

Chapter 14

IoT and Machine Learning in Smart City Healthcare Systems

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ABSTRACT

The phrase “smart city” refers to a collection of ideas and technology aimed at making cities more effective, technologically sophisticated, environmentally friendly, and socially inclusive. Technical, economic, and social innovations are among these ideas. Since the 2000s, this phrase has been around by a variety of players in politics, commerce, administration, and urban planning to describe technological advances and advancements in cities. A response to the commercial, societal, and governmental issues which post-industrial nations are facing in the new era, the concept of smart city is employed is combined with the use of digital technology. The main emphasis is on addressing issues that urban society faces, such as resource shortages, environmental pollution, population increase, and demographic changes. In a more general sense, the phrase also refers to non-technical innovations that improve the sustainability of urban living.

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1. INTRODUCTION

In the medical industry, AI can be utilized in a variety of procedures as artificial intelligence techniques help healthcare workforce in prediction and prevention as well as in treatment and especially in operations. For instance, there are currently operating theatres in the USA where every stage of a surgery is precisely documented, and the treating doctors are also provided extensive guidance in choosing the following steps and even the specific incisions to be performed. By having sensors embedded into the room, the patient is always monitored and receives the best treatment possible.

As a consequence, the job of professionals, including radiologists, will also alter. The technology is already doing an amazing job, mainly with imaging procedures which may be readily reviewed and technically standardized. It can make judgments more accurately than the treating doctor since it has assessed millions of instances. Even while the doctor will always have the last say, artificial intelligence will allow him to get a vital second opinion that may either support his own anamnesis or offer new information. The declarations and suggestions for action will be more definite the more information the system has about the patient directly and the more situations it is aware of in general. Therefore, it will be preferable in the future to have as much data as is accessible and to assess it. Generally, using wearable data for routine check-up can in the treatment and the physicians can make the best choices fast and provide actionable advice. For instance, a sufferer may make a better decision about either to visit a doctor or if the illness is expected to pass by oneself over the morning if they awaken in the morning. The problem we are now facing is that there are many interfaces amongst medical subsystems that need to be interoperable with one another. Patient data records may be standardized, reliably transmitted, reviewed, and forgery-proof kept with the use of a blockchain (Chelladurai & Pandian, 2022). As a result, persons in charge of handling medical data no longer need to coordinate various systems concurrently but instead can depend on a solid standard. Other businesses and areas where the sharing of trustworthy, immutable data is crucial will also adopt a blockchain as a foundational technology. One can be a significant way closer to having a digitized file of a patient that gives the acting physician all necessary information (and thus also benefits the patient. Applications for networked smart homes (Nyangaresi, 2022) will be useful in this situation. The patient can connect with the treating doctor when he shows symptoms by getting out of bed and standing in front of a mirror with cameras. He then determines in real time which actions are prudent based on the patient data. But the situation goes even further: in the worst-case scenario, wearable medical devices or fall sensors embedded in the carpet and home might identify if a patient has fallen and lies on ground or while assistance is needed for another reason. In the realm of a smart city, a hospital with the right capacity might be chosen based on the diagnosis, and the associated control centre may be notified. Such smart infrastructures, when combined with wearable and smart diagnostics (Helmy et al., 2022), may make it possible for elderly people, for living on their own in their homes for extended periods of time while maintaining access to dependable care. Particularly in the hospital setting, the nursing staff's limited time is used up (too much) by collecting patient data. Here, intelligent gadgets may be used to gather crucial patient data, for instance, by voice command, appropriately allocate it, and assess it with the use of big data and artificial intelligence. Wearable (Poongodi et al., 2022) can't capture everything, thus the nursing team often also gets information through impressions and assessments of patients. By not having to record every piece of information or even later upload it through a PC to the electronic patient file, the nurses will have sufficient time to provide the real treatment. In essence, this can be an incomplete solution to a crisis care required in the

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