

ITECH 5500

Professional Research and Communication Literature Synthesis

Table of Content: Page no:

1. AI and Smart city 3
2. Synthesis Matrix 4
3. References 6

# AI and Smart city

As per the data analysis done by UN, Population will reach 9.7 billion by the end of 2050 A.D. It is estimated that almost 70% of population will be in urban population with many cities accommodating more than 10M resident. As the number keep on growing, there will be lots of challenges like managing the resources and energy to all the inhabitants at the same time without distortion of environment.

Another critical challenge is administration and management to prevent sanitation issues, mitigate traffic congestion, thwart crime, etc.

But many of these problems can be tamed by the means of AI-enable IOT. By using advance technology, it can be facilitated the new experience for inhabitants by making their day-to-day living comfortable and easier. This has given rise to concept of Smart city.

A smart city is a city that makes use of information and technologies to enhance the quality and performance of urban services (like energy and transportation), thereby reduces the consumption of resources, prevents wastage, and overall costs. Smart cities not only possess ICT but also employ technology in a way that positively impacts the inhabitants.

# Synthesis Matrix

TOPIC: Implementing AI in Smart city

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |
| Author  Main Idea | ***Artificial Intelligence and Smart cities***  ***(Michael Batty)*** | ***Evolutionary Deep Learning for Car Park Occupancy Prediction in Smart Cities***  ***(Andr´es Camero, Jamal Toutouh, Daniel H. Stolfi, and Enrique Alba)*** | ***Artificial Intelligence Enabled IoT: Traffic Congestion Reduction in Smart Cities***  ***(Safeeullah Soomro, Mahdi H. Miraz, Anupama Prasanth and Mirza Abdullah)*** | ***Security and Privacy Challenges in Smart Cities***  ***(Trevor Braun, Benjamin C. M. Fung, Farkhund Iqbal, Babar Shah)*** | ***Enabling Cognitive Smart Cities Using Big Data and Machine Learning: Approaches and Challenges***  ***(Mehdi Mohammadi, Ala Al-Fuqaha)*** | ***Intelligent or smart cities and buildings: a critical exposition and a way forward***  ***(Ghaffarianhoseini, A., AlWaer, H., Ghaffarianhoseini, A, Clements­Croome, D., Berardi, U., Raahemifar, K. and  Tookey, J)*** | ***Will Democracy Survive Big Data and Artificial Intelligence?***  ***(Dirk Helbing, Bruno S. Frey, Gerd Gigerenzer, Ernst Hafen, Michael Hagner, Yvonne Hofstetter, Jeroen van den Hoven, Roberto V.*** ***Zicari, Andrej Zwitter)*** |
| 1.Auto learning | ***When one says ‘Learn’ it focuses on deep learning complex pattern and environment.*** | ***Deep Learning with Recurrent Neural Networks to address the prediction of car park occupancy rate.*** | ***They have employed distributed multi-agent Q learning and various surveillance cameras to provide real-time information for intelligent traffic light control system to observe the states of both motorized traffic and non-motorized traffic*** | ***The model seeks to protect an individual from location tracking, systems learning what a user is doing, and invasive identification efforts.*** | ***there is a need to utilize modern and advanced learning models like deep learning. A nascent research path is to overcome the resource limitation of these devices to allow them to utilize deeper neural network models*** | ***Building the smart building with intelligence need a Deep learning from Artificial neural Network(ANN).*** | ***It involves running so-called deep learning algorithms over the search engine data collected about its users. Beyond this, a kind of social control is also planned.*** |
| Less Human involvement | ***The real power of AI may well come from collaboratives of man and machine, working together, rather than ever more powerful machines working by themselves.*** | ***The ANN technology gives machine the ability to think like human so huge machine can work by their own and not much of human direction needed.*** | ***Human population are increasing rapidly and due to overcrowded it will be hard to manage traffic. Artificial intelligence can manage and think many ways to control that.*** | ***A smart city will rely on automation for peak efficiency, and artificial intelligence will be crucial for implementing automation in a versatile manner. Everything from connecting users to emergency services when they are in distress, to identifying malicious behavior within the smart city network, will rely on artificial intelligence to identify problems and implement solutions at speeds surpassing human ability*** | ***Many sensors and smart devices generate data at a high rate. Not all the data can be reviewed by humans for justification, but the system should learn and improve itself from previous experiences.*** | ***Moving beyond the current level of debates, as extensively discussed by Greenfield (2017), we should continue to explore how such advanced datadriven technologies, IoT devices and their radical adoption can provide meaningful benefits for individuals, societies and our environments, what impacts they have on daily lifestyles, who benefits from these enormous sources of data, how new challenges are being created and how the real essence of human is being redefined.*** | ***It can be expected that supercomputers will soon surpass human capabilities in almost all areas—somewhere between 2020 and 2060.*** |
| Smart Car system and house | ***Pattern recognition techniques that lie at the basis of machine learning are highly routinized iterative schemes where the pattern in question – be it a signature, a face, the environment around a driverless car and so on – is computed as an elaborate averaging procedure which takes a series of elements of the pattern and weights them in such a way that the pattern can be reproduced perfectly by the combinations of elements of the original pattern and the weights.*** | ***This is an interesting problem in smart mobility and we here approach it in an innovative way, consisting in automatically design a deep network that encapsulates the behavior of the car occupancy and then is able to make an informed guess on the number of free parking spaces near to the medium time horizon.*** | ***Suppose a car is being driven according to the pre-planned route, namely “A”. However, due to accident or any other reason a sudden congestion has been observed. The drivers IoT device will receive this information to display. These devices may even get connected to using freely available WiFi hotspot at the signals or any other means of wireless communication.*** | ***The autonomous car app shows you that car was rerouted to avoid congestion on the highway, and he should arrive at destination shortly.*** ***Meanwhile, at home, the house smart systems kick into high gear in anticipation of James’ arrival and change the temperature to make sure the air conditioning is used only when needed.*** | ***detecting a sleepy face in a human pose detection system could lead to totally different actions in the contexts of driving a car and relaxing at home.*** | ***The idea of intelligent and smart buildings may seem new but its history goes back to years ago. Back in1997, Clements-Croome developed a holistic definition of intelligent buildings and clarified what it should encompass. Hartkopf et al*** | ***Algorithms, computer code, software, models and data will increasingly determine what we see in the digital society, and what are choices are with regard to health insurance, finance,politics and automated car.*** |
|  |  |  |  |  |  |  |  |

Reference:

* Batty, M. (2018). Artificial intelligence and smart cities.
* Camero, A., Toutouh, J., Stolfi, D. H., & Alba, E. (2018, June). Evolutionary deep learning for car park occupancy prediction in smart cities. In *International Conference on Learning and Intelligent Optimization* (pp. 386-401). Springer, Cham.
* Soomro, S., Miraz, M. H., Prasanth, A., & Abdullah, M. (2018). Artificial intelligence enabled IoT: Traffic congestion reduction in smart cities.
* Braun, T., Fung, B. C., Iqbal, F., & Shah, B. (2018). Security and privacy challenges in smart cities. *Sustainable cities and society*, *39*, 499-507.
* Mohammadi, M., & Al-Fuqaha, A. (2018). Enabling cognitive smart cities using big data and machine learning: Approaches and challenges. *IEEE Communications Magazine*, *56*(2), 94-101.
* Ghaffarianhoseini, A., AlWaer, H., Ghaffarianhoseini, A., Clements-Croome, D., Berardi, U., Raahemifar, K., & Tookey, J. (2018). Intelligent or smart cities and buildings: a critical exposition and a way forward. *Intelligent Buildings International*, *10*(2), 122-129.