

USING TECHNOLOGY TO CREATE SMART CITIES

Kupryienka P.D.

Belarusian State University of Informatics and Radioelectronics, Minsk, Republic of Belarus

Kovalenko R. I. – Senior Lecturer

Annotation. This theses describes how the development of technology may be implemented in our day-to-day lives. It analyzes how the use of technology to embody the smart city concept will influence our lives and what consequences of the embodiment will be.

Keywords. Smart cities, technology, services, information, infrastructure, efficiency, environment, resources, recycling, safety, security, reaction time, AI, crime prevention, privacy, personal information, advertisement.

“Smart cities” is one of the most popular topics to research nowadays. With the development of technology it’s been becoming more and more obvious that technology and our future are closely linked. Not only is this idea being actively discussed but also some cities have become possible contenders for being called the first smart city in the world.

This leads to a question: “What is a smart city?” According to Wikipedia, “a smart city is an urban area that uses different types of electronic methods and sensors to collect data. Insights gained from those

data are used to manage assets, resources and services efficiently" [1]. In other words, a smart city is a living organism that is able to adapt and develop. It has its own organs of perception which provide it with sufficient data to adapt and to adjust some aspects of its life so as to provide higher efficiency. These organs are sensors, cameras, detectors. They are used to provide the organism with data exactly like eyes provide us with images of what happens around us. The data is then processed and transformed into information that is used to adjust, for instance, the length of traffic lights.

In addition, this information can not only be used by special services but also by a wide range of services including medical services, city-planning services, maintenance services, et cetera. Just imagine that there's a real-time monitoring aimed at searching for people in need of help and once a citizen is having a heart attack an ambulance is already on its way.

By analyzing articles about smart cities, future projects and concepts we've come up with a list of aspects of a city life that will possibly change once there are smart cities in existence. The list includes:

- efficiency of operation;
- economic aspects;
- influence on the environment;
- safety and security;
- privacy.

First of all, once there's sufficient information about how a city "lives", there's a wide range of measures that can be taken in order to enhance the efficiency of a city's life. This includes better traffic solutions, infrastructure enhancements and the detection of "soft spots" to find solution to a problem. There are concepts of "smart traffic lights" which analyze the flow of traffic in order to adjust the time of traffic lights [2]. Moreover, when a sensor detects an ambulance, it automatically adjusts traffic lights in order to pave the free way to the ambulance. Thus the number of traffic congestions can be reduced drastically. In this aspect the introduction of technologies is going to have an exceptionally positive effect.

Secondly, numerous researches prove that the better the infrastructure of a city is, the more attractive the city is [3]. With the enhancements in the operation of the city there's an influx of investment which finally leads to opening businesses. The more attractive the city is, the bigger appearing companies are. No one can imagine a Google office in a place with a lack of quality infrastructure, but we can see that Google offices are created in the most developed cities of the world: San-Francisco, Los-Angeles, Amsterdam, London, Berlin, Moscow, Hong Kong, Seoul, etc. All these cities have something in common: highly developed infrastructure. This is the straight evidence of the influence of an infrastructure development level on economy.

Thirdly, the problem of global warming is one of the greatest threats to the environment of our planet and is one of the most discussed ones. However, this is not the only problem the humanity is facing currently, there are other threats which include: global pollution, the extinction of numbers of species, deforestation, the depletion of nonrenewable resources, etc. The list seems to be infinite. Smart city concepts introduce the use of renewable resources and environmentally-friendly energy, the reduction of waste produced and its recycling. Sweden is globally famous for recycling. Only 1 per cent of the rubbish produced is thrown out. Plastic and glass are recycled, biological waste is used to produce biofuel for buses.

When it comes to technology it's impossible not to mention its influence on safety and security. Thousands of crimes have been solved thanks to CCTV cameras. However, it is done manually by the police. Once the smart city concept is implemented the special services' reaction time will reduce drastically. It is supposed, that using an AI to detect crimes will substantially change the situation as the most important thing will be detectors' coverage area. It will be so because AI will be a "witness" of a crime: it will be able to provide all the sufficient data to the police officers for them to know what to expect. Even now there are many examples of using technologies to provide safety: some New-York districts are covered with audio detectors that are able to detect a shooting and inform the police, London is also famous for its crime prevention services due to the fact that cameras in London are connected to services that use an AI to determine what the situation that a camera's "seeing" is. Minsk is also not falling behind as there are some cameras connected to a similar service [4].

However, with the wide spread of technology the problem of privacy has become one of the most discussed ones. It's no secret that our personal information is used by services such as Google or Facebook in order to impose personalized ads on us. On the one hand, these services' existence is impossible without advertisement and they struggle to improve it as much as possible. On the other hand, it's our right to decide whether to provide these services with our personal information or not. What concerns smart cities, if there are cameras on every corner, it will not be difficult to keep track of citizens' activities and hobbies. If used incorrectly, this may lead to total control over the citizens which will finally lead to a crisis.

To sum up everything written above, modern technologies are increasingly spreading all over the world and it's impossible to deny their influence on our lives. Bearing this in mind, it's only up to the humanity to decide whether to try taking advantage of modern technologies or to keep it that way. No matter which path we'll choose we will still have to cope with the consequences of our choice.

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