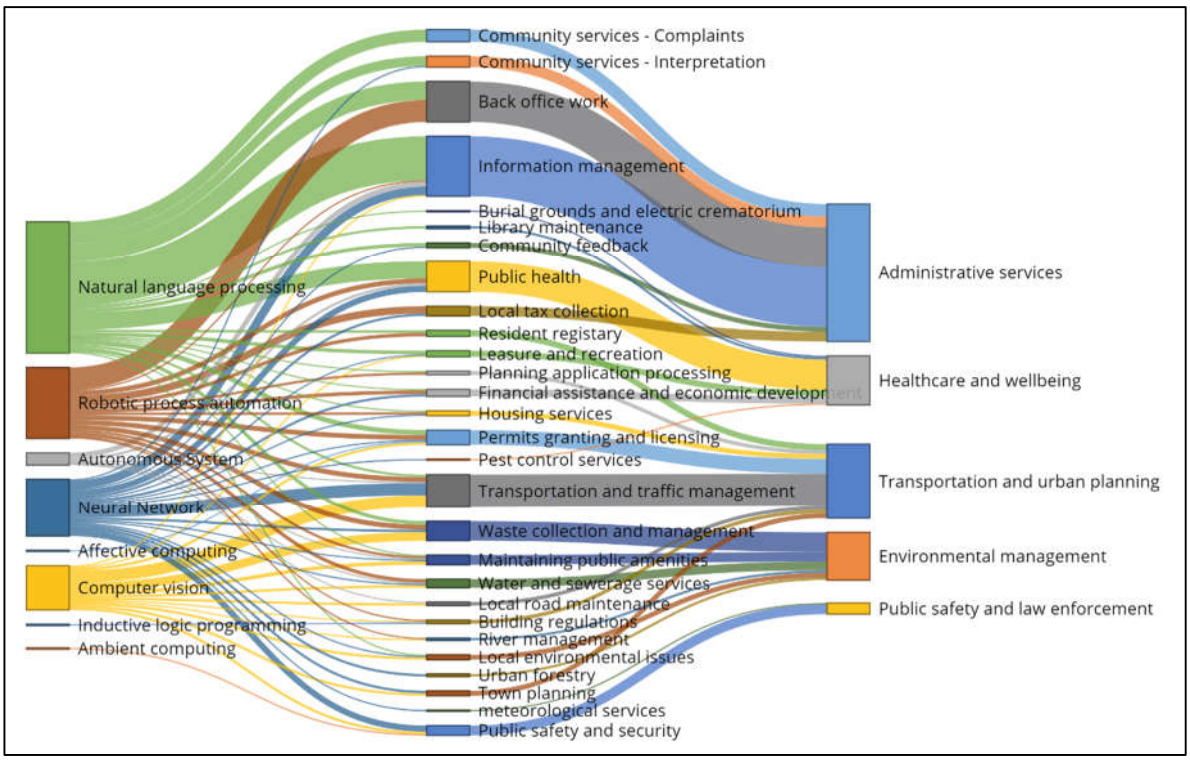

Figure 8. AI technology and AI supported local government services.

These capabilities of NLP provided local government with a more effective and efficient way of:

- Removing language barriers—Phoenix Council, US utilises Amazon Web Services (AWS) Lex chatbot to create a conversation interface in both English and Spanish (AZ Business Magazine, 2021);
- Freeing up human time from performing repetitive boring tasks—Lewes and Eastbourne Council in the UK employ ELLIS, covering over 1,000 council topics and which was trained on 12,000 resident questions. It has already enabled the relocation of 5 full-time contact agents away from live chat to focus on the more complicated tasks (Govlaunch, 2022);
- Connecting residents to city council services 24 hours a day—The Public Relations Office within Municipality of Grosseto in Italy implemented digital functions to enhance communication between residents and the administration. A virtual assistant is available 24/7 to guide residents through online procedures and assist with problem-solving (Municipality of Grosseto, 2021);
- Enhancing wide-scale customer experience - The municipalities of Kortrijk, Tournai, and Roubaix collaborated to create the free Tripster chat tourism service, an overarching approach to promoting cross-border tourism and making it more accessible to everyone (Tripster, 2021).

Additionally, NLP has played a key role during the COVID-19 pandemic. The Kolkata Municipality in India used an innovative chatbot tool to streamline the vaccination process as it fights COVID-19. Within ten weeks of the chatbot-embed platform launch in mid-May 2021, it attracted more than 250,000 unique users and booked more than 75,000 vaccination appointments directly through the platform. Initially, the platform was only connected to three vaccination centres. However, it was rapidly expanded to include approximately 100 vaccination sites across the city, which significantly improved the accessibility and efficiency of the vaccination campaign (Bhatia, 2021). Furthermore, some municipalities have leveraged NLP for short-term purposes, such as during elections. For instance, the Hamilton Council in Canada introduced two innovative online tools—a voice query directory and a virtual assistant—aimed at enabling residents to effortlessly locate and access information about the municipal election held on October 24, 2022 (Hamilton City Council, 2022).

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4.2.2. Neural Networks in Local Governments

NNs are integrated with 19 services and predominantly linked to transportation and traffic management, public safety and security, information management and public health. However, NNs are recognised as a computationally expensive technology due to their demand for significant processing power and time. Consequently, they have been utilised for complex service provision such as transportation and traffic management and public safety and security.

Several municipalities utilise NNs for different types of transportation and traffic management, including:

- Mapping ideal locations for electric vehicle charging points—Implemented by Irving Municipality in the US (VOLTA NEWS, 2023).
- Junction improvements—Undertaken by Lancashire County Council in the UK (Say, 2022).
- Determining the safest route—Implemented by Los Angeles City Council in the US (Fast Company, 2017).
- Assisting citizens in emergency situations such as bridge collapse—Utilised by Atlanta City Council, US (Statescoop, 2017).
- Analysing traffic patterns of different mode of transportation—Implemented by Kansas City Council in the US (Route-Fifty, 2017).
- Navigating parking system—Utilised by Hangzhou Municipality (Ascend Editorial Team, 2022), among others.

Moreover, NNs have also been utilised for safety and security, including:

- Predicting crime locations—Chicago Municipality adopted a model to predict when and where violent crimes are likely to occur. The former mayor Rahm Emanuel announced in early 2018 that gun violence was down 25% compared to the previous year (Emanuel, 2018).
- Predicting child abuse—Implemented by Hackney Council in the UK (Marsh, 2019).
- Safeguarding against cybersecurity issues—Utilised by Gilbert Town Council in the US (Diaz, 2022).
- Identifying and addressing anti-social behaviours—Undertaken by Sunderland City Council in the UK (Wray, 2022).

4.2.3. Robotic Process Automation in Local Governments

RPA is connected with 13 services, with 51 recorded cases of its usage. Among these cases, the majority were recorded for back-office work. The back office is often referred to as the engine room of the organisation (Anagnoste, 2017), where much of the work performed determines the overall success of operations (Vignesh et al., 2016; Makridakis, 2017). Its tasks encompass procurement, finance and accounting, human resource management, payroll, work reporting, and more (Bekkers, 2007; Paagman et al., 2015; Anagnoste, 2017).

Local government back-office employees often find themselves engaged in repetitive tasks for many hours each day, which can lead to an acceleration of errors and a slowdown in progress (David et al., 2023; Senadheera et al., 2024). In addition, inefficient legacy systems contribute to the accumulation of numerous pre-approval documents on desks for extended periods, resulting in suboptimal service delivery. The pre sence of outdated and inefficient administrative processes not only hampers the speed at which local governments can respond to the needs of residents but also affects the overall quality of services provided (Olowu, 2003; Ehsan, 2020).

RPA is recommended technology for back-office work, and this finding is further justified in the local government sector as well (El-Gharib & Amyot, 2023). It offers a non-invasive and cost-effective solution (Ansari et al., 2019; Plattfaut & Borghoff, 2022), which is particularly important for local councils operating in high paced work environments with limited budgets (Wewerka & Reichert, 2021; Ray et al., 2023).

In local government back-office work, RPA is utilised for various tasks including:

- Payslip account management, including Council's payslip archiving system—Implemented by Surrey County Council in the UK (Surrey County Council, 2018);
- Management of financial assistance processing—Undertaken by Strängnäs Municipality in Sweden (Strängnäs Municipality, 2019);

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- Validation of Blue Badge applications and invoice processing—Managed by Cumbria County Council, UK (UK Authority, 2022);
- Financial auditing and risk management mitigation—Liverpool City Council, Australia (Zinnov, 2023);
- Mileage calculations & value added tax (VAT) calculations—Handled by Gloucestershire County Council (Gloucestershire County Council, 2018).

Tax calculation (Norfolk County Council, 2021), water and sewerage service (Blacktown City Council, 2020), waste collection (Alcorcón City Council, 2022) and river management (Shanghai City Council, 2018) are among other main services provided by RPA in local government.

4.2.4. Computer Vision in Local Governments

According to the findings, CV has been employed across 13 services in local government. Among these, CV is predominantly used for transportation and traffic management as well as waste collection and management services. Some local governments have also utilised CV for transportation management, gradually extending its application to public safety. For instance, Seoul Municipality fixed CCTV on every street, which transmit data to the Transportation Operation and Information Service (TOPIS). The TOPIS website utilises this data for real-time traffic monitoring. Additionally, instances of illegal vehicle driving or parking are detected, leading to automatic fines. In cases of accidents or road constructions, detour routes are suggested, and accident notices are promptly sent to connected police and hospitals (Bandopadhyay, 2019). Moreover, there are local government AI use-cases in remote sensing to count pools, assess rooftop solar panels, electrical infrastructure asset management, leak detection in water management, and in the security/surveillance space.

Some local governments have installed fixed cameras to the municipal garbage tracks to identify:

- Roadside assets maintenance—Brimbank City Council, Australia (Australian Research Council, 2023);
- Pothole detection—Helsingborg Municipality, Sweden (Hornblad, 2022);
- Identification of blighted areas—Tuscaloosa Municipality, the US (Sanchez, 2021).

4.2.5. Other AI Technologies in Local Governments

Autonomous systems are used for five types of services, primarily focusing on information management in local government. For instance, Ogaki City Council in Japan use robots to guide the people to the appropriate information window or assisting them in filling out government forms (Japan Times, 2019). Additionally, affective computing, ambient computing (Bibri 2015a, b), and ILP are used for each service of local government. Affective computing is used for permit granting and licensing by London Borough Council in the UK (Davies, 2016). ILP is employed to codify building regulations in California municipalities (Krueger et al., 2019). Besides, ambient computing is utilised for public safety and security in Australia (Ku-ring-gai Council, 2019).

5. Findings and Discussion

This section is not mandatory but may be added if there are patents resulting from the work reported in this manuscript.

5.1. Why Have NLP And RPA Gained Popularity in Local Governments, and How Can these Technologies Address Specific Challenges?

NLP and RPA have gained popularity in local governments due to their profound impact on efficiency and communication. The adoption of NLP significantly enhances the quality of interaction between governments and citizens in the administrative processes/governmental affairs procedures (Androutsopoulou et al., 2019; Wang et al., 2022; Jiang et al., 2023). The common application is the NLP-driven chatbots and virtual assistants that are operational round-the-clock, efficiently addressing frequently asked questions (FAQs) and navigating users through intricate administrative procedures (Androutsopoulou et al., 2019; Cortés-Cediel et al., 2023). Chowdhary (2020) identified

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nine applications of NLP: indexing and searching large texts, information retrieval, classification of text into categories, information extraction, automatic language translation, automatic summarisation of texts, question-answering, knowledge acquisition, and text generation/dialogues.

These automations streamline information access and service requests and contribute to boosting citizen satisfaction with the government's service experiences (Zhu et al., 2022; Ju et al., 2023; Sienkiewicz-Małyjurek, 2023). Furthermore, NLP's capability to sift through and analyse copious amounts of textual data accrued in administrative processes is invaluable (Androutsopoulou et al., 2019; Nicolas et al., 2021). This process facilitates the extraction of pertinent insights, the discernment of trends, and informs governmental policy decisions (Chen & Wei, 2023; Jiang et al., 2023; Yigitcanlar et al., 2023a). An exemplar of its application is sentiment analysis, which can efficiently evaluate public opinion on diverse issues, thus empowering governments to tailor their responses to citizen concerns more efficiently while enhancing the government's response level (Lu et al., 2023). This refined approach to public engagement and data analysis underscores NLP's pivotal role in modernising and optimising government-citizen interactions (Wang et al., 2022; Cortés-Cediel et al., 2023).

RPA has become a crucial instrument in streamlining the routine tasks prevalent in local government operations, particularly in the context of implementing digital transformation initiatives within smart city strategies (Sobczak & Ziora, 2021). RPA's ability to automate paperwork and repetitive administrative functions significantly alleviates staff workload (Hyun et al., 2021; Johansson et al., 2022). This automation translates into expedited processing for various administrative processes/governmental affairs procedures, such as license renewals and application processing, enhancing overall service delivery (Ranerup & Henriksen, 2019). A key benefit of RPA is its potential for cost reduction, a critical factor for local governments operating within stringent budgetary constraints (Adamczyk et al., 2021).

Additionally, the precision of automated processes reduces the likelihood of errors, ensuring heightened accuracy in data management and regulatory compliance—a vital consideration in government operations where inaccuracies can lead to substantial repercussions (Hyun et al., 2021; Sobczak & Ziora, 2021). Thus, the adoption of NLP and RPA technologies offers local governments a pathway to not only bolster operational efficiency and service quality but also promote government decisions to adapt more responsively to the dynamic needs and expectations of their citizenry, e.g., unbiased decisions, new forms of democratic participation, inclusion of users and improved working conditions for employees (Wirtz & Müller, 2019; Johansson et al., 2022; Hujran, et al., 2023).

5.2. Which Service Areas Are Most Affected by AI Technology in Local Governments, and How Does AI Improve the Efficiency in these Service Areas?

AI technology is revolutionising various service areas within local government, with significant impacts observed in the areas of administrative services, healthcare and wellbeing, transportation and urban planning, environmental management and public safety and law enforcement:

Firstly, AI facilitates the automation of routine administrative tasks in local government operations, such as data entry, document processing, and handling customer service inquiries (Ng et al., 2021). AI-powered optical character recognition (OCR) technology automates data entry by extracting information from documents such as forms, applications, and records (Baviskar et al., 2021; Sharma et al., 2022). This process reduces manual data entry errors and speeds up processing times for various administrative tasks (Pencheva et al., 2018). NLP algorithms enable chatbots and virtual assistants to handle citizen queries effectively, reducing response times (Engin & Treleaven, 2019; Susar & Aquaro, 2019). AI-based workflow automation platforms streamline administrative processes by routing tasks, assigning priorities, and automating notifications and approvals (Chen et al., 2023; Gill et al., 2024; Licardo et al., 2024). These systems optimise task management, reduce bottlenecks, and ensure smoother coordination among local government officials, thereby leading to heightened productivity and efficiency (Habbal et al., 2024).

Secondly, AI transforms transportation and urban planning by optimising traffic flow, enhancing public transit, implementing smart parking solutions, refining infrastructure planning,

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integrating micro-mobility options, and promoting transportation equity (Kamrowska-Załuska, 2021; Paiva et al., 2021; Mitieka et al., 2023). Smart traffic management systems use AI to analyse real-time traffic patterns and accordingly adjust signal timings to improve flow and reduce congestion (Araghi et al., 2015). Urban planners utilise AI to simulate scenarios for infrastructure development, optimising city layouts for improved mobility (Alahi et al., 2023; Bibri et al., 2024; Son et al., 2023). These AI-driven solutions improve efficiency, reduce congestion, minimise emissions, and foster inclusive urban development, creating more sustainable and resilient local government functions (Kamrowska-Załuska, 2021; Son et al., 2023).

Thirdly, in local government, AI revolutionises environmental management by tracking pollution sources, optimising waste management, enhancing energy efficiency, conserving natural resources, aiding climate adaptation, and supporting emergency response (Andeobu et al., 2022; Bibri et al., 2023a, b). By leveraging AI across these fronts, local governments enact proactive measures, reduce environmental impact, and promote sustainability, safeguarding communities and fostering resilience for future generations (Buyya et al., 2018).

AI-powered chatbots and virtual assistants interact with citizens, providing information on healthcare services, scheduling appointments, and offering initial triage for medical inquiries (Agarwal et al., 2022; Senadheera et al., 2024). This reduces the burden on staff, improves accessibility to services, and ensures timely assistance for citizens. The COVID-19 pandemic has prompted local government entities to significantly utilise AI technologies to bolster health and safety measures (Costa & Peixoto, 2020). AI algorithms analyse health data and social media to detect outbreaks, track trends, and predict risks, enabling targeted interventions and resource allocation to mitigate disease spread (Elavarasan & Pugazhendhi, 2020; Agarwal et al., 2022).

Finally, AI-powered chatbots and virtual assistants engage with communities, offering crime prevention tips, safety information (Blauth et al., 2022), and aid in reporting incidents, fostering trust, transparency, and collaboration between local government and citizens for more effective emergency services (Alahi et al., 2023). AI systems prioritise emergency calls, assess incident severity, and recommend response strategies, enhancing dispatch efficiency, reducing response times, and optimising resource allocation during emergencies (Farahani et al., 2020; Costa et al., 2022).

In summary, local governments can significantly enhance operational efficiency by leveraging AI to automate tasks, analyse data, predict trends, enhance citizen engagement, and optimise resource allocation. This enhanced efficiency facilitates more effective public service delivery, enabling the tackling of complex challenges with greater precision and agility. The integration of AI technologies into the operational frameworks of local governments not only streamlines administrative processes but also enriches the decision-making ecosystem with data-driven insights. This technological empowerment facilitates a more responsive, transparent, and inclusive governance model and contributes to fostering a more connected and satisfied community.

5.3. Why Do Public Safety and Law Enforcement Get Less Attention on Local Government AI Applications?

Local governments often prioritise AI applications that directly address immediate challenges or offer clear efficiency gains in service delivery (Mikhaylov et al., 2018; Dwivedi et al., 2021). The results indicated that AI initiatives in areas such as administrative service, transportation, and urban planning may receive more attention than public safety. Meanwhile, public safety issues are often multifaceted and sensitive, involving considerations of law enforcement, emergency response, community relations, and privacy rights (van Dijk et al., 2019; Nassar & Kamal, 2021).

Implementing AI solutions in this domain requires careful planning, stakeholder engagement, and consideration of ethical and legal implications, which can pose challenges for local government AI projects (Gentzel, 2021). Local governments often face resources in terms of both funding and expertise when it comes to developing and implementing AI solutions for enhancing public safety (Mikhaylov et al., 2018; Gracias et al., 2023). Consequently, they prioritise their investments based on immediate needs and may allocate resources to other services. For instance, Seoul Municipality initially installed CCTV cameras for real-time traffic monitoring. However, during emergencies, they

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repurpose these cameras to enhance city safety, demonstrating a flexible and adaptive approach to resource utilisation.

In the newsletter of Forbes, Dan Hoffman, the city manager of City of Winchester, stated that "…in time though, I see AI having an impact as big, if not bigger, in public safety. However, those will take longer to develop and trust for obvious reasons. Adoption in the first responder community will also take time as those systems are traditionally more expensive and require more standards and training. However, when the time comes, there will be huge leaps in AI tools that help prevent fires and medical emergencies. We're already seeing AI tools employed by groups like the National Centre for Missing and Exploited Children making great strides in fighting child sex abuse. So, we're seeing larger national organisations use AI for public safety; it's just a matter of time before it is more common at the local level" (Schmelzer, 2020).

Furthermore, addressing the concerns and challenges associated with implementing AI in public safety necessitates a long-term strategy incorporating input from a broad array of stakeholders and establishing ethical guidelines. This strategy is required to guarantee that AI technologies are deployed in a manner that is transparent, responsible, and effective, especially within community settings. As Fukuda-Parr & Gibbons (2021) suggested, AI-driven application in public safety requires a deliberate and considered framework that balances technological innovation with ethical considerations, safeguarding individuals' and communities' rights and well-being while enhancing public safety measures.

5.4. Why Do Different Local Governments Use Different AI Systems?

The findings reveal a diverse landscape where different local governments employ various AI systems for service provision. This diversity stems from the unique needs and priorities of each locality, shaped by factors like population size, geographic location, economic activity, and social demographics (Brownson et al., 2009; Tan & Taeihagh, 2020). For instance, a city prone to natural disasters may prioritise AI systems for disaster prediction and prevention, while an urban area may focus on urban issues such as traffic optimisation. The selection of specific AI systems is influenced by a myriad of factors (Duan et al., 2019), including budgetary constraints, availability of technological infrastructure, and human capital (Thuan et al., 2015; Votto et al., 2021; Kelly et al., 2022). Local governments with robust resource allocation mechanisms tend to leverage AI systems more effectively and efficiently (Păvăloaia & Necula, 2023).

Furthermore, each local government grapples with its unique set of challenges, spanning from crime rates and environmental concerns to transportation congestion (Madumo, 2015; Mikalef et al., 2019). In response, AI systems are tailored to address these specific challenges, resulting in varied deployment strategies based on local needs (Peres et al., 2020). As primary service providers to the community, local governments must accommodate the preferences of a diverse range of stakeholders, including community members themselves (Beynon-Davies & Martin, 2004). However, aligning these preferences can be complex, as public officials, community leaders, and citizen stakeholders may harbor differing priorities and opinions regarding AI adoption (Miller, 2022). Moreover, local governance structures and political dynamics significantly influence the selection and implementation of AI systems (Dafoe, 2017).

Overall, the adoption of various AI systems across different local governments is driven by a multitude of factors, including distinct needs, resources, regulations, and stakeholder preferences. This diversity necessitates thorough evaluation by each local government to select AI solutions that best align with their specific challenges and objectives. It is imperative for AI deployment in local governments to not only address the unique needs of communities but also to comply with local regulatory frameworks and to accommodate the expectations of diverse stakeholders. Tailoring AI deployment in this matter can enhance the capacity of local governments for service delivery, informed decision-making, and overall operational efficiency, particularly within specific community contexts.

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5.5. What Are the Key Challenges, Future Impacts, and Trends?

The adoption of AI technology in local government holds promise for enhanced efficiency and service delivery, but also poses significant challenges that demand deliberate, careful consideration and strategic planning. One major hurdle lies in integrating AI technologies with existing legacy systems (Sun & Medaglia, 2019; Pencheva et al., 2020; Dwivedi et al., 2021), as these systems may not be designed for compatibility with AI. This integration process often requires extensive overhauls or replacements and entails seamless functionality and communication between new and established systems (Wang et al., 2021; Dwivedi et al., 2021). Additionally, since AI-driven applications rely heavily on data, safeguarding the privacy and security of sensitive information managed by governments becomes a critical concern (Sun & Medaglia, 2019; Alshahrani et al., 2022; Sienkiewicz-Małyjurek, 2023).

This challenge includes considerations not only of the technical aspects of data security but also of the ethical dimensions and the preservation of public trust (Aoki, 2020; Chen et al., 2021; Ingrams et al., 2022). Moreover, the potential of AI algorithms to unintentionally reflect and amplify biases present in their training data necessitates vigilant oversight of the ethical repercussions of AI-driven decision-making (Sunarti et al., 2021; Shaamala et al., 2024). This oversight is imperative to ensure equitable and non-discriminatory application and practice of these technologies (Li et al., 2023a; Saeed & Omlin, 2023). Another pivotal challenge is navigating the evolving regulatory landscape, particularly concerning data usage and privacy. Governmental entities are compelled to ensure adherence to extant laws while remaining adaptable to the dynamic regulatory context (Sun & Medaglia, 2019; Campion et al., 2022; Li et al., 2023b). As regulations governing data privacy and use continue to evolve, local governments must stay informed of these changes and adapt their practices accordingly. This adaptation is critical to ensure compliance with legal standards and uphold ethical principles in the implementation of AI technologies.

Furthermore, the financial consideration of implementing AI solutions may pose a significant barrier, especially given the budgetary constraints typical of local governments (Wang et al., 2021; Yigitcanlar et al., 2023b). In this context, it is imperative for local governments to meticulously evaluate the balance between financial outlays and the potential long-term advantages of AI implementation. This evaluation must prioritise ensuring that the realised benefits align not only with the initial promises of AI adoption and utilisation but also substantively contribute to enhancing the well-being of citizens (Nzobonimpa & Savard, 2023). It is critical that these advancements are achieved without inadvertently compromising the welfare of any community segments, thereby maintaining a holistic approach to public service enhancement through AI integration (Williams et al., 2016; Jang, 2023; Mesa, 2023).

Besides, the deployment of AI technologies requires a workforce with specialised skills, not only in terms of recruiting new talent but also in training existing employees to operate and manage these advanced systems competently (Wang et al., 2021; Mikalef et al., 2022). This need for skill development may represent a time-intensive and financially demanding undertaking, adding to the complexity of adopting AI in local government. It underscores the importance of investing in human capital development alongside technological infrastructure to ensure the successful deployment and sustainable functioning of AI solutions within local government contexts.

Lastly, it is important to note local government cybersecurity (Hossain et al., 2024), and the role of fake/synthetic data/poisoned data and adversarial attacks, and how these may affect services provided through AI enabled local government systems are among the factors to be carefully considered.

5.6. Limitations of the Study

It is imperative to recognise the constraints that could affect how the results are interpreted: (a) This study is purely based on a grey literature review, which often lacks the rigorous peer-review process of academic literature, leading to variations in quality and reliability; (b) The analysis results presented here could involve unintended bias of authors; (c) There is a possibility that there exist more than 262 real-world use-cases; however, our research methodology may not have been able to

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locate them, potentially resulting in gaps or the introduction of biases into the data synthesis process; (d) The study encountered challenges in accessing Chinese cases, which required additional efforts for data collection. This entailed conducting a secondary search using Baidu for rectification and translation purposes, a process which was labour-intensive; (e) It is important to acknowledge the shortcomings in the available case information—Each piece of literature reviewed presented large differences across their format and the level of detail presented, ranging from comprehensive descriptions to brief overviews. As a result, the key characteristics of the cases were restricted to AI technology, local government name, country name, comprehensive use description, and year of introduction; (f) Today in many organisations, people are using Generative AI—such as ChatGPT—to perform routine office tasks without policy guidance or oversight or 'under the radar'. This is almost certainly true in local governments too, especially in citizen facing roles, but will not show up in an online trawl, but certainly represents an important local government use case. Nonetheless, despite these limitations, the study was carried out in a measured and transparent manner, aiming to provide valuable insights into AI adoption in local governance while considering these gaps in the methodology and data sources.

5. Conclusion

This paper offers a comprehensive understanding of the real-world scenarios in which AI is used within local governments. This review highlights the growing significance of AI in smart city local governance, which has the potential to transform the delivery of public services, reshape decision-making processes, and redefine the interaction between governments and citizens, particularly under the call for a smart city agenda.

While AI presents promising solutions for enhancing local government efficiency, improving public services, and tackling complex challenges, its expanding integration into local governance necessitates a comprehensive and appropriate strategy to ensure AI will be responsibly used within the local government framework to enhance residents' and community well-being. Furthermore, local governments should carefully consider ethical implications, data privacy, and the equitable distribution of technology benefits, ensuring that AI serves as a public value tool and fosters more responsive, efficient, and inclusive local governance.

We advocate the critical need for interdisciplinary collaboration in advancing research, practice, and policy related to the utilisation of AI technologies in local government contexts. By combining expertise from various fields, such as computer science, public administration, policy analysis, urban planning, philosophy, and social sciences, interdisciplinary collaboration can enrich the research in this area.

In terms of research, interdisciplinary collaboration can facilitate the integration of multiple perspectives and methodologies, enriching the analysis of AI utilisation in local government. For example, collaboration between computer scientists and scholars in public administration can foster the development of innovative research methodologies for data collection and analysis. This includes the application of NLP techniques to derive insight from policy documents and organisational reports, showcasing the interdisciplinary approach's potential to yield significant advancements in understanding and applying AI in public sector contexts. Similarly, collaboration between urban planners and social scientists can offer crucial insights into the societal impacts of AI adoption in local government. This includes exploring key issues related to equity, accessibility, and community engagement, thereby deepening understanding of the impact of AI on different communities and social groups and helping to develop more inclusive and equitable public service strategies.

In addition, prospective research should aim to address the identified constraints in existing research efforts, such as conducting more thorough practice reviews, improving data collection methodologies, and exploring the impact of AI on governance outcomes. Interdisciplinary collaboration can help address these constraints. By drawing on expertise from various disciplines, researchers can enhance the rigor and validity of their studies, ensuring that findings are robust and reliable. For example, interdisciplinary research teams can employ mixed methods approaches that combine quantitative data analysis with qualitative insights from interviews, focus groups, and

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participant observations. Adopting this holistic approach allows for a more nuanced understanding of the complex dynamics underlying AI utilisation in local government, which may help address multifaceted challenges and leverage the opportunities presented by AI technologies to enhance local governance and public service delivery.

Concerning practice, interdisciplinary collaboration can facilitate knowledge exchange and capacity building among practitioners from different fields. For example, collaboration between AI developers and public sector managers can promote the co-design and co-creation of AI-enabled solutions that are tailored to the specific needs and priorities of local government agencies. Similarly, collaboration between data scientists and urban planners can support the development of data-driven decision-making frameworks that integrate AI technologies into the planning and implementation of urban development projects. Moreover, local government practitioners can benefit from the insights provided in this study by leveraging AI technologies to enhance service delivery, streamline administrative processes, and improve citizen engagement. Practitioners should also consider the ethical and societal implications of AI adoption and develop strategies to mitigate potential risks.

Regarding policy, interdisciplinary collaboration can inform the development of evidence-based policies and regulatory frameworks that govern the responsible use of AI in local government. By bringing together policymakers, legal experts, ethicists, and technology specialists, interdisciplinary collaboration can facilitate discussions on key policy issues, such as data privacy and security, algorithmic bias, fairness, transparency, and accountability. This collaborative approach can help ensure that AI policies are informed by the latest research findings and reflect the diverse perspectives of stakeholders from different disciplines. This includes establishing frameworks for ethical AI deployment, ensuring transparency and accountability in decision-making processes, and promoting equity and inclusivity in access to AI-enabled services.

Overall, interdisciplinary collaboration is essential for advancing research, practice, and policy related to AI utilisation in local government contexts. By leveraging the collective expertise and perspectives of diverse disciplines, interdisciplinary collaboration can drive innovation, foster knowledge exchange, and promote responsible and inclusive AI governance.

In conclusion, this study provides useful insights and perspectives for smart city local government decision-makers, practitioners, researchers, and other stakeholders to effectively utilise AI technology in the local government context. By enhancing the understanding of AI technology utilisation in local governments through the lessons drawn from 262 leading practices, this study lays a foundation for informed decision-making and strategic planning in local governance—particularly in the context of smart cities.

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Appendix A: Local government AI use-cases

AI technology	Local government	Country	General service	Sub-service	Year	URL
"Inductive logic programming"	California Cities	US	Transportation and urban planning	Building regulations	2019	http://logicprogramming.stanford.edu/readings/symbium.pdf
"Robotic process automation"	Sea Girt	US	Transportation and urban planning	Building regulations	2018	https://www.govpilot.com/blog/robotic-process-automation-for-local-governments/
"Robotic process automation"	Norfolk County Council	UK	Administrative services	Local tax collection	2021	https://www.blueprism.com/resources/case-studies/norfolk-county-council-enhances-citizens-experience-with-a-digital-workforce/
"Robotic process automation"	Brent Council	UK	Transportation and urban planning	Housing services	2018	https://www.uipath.com/resources/automation-case-studies/brent-council-uk-government-rpa
"Robotic process automation"	Surrey County Council	UK	Administrative services	Back-office work	2018	https://www.uipath.com/resources/automation-case-studies/surrey-county-council-improves-employee-experience-with-automation
"Robotic process automation"	Municipality Of Strängnäs	Sweden	Administrative services	Back-office work	2019	https://www.uipath.com/resources/automation-case-studies/strangnas-municipality-government-rpa
"Robotic process automation"	Municipality Of Copenhagen	Denmark	Administrative services	Back-office work	2015	https://www.uipath.com/resources/automation-case-studies/copenhagen-municipality-enterprise-rpa#:~:text=Copenhagen%20has%20deployed%20its%20first,the%20information%20retrieval%20and%20reconciliation.
"Robotic process automation"	Sefton Council	UK	Administrative services	Local tax collection	2015	https://www.arvato.co.uk/wp-content/uploads/2019/06/Arvato_UK_rpa_public_sector_whitepaper_updated.pdf
"Robotic process automation"	Sefton Council	UK	Administrative services	Back-office work	2015	
"Robotic process automation"	North Tyneside Council	UK	Transportation and urban planning	Housing services	2017	https://www.ukauthority.com/articles/robots-deliver-award-winning-customer-service-in-north-tyneside/
"Robotic process automation"	North Tyneside Council	UK	Administrative services	Local tax collection	2017	
"Robotic process automation"	Cumbria County Council	UK	Transportation and urban planning	Transportation and traffic management	2022	https://www.ukauthority.com/articles/automation-as-a-weapon-in-local-government-s-new-battles/
"Robotic process automation"	Cumbria County Council	UK	Administrative services	Back-office work	2022	
"Robotic process automation"	Willoughby Council	Australia	Administrative services	Back-office work	2021	https://zinnov.com/automation/intelligent-automation-driving-government-digital-transformation-blog/
"Robotic process automation"	Willoughby Council	Australia	Administrative services	Back-office work	2020	https://www.governmentnews.com.au/type_contributors/dexter-the-robot-improving-customer-experience/

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"Robotic process automation"	San Francisco Municipal	San Francisco	Transportation and urban planning	Transportation and traffic management	2023	https://zinnov.com/automation/intelligent-automation-driving-government-digital-transformation-blog/
"Robotic process automation"	City Council Of Geneva	Switzerland	Healthcare and wellbeing	Financial assistance and economic development	2021	https://zinnov.com/automation/intelligent-automation-driving-government-digital-transformation-blog/#:~:text=Further%2C%20the%20City%20Council%20of,audit%20and%20risk%20management%20processes.
"Robotic process automation"	Liverpool City Council	Australia	Administrative services	Back-office work	2023	https://zinnov.com/automation/intelligent-automation-driving-government-digital-transformation-blog/#:~:text=Further%2C%20the%20City%20Council%20of,audit%20and%20risk%20management%20processes.
"Robotic process automation"	Tasman Sea Hawke's Bay Regional Council	New Zealand	Transportation and urban planning	Resident registry	2020	https://zinnov.com/automation/intelligent-automation-driving-government-digital-transformation-blog/
"Robotic process automation"	Municipality Of Frederiksberg	Denmark	Transportation and urban planning	Resident registry	2020	https://www.fujitsu.com/global/imagesgig5/CS_2020Aug_Frederiksberg-Municipality.pdf
"Robotic process automation"	Municipality Of Frederiksberg	Denmark	Transportation and urban planning	Resident registry	2023	https://www.fujitsu.com/global/imagesgig5/CS_2020Aug_Frederiksberg-Municipality.pdf
"Robotic process automation"	Pecos	USA	Administrative services	Back-office work	2022	https://govlaunch.com/collections/automation
"Robotic process automation"	Avondale	USA	Administrative services	Back-office work	2020	https://govlaunch.com/collections/automation
"Robotic process automation"	Middlesbrough Council	England	Administrative services	Local tax collection	2021	https://govlaunch.com/collections/automation
"Robotic process automation"	Burnaby	Canada	Administrative services	Back-office work	2022	https://govlaunch.com/collections/automation
"Robotic process automation"	Nottingham City Council	England	Administrative services	Back-office work	2022	https://govlaunch.com/collections/automation
"Robotic process automation"	Leeds City Council	England	Administrative services	Local tax collection	2016	https://govlaunch.com/collections/automation
"Robotic process automation"	Glenelg	Australia	Administrative services	Back-office work	2020	https://govlaunch.com/collections/automation
"Robotic process automation"	Kingston	Australia	Environmental management	Waste collection and management	2022	https://govlaunch.com/collections/automation
"Robotic process automation"	Grand Forks	USA	Transportation and urban planning	Transportation and traffic management	2018	https://govlaunch.com/collections/automation
"Robotic process automation"	Thurrock Council	England	Healthcare and wellbeing	Financial assistance and economic development	2021	https://govlaunch.com/collections/automation
"Robotic process automation"	Gloucestershire County Council	England	Administrative services	Back-office work	2022	https://govlaunch.com/collections/automation

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"Robotic process automation"	Porto Alegre	Brazil	Transportation and urban planning	Permits granting and licensing	2022	https://govlaunch.com/collections/automation
"Robotic process automation"	Sundsvall	Sweden	Administrative services	Information management	2022	https://govlaunch.com/collections/automation
"Robotic process automation"	Alcorcón City Council	Spain	Environmental management	Waste collection and management	2021	https://govlaunch.com/collections/automation
"Robotic process automation"	Norwich City Council	England	Healthcare and wellbeing	Financial assistance and economic development	2021	https://govlaunch.com/collections/automation
"Robotic process automation"	Hamilton City Council	Canada	Environmental management	Waste collection and management	2021	https://govlaunch.com/collections/automation
"Robotic process automation"	Ronneby	Sweden	Administrative services	Back-office work	2021	https://govlaunch.com/collections/automation
"Robotic process automation"	Culiacán	Mexico	Transportation and urban planning	Planning application processing	2021	https://govlaunch.com/collections/automation
"Robotic process automation"	Tuscaloosa Municipality	USA	Environmental management	Maintaining public amenities	2021	https://govlaunch.com/collections/automation
"Robotic process automation"	Värmdö	Sweden	Environmental management	Water and sewerage services	2023	https://govlaunch.com/collections/automation
"Robotic process automation"	Sunshine Coast	Australia	Environmental management	Waste collection and management	2021	https://govlaunch.com/collections/automation
"Robotic process automation"	Devonport	Australia	Transportation and urban planning	Permits granting and licensing	2021	https://govlaunch.com/collections/automation
"Robotic process automation"	Heinola	Finland	Administrative services	Back-office work	2021	https://govlaunch.com/collections/automation
"Robotic process automation"	Bellevue	USA	Transportation and urban planning	Permits granting and licensing	2020	https://govlaunch.com/collections/automation
"Robotic process automation"	Tandridge District Council	England	Administrative services	Back-office work	2017	https://govlaunch.com/collections/automation
"Robotic process automation"	Blacktown	Australia	Environmental management	Water and sewerage services	2020	https://govlaunch.com/collections/automation
"Robotic process automation"	Auckland	New Zearland	Administrative services	Local tax collection	2020	https://govlaunch.com/collections/automation
"Robotic process automation"	South Ayrshire Council	Scotland	Administrative services	Back-office work	2020	https://www.theguardian.com/society/2020/oct/28/nearly-half-of-councils-in-great-britain-use-algorithms-to-help-make-claims-decisions
"Computer vision"	Erin	Canada	Environmental management	Maintaining public amenities	2021	https://govlaunch.com/collections/automation

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“Computer vision”	Stratford	Australia	Environmental management	Maintaining public amenities	2021	https://govlaunch.com/collections/automation
“Computer vision”	Brimbank City Council	Australia	Environmental management	Waste collection and management	2023	https://apo.org.au/sites/default/files/resource-files/2023-08/apo-nid323811_0.pdf
“Computer vision”	Kitchener	Canada	Environmental management	Maintaining public amenities	2021	https://www.kitchener.ca/en/news/locally-made-robots-helping-city-staff-improve-kitchener-sidewalks.aspx
“Computer vision”	Municipality Of Rotterdam	Netherland	Transportation and urban planning	Building regulations	2022	https://www.spotr.ai/customer-stories/rotterdam
“Computer vision”	City Council Of A Western Australian	Australia	Healthcare and wellbeing	Leisure and recreation	2021	https://www.integrasources.com/cases/computer-vision-sports-monitoring/
“Computer vision”	Helsingborg Municipality	Sweden	Environmental management	Waste collection and management	2021	https://univrses.com/press-releases/computer-vision-helps-make-helsingborg-a-smarter-city/
“Computer vision”	Helsingborg Municipality	Sweden	Transportation and urban planning	Local road maintenance	2021	https://univrses.com/press-releases/computer-vision-helps-make-helsingborg-a-smarter-city/
“Computer vision”	Helsingborg Municipality	Sweden	Transportation and urban planning	Transportation and traffic management	2021	https://univrses.com/press-releases/computer-vision-helps-make-helsingborg-a-smarter-city/
“Computer vision”	Tuscaloosa Municipality	USA	Environmental management	Waste collection and management	2021	https://www.planning.org/publications/report/9270237/
“Computer vision”	Seoul	South Korea	Transportation and urban planning	Transportation and traffic management	2019	https://www.sparkcognition.com/artificial-intelligence-and-the-new-urban-infrastructure/
“Computer vision”	Tel-Aviv Municipality	Israel	Environmental management	Water and sewerage services	2019	https://www.spiceworks.com/tech/iot/articles/what-is-internet-of-everthing/
“Computer vision”	Las Vegas	USA	Transportation and urban planning	Transportation and traffic management	2021	https://governmenttechnologyinsider.com/whats-ahead-for-smart-cities/
“Computer vision”	Mangaung Metropolitan Municipality	South Africa	Environmental management	Water and sewerage services	2019	https://www.smec.com/au/insights/deploying-artificial-intelligence-for-underground-asset-condition-assessments/
“Computer vision”	Copenhagen City	Denmark	Environmental management	Local environmental issues	2019	https://www.linkedin.com/pulse/smart-cities-computer-vision-technology-debiprasad-bandopadhyay/
“Computer vision”	Seoul	South Korea	Public safety and law enforcement	Public safety and security	2019	https://www.linkedin.com/pulse/smart-cities-computer-vision-technology-debiprasad-bandopadhyay/
“Computer vision”	Singapore	Singapore	Transportation and urban planning	Transportation and traffic management	2018	https://www.linkedin.com/pulse/smart-cities-computer-vision-technology-debiprasad-bandopadhyay/
“Computer vision”	Barcelona	Spain	Environmental management	Waste collection and management	2021	https://www.wowza.com/blog/smart-city-trends
“Computer vision”	Blackpool Council’	England	Transportation and urban planning	Local road maintenance	2020	https://www.government-transformation.com/data/local-authorities-achieving-results-with-ai-roll-outs

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"Computer vision"	BCP Council Of Bournemouth, Christchurch And Poole	England	Environmental management	Waste collection and management	2021	https://www.government-transformation.com/data/local-authorities-achieving-results-with-ai-roll-outs
"Natural language processing"	Milton Keynes	England	Transportation and urban planning	Permits granting and licensing	2018	https://www.government-transformation.com/data/local-authorities-achieving-results-with-ai-roll-outs
"Natural language processing"	Barcelona	Spain	Administrative services	Back-office work	2004	http://www.comune.torino.it/hops/documents/deliverables/brochure_A4_n1.pdf
"Natural language processing"	Turin Municipal	Italy	Administrative services	Back-office work	2004	http://www.comune.torino.it/hops/documents/deliverables/brochure_A4_n1.pdf
"Natural language processing"	London Borough Of Camden	England	Administrative services	Back-office work	2004	http://www.comune.torino.it/hops/documents/deliverables/brochure_A4_n1.pdf
"Natural language processing"	Beirut Municipality	Lebanon	Administrative services	Community services - Interpretation	2010	https://medium.com/beirut-spring/beirut-municipality-website-uses-machine-translation-to-populate-english-and-french-pages-590ff54b502c
"Natural language processing"	Wollongong City Council	Australia	Administrative services	Community services - Interpretation	2022	https://wollongong.nsw.gov.au/about-google-translate
"Natural language processing"	Swindon Council	England	Administrative services	Community services - Interpretation	2019	https://cities-today.com/council-slashes-translation-costs-with-machine-learning/
"Natural language processing"	Municipality Of Rimini	Italy	Administrative services	Back office work	2021	https://dt4regions.eu/dt-book/dt-stories/open-digital-assistant
"Natural language processing"	Phoenix Municipality	USA	Administrative services	Community services - Interpretation	2021	https://govlaunch.com/stories/ten-local-government-chatbots-that-are-making-a-difference
"Natural language processing"	Williamsburg	USA	Administrative services	Information management	2018	https://govlaunch.com/stories/ten-local-government-chatbots-that-are-making-a-difference
"Natural language processing"	Singapore	Singapore	Administrative services	Community services - Complaints	2014	https://govlaunch.com/stories/ten-local-government-chatbots-that-are-making-a-difference
"Natural language processing"	Kawasaki	Japan	Transportation and urban planning	Permits granting and licensing	2018	https://govlaunch.com/stories/ten-local-government-chatbots-that-are-making-a-difference
"Natural language processing"	Kawasaki	Japan	Administrative services	Information management	2018	https://govlaunch.com/stories/ten-local-government-chatbots-that-are-making-a-difference
"Natural language processing"	Kakegawa City	Japan	Transportation and urban planning	Permits granting and licensing	2018	https://govlaunch.com/stories/ten-local-government-chatbots-that-are-making-a-difference
"Natural language processing"	Kolkata	India	Healthcare and wellbeing	Public health	2021	https://govlaunch.com/stories/ten-local-government-chatbots-that-are-making-a-difference
"Natural language processing"	Kakegawa City	Japan	Administrative services	Information management	2018	https://govlaunch.com/stories/ten-local-government-chatbots-that-are-making-a-difference

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"Natural language processing"	Boston	USA	Healthcare and wellbeing	Public health	2021	https://govlaunch.com/stories/ten-local-government-chatbots-that-are-making-a-difference
"Natural language processing"	Derby City Council	England	Healthcare and wellbeing	Public health	2023	https://govlaunch.com/stories/ten-local-government-chatbots-that-are-making-a-difference
"Natural language processing"	Cabarrus County	USA	Healthcare and wellbeing	Public health	2021	https://govlaunch.com/stories/ten-local-government-chatbots-that-are-making-a-difference
"Natural language processing"	Los Angeles	USA	Administrative services	Back-office work	2017	https://govlaunch.com/stories/ten-local-government-chatbots-that-are-making-a-difference
"Natural language processing"	Ronneby	Sweden	Administrative services	Back-office work	2021	https://govlaunch.com/stories/ten-local-government-chatbots-that-are-making-a-difference
"Natural language processing"	San Antonio	USA	Healthcare and wellbeing	Leisure and recreation	2023	https://govlaunch.com/collections/chatbots
"Natural language processing"	Fairfield	USA	Administrative services	Community services - Complaints	2017	https://govlaunch.com/collections/chatbots
"Natural language processing"	Derby City Council	England	Administrative services	Back-office work	2023	https://govlaunch.com/collections/chatbots
"Natural language processing"	Stirling	Scotland	Healthcare and wellbeing	Leisure and recreation	2023	https://govlaunch.com/collections/chatbots
"Natural language processing"	Coral Gables	USA	Administrative services	Information management	2023	https://govlaunch.com/collections/chatbots
"Natural language processing"	Atlanta	USA	Administrative services	Information management	2023	https://govlaunch.com/collections/chatbots
"Natural language processing"	Virginia Beach	USA	Administrative services	Back-office work	2023	https://govlaunch.com/collections/chatbots
"Natural language processing"	Nottingham City Council	England	Environmental management	Local environmental issues	2023	https://govlaunch.com/collections/chatbots
"Natural language processing"	Kelowna	Canada	Administrative services	Information management	2022	https://govlaunch.com/collections/chatbots
"Natural language processing"	Buenos Aires	Argentina	Healthcare and wellbeing	Financial assistance and economic development	2020	https://govlaunch.com/collections/chatbots
"Natural language processing"	Hamilton City Council	Canada	Administrative services	Information management	2022	https://govlaunch.com/collections/chatbots
"Natural language processing"	Kawasaki	Japan	Administrative services	Information management	2018	https://govlaunch.com/collections/chatbots
"Natural language processing"	Kawasaki	Japan	Transportation and urban planning	Permits granting and licensing	2018	https://govlaunch.com/collections/chatbots
"Natural language processing"	Phoenix Municipality	USA	Administrative services	Community services - Interpretation	2021	https://govlaunch.com/collections/chatbots

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"Natural language processing"	Singapore	Singapore	Administrative services	Information management	2021	https://govlaunch.com/collections/chatbots
"Natural language processing"	Telford And Wrekin Council	England	Healthcare and wellbeing	Library maintenance	2021	https://govlaunch.com/projects/telford-and-wrekin-council-add-three-new-services-thanks-to-tom-their-ai-assistant
"Natural language processing"	Telford And Wrekin Council	England	Transportation and urban planning	Housing services	2021	https://govlaunch.com/projects/telford-and-wrekin-council-add-three-new-services-thanks-to-tom-their-ai-assistant
"Natural language processing"	Telford And Wrekin Council	England	Transportation and urban planning	Resident registry	2021	https://govlaunch.com/projects/telford-and-wrekin-council-add-three-new-services-thanks-to-tom-their-ai-assistant
"Natural language processing"	Lewes And Eastbourne Council	England	Administrative services	Back-office work	2022	https://govlaunch.com/collections/chatbots
"Natural language processing"	Frankston	Australia	Administrative services	Information management	2020	https://govlaunch.com/collections/chatbots
"Natural language processing"	Leeds City Council	England	Environmental management	Waste collection and management	2022	https://govlaunch.com/collections/chatbots
"Natural language processing"	Monmouthshire County Council	England	Administrative services	Information management	2021	https://govlaunch.com/collections/chatbots
"Natural language processing"	Grosseto	Italy	Administrative services	Information management	2021	https://govlaunch.com/collections/chatbots
"Natural language processing"	Treviso	Italy	Administrative services	Information management	2022	https://govlaunch.com/collections/chatbots
"Natural language processing"	Ronneby	Sweden	Administrative services	Back-office work	2021	https://govlaunch.com/collections/chatbots
"Natural language processing"	Mendoza	Argentina	Administrative services	Information management	2021	https://govlaunch.com/collections/chatbots
"Natural language processing"	Kortrijk	Belgium	Healthcare and wellbeing	Leisure and recreation	2021	https://govlaunch.com/collections/chatbots
"Natural language processing"	Boston	USA	Healthcare and wellbeing	Public health	2021	https://govlaunch.com/collections/chatbots
"Natural language processing"	Devonport	Australia	Administrative services	Information management	2021	https://govlaunch.com/collections/chatbots
"Natural language processing"	Houston	USA	Administrative services	Community services - Complaints	2021	https://govlaunch.com/collections/chatbots
"Natural language processing"	London Borough Of Redbridge	London	Transportation and urban planning	Planning application processing	2020	https://govlaunch.com/collections/chatbots
"Natural language processing"	Kuusamo	Finland	Administrative services	Information management	2021	https://govlaunch.com/collections/chatbots
"Natural language processing"	Markham	Canada	Administrative services	Information management	2020	https://govlaunch.com/collections/chatbots

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"Natural language processing"	Buenos Aires	Argentina	Transportation and urban planning	Transportation and traffic management	2021	https://govlaunch.com/collections/chatbots
"Natural language processing"	Markham	Canada	Administrative services	Information management	2020	https://govlaunch.com/collections/chatbots
"Natural language processing"	Buenos Aires	Argentina	Healthcare and wellbeing	Public health	2021	https://govlaunch.com/collections/chatbots
"Natural language processing"	New Orleans	USA	Administrative services	Information management	2019	https://govlaunch.com/collections/chatbots
"Natural language processing"	Mogi Das Cruzes	Brazil	Transportation and urban planning	Resident registry	2021	https://govlaunch.com/collections/chatbots
"Natural language processing"	Sydney	Australia	Administrative services	Information management	2020	https://govlaunch.com/collections/chatbots
"Natural language processing"	Trollhättan	Sweden	Administrative services	Community services - Complaints	2023	https://govlaunch.com/collections/chatbots
"Natural language processing"	Delta	Canada	Healthcare and wellbeing	Public health	2021	https://govlaunch.com/collections/chatbots
"Natural language processing"	Manningham	Australia	Administrative services	Information management	2021	https://govlaunch.com/collections/chatbots
"Natural language processing"	Sønderborg	Denmark	Healthcare and wellbeing	Public health	2020	https://govlaunch.com/collections/chatbots
"Natural language processing"	Vantaa	Finland	Healthcare and wellbeing	Public health	2021	https://govlaunch.com/collections/chatbots
"Natural language processing"	Duisburg	Germany	Healthcare and wellbeing	Burial grounds and electric crematorium	2020	https://govlaunch.com/collections/chatbots
"Natural language processing"	Varberg	Sweden	Administrative services	Information management	2021	https://govlaunch.com/collections/chatbots
"Natural language processing"	Hamilton City Council	New Zearland	Administrative services	Community feedback	2021	https://govlaunch.com/collections/chatbots
"Natural language processing"	Järvenpää	Finland	Administrative services	Information management	2020	https://govlaunch.com/collections/chatbots
"Natural language processing"	Tilburg	Netherlands	Administrative services	Information management	2022	https://govlaunch.com/collections/chatbots
"Natural language processing"	Porvoo	Finland	Administrative services	Information management	2022	https://govlaunch.com/collections/chatbots
"Natural language processing"	Borås	Sweden	Administrative services	Information management	2020	https://govlaunch.com/collections/chatbots
"Natural language processing"	Pori	Finland	Administrative services	Back-office work	2021	https://govlaunch.com/collections/chatbots

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"Natural language processing"	Greater Sudbury	Canada	Administrative services	Community services - Complaints	2020	https://govlaunch.com/collections/chatbots
"Natural language processing"	Knoxville	USA	Administrative services	Community services - Interpretation	2020	https://govlaunch.com/collections/chatbots
"Natural language processing"	Kelowna	Canada	Healthcare and wellbeing	Public health	2020	https://govlaunch.com/collections/chatbots
"Natural language processing"	Maribyrnong	Australia	Administrative services	Community services - Interpretation	2020	https://govlaunch.com/collections/chatbots
"Natural language processing"	Dallas	USA	Healthcare and wellbeing	Public health	2020	https://govlaunch.com/collections/chatbots
"Natural language processing"	Adelaide	Australia	Environmental management	Waste collection and management	2020	https://govlaunch.com/collections/chatbots
"Natural language processing"	Adelaide	Australia	Transportation and urban planning	Transportation and traffic management	2020	https://govlaunch.com/collections/chatbots
"Natural language processing"	Adelaide	Australia	Healthcare and wellbeing	Library maintenance	2020	https://govlaunch.com/collections/chatbots
"Natural language processing"	Bellevue	USA	Healthcare and wellbeing	Public health	2020	https://govlaunch.com/collections/chatbots
"Natural language processing"	Goldsboro	USA	Administrative services	Community services - Complaints	2021	https://govlaunch.com/collections/chatbots
"Natural language processing"	Portland	USA	Administrative services	Back-office work	2020	https://govlaunch.com/collections/chatbots
"Natural language processing"	Arun District Council	England	Administrative services	Information management	2021	https://govlaunch.com/collections/chatbots
"Natural language processing"	Derby City Council	England	Healthcare and wellbeing	Public health	2021	https://govlaunch.com/collections/chatbots
"Natural language processing"	Aberdeen City Council	Scotland	Administrative services	Information management	2020	https://govlaunch.com/collections/chatbots
"Natural language processing"	Williamsburg	USA	Administrative services	Back-office work	2018	https://govlaunch.com/collections/chatbots
"Natural language processing"	Johns Creek	USA	Administrative services	Information management	2020	https://govlaunch.com/collections/chatbots
"Natural language processing"	Ottawa	Canada	Environmental management	Waste collection and management	2019	https://govlaunch.com/collections/chatbots
"Natural language processing"	Austin	USA	Healthcare and wellbeing	Public health	2020	https://govlaunch.com/collections/chatbots
"Natural language processing"	Johns Creek	USA	Administrative services	Back-office work	2018	https://govlaunch.com/collections/chatbots

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"Natural language processing"	Los Angeles	USA	Administrative services	Back-office work	2017	https://govlaunch.com/collections/chatbots
"Natural language processing"	North Charleston	USA	Administrative services	Community services - Complaints	2018	https://govlaunch.com/collections/chatbots
"Natural language processing"	Kansas City	USA	Administrative services	Information management	2017	https://govlaunch.com/collections/chatbots
"Natural language processing"	Henderson	USA	Administrative services	Information management	2019	https://govlaunch.com/collections/chatbots
"Natural language processing"	Johns Creek	USA	Administrative services	Information management	2018	https://govlaunch.com/collections/chatbots
"Natural language processing"	Virginia Beach	USA	Administrative services	Information management	2021	https://govlaunch.com/collections/chatbots
"Natural language processing"	Albuquerque	USA	Administrative services	Information management	2017	https://govlaunch.com/collections/chatbots
"Natural language processing"	Williamsburg	USA	Administrative services	Information management	2018	https://govlaunch.com/collections/chatbots
"Natural language processing"	Gilbert	USA	Administrative services	Community feedback	2018	https://govlaunch.com/collections/chatbots
"Natural language processing"	San Jose	USA	Administrative services	Community services - Complaints	2020	https://www.govtech.com/opinion/how-ai-helps-state-and-local-governments-work-smarter
"Neural Network"	Chicago's Local Government	USA	Public safety and law enforcement	Public safety and security	2018	https://d3.harvard.edu/platform-rctom/submission/smarter-cities-how-machine-learning-can-improve-municipal-services-in-chicago/
"Neural Network"	Cartagena, Medellin and Monteria	Colombia	Administrative services	Community feedback	2020	https://www.oecd-ilibrary.org/sites/08955f48-en/index.html?itemId=/content/component/08955f48-en
"Neural Network"	Los Angeles	USA	Transportation and urban planning	Housing services	2018	https://www.govtech.com/opinion/how-ai-helps-state-and-local-governments-work-smarter
"Neural Network"	North Tyneside Council	England	Administrative services	Local tax collection	2021	https://www.theguardian.com/society/2019/oct/15/councils-using-algorithms-make-welfare-decisions-benefits
"Neural Network"	Hackney Council	England	Public safety and law enforcement	Public safety and security	2021	https://www.theguardian.com/society/2019/oct/15/councils-using-algorithms-make-welfare-decisions-benefits
"Neural Network"	Municipality Of Amsterdam	Netherlands	Transportation and urban planning	Transportation and traffic management	2022	https://www.xomnia.com/xomnia-supports-the-municipality-of-amsterdam-with-machine-learning-expertise/
"Neural Network"	City Of Ryde	Australia	Environmental management	Urban forestry	2020	file:///C:/Users/N11476524/OneDrive%20-%20Queensland%20University%20of%20Technology/Desktop/3rd%20Paper/Extra/local-government-stays-green-with-machine-learning-783314431.pdf

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“Neural Network”	Swindon Borough Council	England	Administrative services	Community services - Interpretation	2021	https://govlaunch.com/collections/machine-learning
“Neural Network”	Buffalo	USA	Environmental management	Water and sewerage services	2023	https://govlaunch.com/collections/machine-learning
“Neural Network”	Irving	USA	Transportation and urban planning	Transportation and traffic management	2023	https://govlaunch.com/collections/machine-learning
“Neural Network”	East Lansing	USA	Environmental management	Waste collection and management	2022	https://govlaunch.com/collections/machine-learning
“Neural Network”	Lancashire County Council	England	Transportation and urban planning	Transportation and traffic management	2022	https://govlaunch.com/collections/machine-learning
“Neural Network”	North Tyneside Council	England	Healthcare and wellbeing	Public health	2022	https://govlaunch.com/collections/machine-learning
“Neural Network”	Aberdeen City Council	Scotland	Healthcare and wellbeing	Public health	2022	https://govlaunch.com/collections/machine-learning
“Neural Network”	Gilbert	USA	Public safety and law enforcement	Public safety and security	2019	https://govlaunch.com/collections/machine-learning
“Neural Network”	Sunderland City Council	England	Public safety and law enforcement	Public safety and security	2022	https://govlaunch.com/collections/machine-learning
“Neural Network”	Sunderland City Council	England	Administrative services	Local tax collection	2022	https://govlaunch.com/collections/machine-learning
“Neural Network”	Philadelphia	USA	Environmental management	Maintaining public amenities	2021	https://govlaunch.com/collections/machine-learning
“Neural Network”	Los Angeles	USA	Transportation and urban planning	Transportation and traffic management	2022	https://ascend.thentia.com/process/applications-of-machine-learning-in-digital-government/
“Neural Network”	City Of Atlanta	USA	Transportation and urban planning	Transportation and traffic management	2017	https://ascend.thentia.com/process/applications-of-machine-learning-in-digital-government/
“Neural Network”	Kansas City	USA	Transportation and urban planning	Transportation and traffic management	2017	https://ascend.thentia.com/process/applications-of-machine-learning-in-digital-government/
“Autonomous System”	Ogaki City	Japan	Administrative services	Information management	2020	https://www.japantimes.co.jp/news/2019/01/15/national/city-hall-gifu-prefecture-first-japan-deploy-autonomous-robots-aid-residents/
“Autonomous System”	Pittsburgh	USA	Environmental management	Water and sewerage services	2016	https://www.automate.org/blogs/autonomous-robots-are-moving-from-below-the-streets-and-on-to-highways
“Autonomous System”	Upplands-Bro Municipality	Sweden	Healthcare and wellbeing	Public health	2020	https://www.smartcitiesworld.net/news/swedish-municipality-deploys-robots-for-safer-recruitment-5251
“Autonomous System”	Municipalities In Finland	Finland	Healthcare and wellbeing	Public health	2016	https://www.sciencedirect.com/science/article/pii/S1386505619300498?ref=pdf_download&fr=RR-2&rr=8381b903ac20a7ff

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“Autonomous System”	Pune Municipal	India	Environmental management	Maintaining public amenities	2022	https://ilougemedia.com/pune-municipal-corporation-introduces-advanced-robots-to-clean-manholes/
“Autonomous System”	Bucher Municipal	Singapore	Transportation and urban planning	Local road maintenance	2020	https://www.buchermunicipal.com/int/news/bucher-municipal-acquires-enway
“Autonomous System”	London Borough	England	Transportation and urban planning	Permits granting and licensing	2016	https://www.theguardian.com/public-leaders-network/2016/jul/04/robot-amelia-future-local-government-enfield-council
“Autonomous System”	Ku-Ring-Gai Council	Australia	Public safety and law enforcement	Public safety and security	2019	https://www.climatechange.environment.nsw.gov.au/sites/default/files/2022-09/Simtable_modelling_toolKu-ring-gai_Council.pdf
“Autonomous System”	Hangzhou	China	Transportation and urban planning	Transportation and traffic management	2019	https://www.hangzhou.gov.cn/art/2021/12/24/art_812262_59046787.html?eqid=f360863400062d0b000000026486e33e
“Autonomous System”	Hangzhou	China	Transportation and urban planning	Town planning	2019	https://www.hangzhou.gov.cn/art/2021/12/24/art_812262_59046787.html?eqid=f360863400062d0b000000026486e33e
“Autonomous System”	Hangzhou	China	Healthcare and wellbeing	Financial assistance and economic development	2019	https://www.hangzhou.gov.cn/art/2021/12/24/art_812262_59046787.html?eqid=f360863400062d0b000000026486e33e
“Neural Network”	Hangzhou	China	Healthcare and wellbeing	Leisure and recreation	2019	https://www.hangzhou.gov.cn/art/2021/12/24/art_812262_59046787.html?eqid=f360863400062d0b000000026486e33e
“Neural Network”	Hangzhou	China	Healthcare and wellbeing	Public health	2019	https://www.hangzhou.gov.cn/art/2021/12/24/art_812262_59046787.html?eqid=f360863400062d0b000000026486e33e
“Computer vision”	Hangzhou	China	Transportation and urban planning	Transportation and traffic management	2016	http://www.cac.gov.cn/2018-11/27/c_1123771419.htm?isappinstalled=0
“Natural Language Processing”	Guiyang	China	Administrative services	Community services - Complaints	2018	http://www.cac.gov.cn/2018-11/27/c_1123771419.htm?isappinstalled=0
“Computer vision”	Shenzhen	China	Transportation and urban planning	Transportation and traffic management	2018	http://www.cac.gov.cn/2018-11/27/c_1123771419.htm?isappinstalled=0
“Natural Language Processing”	Shanghai	China	Administrative services	Community services - Interpretation	2018	https://www.sast.gov.cn/content.html?id=kjb228884
“Computer vision”	Chengdu	China	Environmental management	River management	2018	https://www.sc.gov.cn/10462/10778/10876/2024/1/10/f30e99b8b89947b895a7399b114c3152.shtml
“Robotic process automation”	Yanan	China	Transportation and urban planning	Planning application processing	2018	http://www.cac.gov.cn/2018-06/03/c_1122925064.htm
“Computer vision”	Guangzhou	China	Transportation and urban planning	Permits granting and licensing	2019	http://www.cac.gov.cn/2019-10/25/c_1573534978283427.htm
“Computer vision”	Wuhan	China	Transportation and urban planning	Transportation and traffic management	2019	http://www.mod.gov.cn/gfbw/gfjy_index/zyhd/4852807.html
“Neural Network”	Changsha	China	Administrative services	Information management	2020	http://www.tianxin.gov.cn/zjtx23/ytx67/mtjj4/202006/t20200601_8156353.html

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“Neural Network”	Changsha	China	Environmental management	Waste collection and management	2020	http://www.tianxin.gov.cn/zjtx23/ytx67/mtjj4/202006/t20200601_8156353.html
“Neural Network”	Changsha	China	Public safety and law enforcement	Public safety and security	2020	http://www.tianxin.gov.cn/zjtx23/ytx67/mtjj4/202006/t20200601_8156353.html
“Natural Language Processing”	Changsha	China	Administrative services	Information management	2020	http://www.tianxin.gov.cn/zjtx23/ytx67/mtjj4/202006/t20200601_8156353.html
“Neural Network”	Changsha	China	Administrative services	Information management	2020	http://www.tianxin.gov.cn/zjtx23/ytx67/mtjj4/202006/t20200601_8156353.html
“Computer vision”	Changsha	China	Transportation and urban planning	Transportation and traffic management	2020	http://www.tianxin.gov.cn/zjtx23/ytx67/mtjj4/202006/t20200601_8156353.html
“Computer vision”	Changsha	China	Environmental management	Waste collection and management	2021	http://www.tianxin.gov.cn/zjtx23/ytx67/mtjj4/202006/t20200601_8156353.html
“Neural Network”	Changsha	China	Healthcare and wellbeing	Financial assistance and economic development	2020	http://www.tianxin.gov.cn/zjtx23/ytx67/mtjj4/202006/t20200601_8156353.html
“Neural Network”	Changsha	China	Administrative services	Information management	2020	http://www.tianxin.gov.cn/zjtx23/ytx67/mtjj4/202006/t20200601_8156353.html
“Neural Network”	Changsha	China	Public safety and law enforcement	meteorological services	2020	http://www.tianxin.gov.cn/zjtx23/ytx67/mtjj4/202006/t20200601_8156353.html
“Computer vision”	Changsha	China	Transportation and urban planning	Town planning	2020	http://www.tianxin.gov.cn/zjtx23/ytx67/mtjj4/202006/t20200601_8156353.html
“Neural Network”	Chongqing	China	Transportation and urban planning	Permits granting and licensing	2020	https://www.ndrc.gov.cn/xwdt/ztzl/szhzxhbxd/gfdt/202007/t20200713_1233659.html
“Neural Network”	Chongqing	China	Transportation and urban planning	Transportation and traffic management	2020	https://www.ndrc.gov.cn/xwdt/ztzl/szhzxhbxd/gfdt/202007/t20200713_1233659.html
“Computer vision”	Chongqing	China	Transportation and urban planning	Town planning	2020	https://www.ndrc.gov.cn/xwdt/ztzl/szhzxhbxd/gfdt/202007/t20200713_1233659.html
“Neural Network”	Chongqing	China	Environmental management	Local environmental issues	2020	https://www.ndrc.gov.cn/xwdt/ztzl/szhzxhbxd/gfdt/202007/t20200713_1233659.html
“Neural Network”	Chongqing	China	Transportation and urban planning	Town planning	2020	https://www.ndrc.gov.cn/xwdt/ztzl/szhzxhbxd/gfdt/202007/t20200713_1233659.html
“Natural Language Processing”	Huhehaote	China	Environmental management	Maintaining public amenities	2020	https://zwfw.nmg.gov.cn/pub/fwzx/202012/t20201224_19302.html
“Autonomous System”	Chongqing	China	Administrative services	Information management	2020	http://www.wz.gov.cn/zwxx_266/jdtp/202009/t20200917_7890266_wap.html
“Robotic process automation”	Hangzhou	China	Environmental management	Water and sewerage services	2021	http://www.linan.gov.cn/art/2021/10/19/art_1229601278_59061028.html
“Neural Network”	Hangzhou	China	Healthcare and wellbeing	Pest control services	2021	https://www.linan.gov.cn/art/2021/10/19/art_1229601278_59061028.html

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Autonomous System	Anyang	China	Administrative services	Information management	2021	https://dsj.henan.gov.cn/2021/09-26/2318831.html
“Computer vision”	Guangzhou	China	Transportation and urban planning	Transportation and traffic management	2022	https://www.hp.gov.cn/xwzx/mtxx/content/post_8663139.html
“Computer vision”	Weihai	China	Administrative services	Information management	2022	http://www.wendeng.gov.cn/art/2022/9/8/art_99344_2970189.html
“Neural Network”	Beijing	China	Administrative services	Information management	2022	https://www.bjtzh.gov.cn/bjtz/xxfb/202208/1610401.shtml
“Neural Network”	Beijing	China	Administrative services	Information management	2022	https://www.beijing.gov.cn/ywdt/gqrd/202203/t20220304_2622495.html
“Natural Language Processing”	Hanzhong	China	Administrative services	Information management	2023	http://www.hanzhong.gov.cn/hzszf/xwzx/bmdt/202307/aa783e1c4a8f4f2d9f9a6b3abb5f735f.shtml
“Natural Language Processing”	Yinchuan	China	Administrative services	Community services - Complaints	2024	https://www.gov.cn/govweb/lianbo/difang/202401/content_6925551.htm
“Robotic process automation”	Jinan	China	Transportation and urban planning	Permits granting and licensing	2022	http://www.jinan.gov.cn/art/2022/8/22/art_80993_4926510.html
“Computer vision”	Harbin	China	Transportation and urban planning	Permits granting and licensing	2021	https://www.ndrc.gov.cn/fggz/fgfg/dfxx/202109/t20210917_1296931.html
“Autonomous System”	Jiaxin	China	Administrative services	Information management	2020	https://www.jiaxing.gov.cn/art/2020/9/29/art_1685305_58831028.html
“Robotic process automation”	Shenzhen	China	Healthcare and wellbeing	Public health	2017	http://ka.sz.gov.cn/ztzl/zt001/content/post_2291748.html
“Neural Network”	Beijing	China	Transportation and urban planning	Transportation and traffic management	2017	https://jtgl.beijing.gov.cn/jgj/jgxx/94246/95332/537586/index.html
“Robotic process automation”	Shanghai	China	Environmental management	Maintaining public amenities	2018	https://www.shwm.gov.cn/TrueCMS/shwmw/xyesdxzzsh/content/2d025728-f2d0-4980-87c7-a04db74ce82b.html
“Robotic process automation”	Shanghai	China	Environmental management	River management	2018	https://www.shwm.gov.cn/TrueCMS/shwmw/xyesdxzzsh/content/2d025728-f2d0-4980-87c7-a04db74ce82b.html
“Robotic process automation”	Shenzhen	China	Healthcare and wellbeing	Public health	2019	http://wjw.sz.gov.cn/ztzl/ygsn/cxal/content/post_3119990.html
“Neural Network”	Shenzhen	China	Transportation and urban planning	Transportation and traffic management	2019	http://jtys.sz.gov.cn/zwgk/ztzl/msss/2019wcr/mrhd/content/post_4205133.html
“Robotic process automation”	Shenzhen	China	Transportation and urban planning	Transportation and traffic management	2020	http://www.szss.gov.cn/sstbhzq/qtdy/zlqmdqyqfkhfgfcssl/content/post_7387911.html
“Autonomous System”	Shanghai	China	Transportation and urban planning	Transportation and traffic management	2021	http://jtyst.jiangsu.gov.cn/art/2021/2/5/art_41775_9666644.html
“Neural Network”	Shenzhen	China	Environmental management	Urban forestry	2022	http://meeb.sz.gov.cn/gkmlpt/content/10/10159/post_10159242.html#3765

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“Neural Network”	Shanghai	China	Healthcare and wellbeing	Public health	2022	https://www.shanghai.gov.cn/gwk/search/content/7aa19db8864a41a39d111039617a49a7?eqid=862b4aad0002618c00000003647d95a7
“Robotic process automation”	Beijing	China	Healthcare and wellbeing	Public health	2022	https://www.beijing.gov.cn/gate/big5/www.beijing.gov.cn/ywdt/zwzt/dah/bxyw/202201/t20220120_2596203.html
“Natural Language Processing”	Chengdu	China	Administrative services	Community feedback	2022	https://cdswszw.gov.cn/tzgg/Detail.aspx?id=27136
“Computer vision”	Hangzhou	China	Environmental management	Waste collection and management	2022	http://epb.hangzhou.gov.cn/art/2022/12/7/art_1692261_59025412.html
“Robotic process automation”	Shenzhen	China	Healthcare and wellbeing	Public health	2022	https://www.sz.gov.cn/cn/xxgk/zfxxgj/gqdt/content/post_10001478.html
“Neural Network”	Guangzhou	China	Healthcare and wellbeing	Public health	2022	https://www.gz.gov.cn/zfjg/gzsylbzj/bmdt/content/post_8701201.html
Computer vision	Chengdu	China	Transportation and urban planning	Transportation and traffic management	2023	https://www.mot.gov.cn/jiaotongyaowen/202303/t20230302_3767032.html
“Neural Network”	Shanghai	China	Administrative services	Information management	2023	https://app.sheitc.sh.gov.cn/gydt/691296.htm
“Computer vision”	Beijing	China	Public safety and law enforcement	Public safety and security	2023	https://www.beijing.gov.cn/fuwu/bmfw/sy/jrts/202304/t20230414_3032789.html
“Computer vision”	Guangzhou	China	Environmental management	Local environmental issues	2023	http://gxj.gz.gov.cn/zt/dlys/aljd/content/post_9384756.html

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