Modern Information And Communication Technology And Their Application In Cyberparks

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Abstract—**Public open spaces may include high streets, street markets, community gardens, parks, playgrounds, each one playing a vital role in the social, cultural and economic life of communities. In this paper we introduce the term Cyber-Park which means that outdoor public place mashed-up with various ICT tools. Furthermore, this paper discusses various ICT tools in the Cyber-Park for safety and security. We will discuss and compare the currently used ICT tools in the CyberPark from security viewpoint. The analysis of ICT tools will be focused on the user location.**

Keywords—ICT, Cyber-Parks, Safety

I. INTRODUCTION

Cities offer various kinds of public places. Public places are created for different purposes e.g. within academic campus, within historical places, or general public places for families and tourists. Public place serves an important entity of urban lives. They are important in the social cultural, and economic life of communities.

They offer the places to relax, meet other people, enjoy fresh air, contact nature and be part of a community. Public places like green spaces and parks provide also several environmental benefits. In public spaces people can display their culture and identities and learn awareness of diversity and difference. Parks and playgrounds provide opportunities for children and young people to meet and play, increasing their social skills. In addition public places supported by modern are created. The penetration of information and communication technologies (ICT) into these "traditional" public spaces is giving the birth to a new type of public spaces: Cyber-Park [1].

The major goal of using Information communication technologies in a Cyber-Park is to promote people to better use the outdoor environment. Modern ICT aims to promote people to move from the virtual life to real life in society. In other words Information communication technologies tools aim to free human from prison called virtual life a predominantly sedentary behavior.

ICT can be used to incentive people to use public spaces, to spend more time outdoors.

But in order to attract people public spaces have to be attractive, easily accessible and inclusive. ICT can be used to manage the road traffic in cities by affecting some events offered in a particular place at a particular time for different user's groups. i.e. elderly, children and young people. In this paper we will introduce ICT tools that are used in public places focused on safety in public places. The paper is organized as following: section 1 introduced the modern ICT tools in Public places. Section 2 describes the CyberParks safety and privacy. Section 3 introduces the concept and section 4 present some conclusions.

II. MODERN ICT TOOLS

This section will introduce the used ICT in CyberParks. Various ICT tools are being used to monitor public spaces [2]. The ICT tools are also summarized in Table 1.

A. Smart Video Cameras

Video cameras are being widely used to monitor traffic. Video surveillance systems have also been used in indoor and outdoor environments with the aim to prevent crime [3]. For years video surveillance systems have been used to prevent crime streets and public spaces, e.g. to police drug-related criminality. Video surveillance is based on features of abnormal behavior that are represented by energy: velocity of the moving targets, and disorder feature of the moving targets,

Energy is used to express the relative positions of the moving targets.) Currently existing video surveillance systems have many limitations to their capabilities. In one case, systems have difficulty in isolating a number of people located at different position at the same time and track those people automatically. In another, the number of possible targeted people is limited by the extent of users'

involvement in manually switching the view from one video camera to another. Furthermore, on the base of saving personal privacy, the implementation of video surveillance is limited and private monitoring of public spaces is restricted. Nonetheless, video surveillance data analysis has proven particularly effective in solving crimes [3].

B. Wireless Networks

Location based services offered by various ICT tools for the definition of new services for wireless networks [4]. The location of the mobile station is necessary to provide to a user certain services that are connected with the location of a person. In some cases, like in accident a person calls an emergency number but cannot give any information about the accident location. In these cases the task of ICT tools to localize the injured person fast and with a high accuracy [5]. Based on the mobile phone service the user location can be determined. In last decade position determination through wireless network technologies has increased. Mobile and wireless communications systems offer positioning services. However for safety and security in CyberParks we intend to provide high quality location services. The mobile station uses signals, transmitted by antennas to calculate its own position. In other words the positioning receiver calculates the distance between the mobile station and the base station by signal measurements. Mobile phone used mostly WIFI networks for internet access or cellular system to setup audio and video communication. The cellular concept is a mobile network architecture composed ideally of hexagonal cells. The cells represent geographic areas. Inside the coverage area, the users, called *mobile stations* (MS) are able to communicate with the network while moving inside the cellular network. Each cell has a *base station* (BS), which serves the mobile stations. However, the coverage zones are not hexagonal in real radio networks. Interference leads to missed and blocked calls due to errors in the digital signaling. Between transmitter (Base Station, BS) and receiver (Mobile Station, MS), the channel is modeled by several key parameters. These parameters vary significantly with the environment (urban, rural, mountains). The propagation of radio signals on both uplink and downlink are affected by the physical channel in several ways. A signal propagating through the wireless channel usually arrives at the destination along a number of different paths, referred to as multi-paths. These paths arise from s*cattering, reflection, refraction* or *diffraction* of the radiated energy of objects that lie in the environment. The received signal is much weaker than the transmitted

signal due to phenomena such as mean propagation loss, slow fading and fast fading. The mean propagation loss comes from square-law spreading, absorption by water and foliage and the effect of ground reflections. Mean propagation loss is range dependent and changes very slowly even for fast mobiles. *Slow fading* results from a blocking effect by buildings and natural features and is also known as long-term fading, or shadowing. *Fast fading* results from multi-path scattering in the vicinity of the mobile. It is also known as short-term fading or Rayleigh fading, for reasons explained below. Multipath propagation results in the spreading of the signal in different dimensions. Figure 1 shows the results of the base station transmission and the effect of streets and the impact of the building on the propagation. The different colors in the pictures represent the coverage area of three base stations (shown as blue dots with a number next to them). The yellow color represents the area where the signal arriving from station 1 is strongest, green is from station 4 and red for station 5. Stations 2 and 3 are not shown in the picture, still there are some points where their signal is strongest and can be seen colored in pink or blue [6].
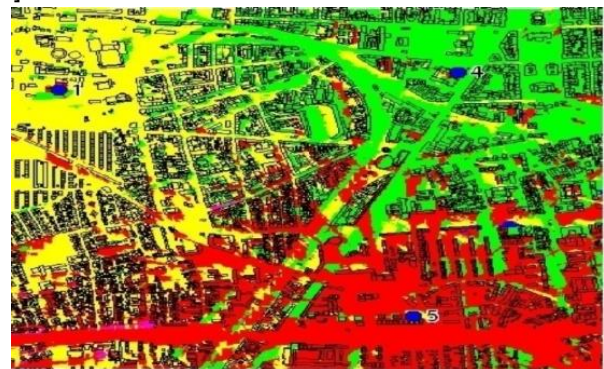

Figure 1: Base station transmitter

C. Satellite Technologies

There are self positioning systems like GPS, GNSS, GLONASS, Galileo. Global positioning system (GPS) is the worldwide satellite-based radio navigation system [7]. GPS consists of three main segments, space , control and user segments. There is basic method for positioning determination based cell identification. Cell identification method is based on approximation of the position of a mobile handset by knowing in which cell located the mobile station. This method is the basic technique however the accuracy of the method is low. A satellite navigation system such as the GPS and GNSS are suited tools to collect the localization data, vehicle's speed, and motion direction, at regular time intervals. Satellite navigation system has been used in real-time road traffic information in order to improve route choice decision. In case of unavailability of satellite

navigation system data, especially in developing countries, or in open door places, the travel speeds can be computed on behalf the cellular data networks. GNSS has been used widely for outdoor services.

III. SAFETY IN CYBER-PARK

People use public spaces that inviting, attractive, accessible and above all safe. Crime in public places reflects a societal problem and is a very complex issue with several assets, and cannot be eliminated by urban planning alone. Mostly crimes are related to assaults and threats and personnel property offences. Various ICT tools and other techniques may help to create a safer cyber- park.

The use ICT tools in public places are not new. Smart camera have been installed in places. However, their application to cyber-park and natural settings is more recent and limited. Implementing ICT tools in CyberParks aims to prevent crime and to increase the safety of outdoor activities.

Security services include position determination and signal tracking with support of Smart Digital, Mobile phone, GPS/ GNSS, QR Code, web service, and WiFi as illustrates Table 1. User location has been determined by services. For instance in mobile environments, user requests for information related to location ever so often during requesting location based services [8]. When the user requests information about some places from the location based server. The location based server needs to know the location of the user and hence the location information is normally requested.

Table 1: ICT based Services

ICT	Services\tasks	Feature	Reliability	
			static	dynamic
Digital camera	Monitor\surveillance	Image detection	√	
Mobile phone	Information	Signal		√
GPS\GNSS	Positioning, tracking	Altitude, longitude		√
WiFi	Internet connection	IP		√
QR code\web service	Information providing	IP/signal	√	
Interactive digital map screen	Visitor guide			√
	Media playing		√	
Multimedia place	Calling, music, games		√	

For improvement of CyberPark safety has been introduced Mobile Agent into wireless video surveillance system, a Mobile Agent based multi-node wireless video collaborative monitoring scheme

is proposed. The Mobile Agent is designed for target tracking. The Mobile Agent can move among network nodes in accordance with designated path or independently selected path through the network conditions as well as information gain. The target will pass through multiple monitoring regions of nodes. Although aim at the same target, each device obtains different target moving information, e.g. Target trajectory. Different Mobile Agents created for each target are used to achieve continuous tracking. With the target switching between different monitoring regions, Mobile Agent moves between different nodes, records target moving information, and accordingly reaches the goal of multi-node collaborative tracking. Videos, sensors and cellular networks are not sufficient for collecting data because of their limited coverage and expensive costs for installation and maintenance. To overcome the limitation of mentioned tools we introduce the GNSS application. Application of GNSS in travel time is proven to be efficient in terms of accuracy. GNSS big data will be managed to reduce traffic congestions and road accidents. Travel time forecasting has been achieved by predicting the travel speeds using EMA Model [9-10]. Furthermore it is a significant requirement to introduce suitable control strategy for longitude based on GNSS Application. The GNSS products provide worldwide and real-time services using precise timing information, positioning technologies [11].

D. Privacy

The collected and stored information about users should be secured. ICT should be used to secure information and user communication. There are various algorithms to protect information from cyber attacks [12]. In general cyber attacks are actions that attempt to bypass security mechanisms of computer systems. Cyber attack detection has been defined as "the problem of identifying individuals who are using a computer system without authorization and those who have legitimate access to the system but are abusing their privileges. We add to this definition the identification of attempts to use a computer system without authorization or to abuse existing privileges [13].

The main scientific challenge is developing multi-agent that detects and tracks the suspected cyber attackers [14]. I believe the issue "cyber attack detection" should be considered as the first priority issue in this time. Because the digital world increases the criminal and terror acts. Moreover we note that the Israeli society is suffering from cyber attacks. Since exist of the internet society the human life is divided in real world and virtual world. Large

number of the people spends their life in virtual world. Many people have misused the internet society. Cyber attacks crime and cyber attacks terror increase exponentially. To save innocent people life we suggest to set ethical rules for virtual world according to real life. Furthermore new security actions are required to protect private life in virtual world. Cyber attacks are actions that attempt to bypass security mechanisms of computer systems. Cyber attack detection has been defined as "the problem of identifying individuals who are using a computer system without authorization and those who have legitimate access to the system but are abusing their privileges. We add to this definition the identification of attempts to use a computer system without authorization or to abuse existing privileges.

IV. SYSTEM MODEL

CyberPark implements various ICT tools to determine the user location as illustrates in Figure 2. The received information from ICT tools will be stored. The obtained data bases are organized according to the kind of ICT tools. Mobile agent manages the obtained information from ICT tools. Furthermore mobile agent protects the information from cyber attacks. The information of the user should be secured.
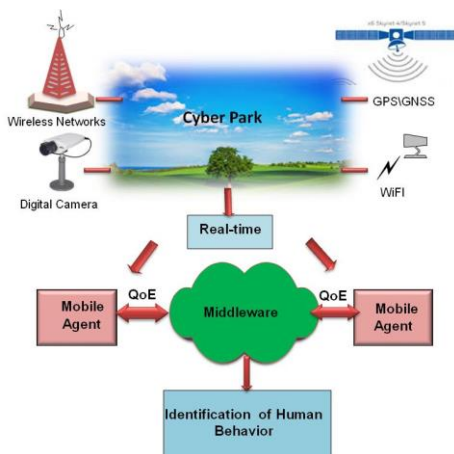

Figure 2: System Model

V. IMPLEMENTATION

Modern ICT tools will promote people to use public places seven days in the week with time variation. By using public places the people consider weather, abnormal condition and time variation. In this paper we introduce an application for interactive digital map based on GNSS. To use ICT tools of CyberPark the user should log on the system as illustrates in Figure 3. The user has to fill some information in order to use ICT tools in cyberpark. Hence the user starts the trip by selecting the desired path. In the other hand the system draws the path of the trip, and tracks the

user. The tracking process can be used on behalf various ICT tools. In this application we use the GNSS to draw the trip path as illustrates in Figure 4.
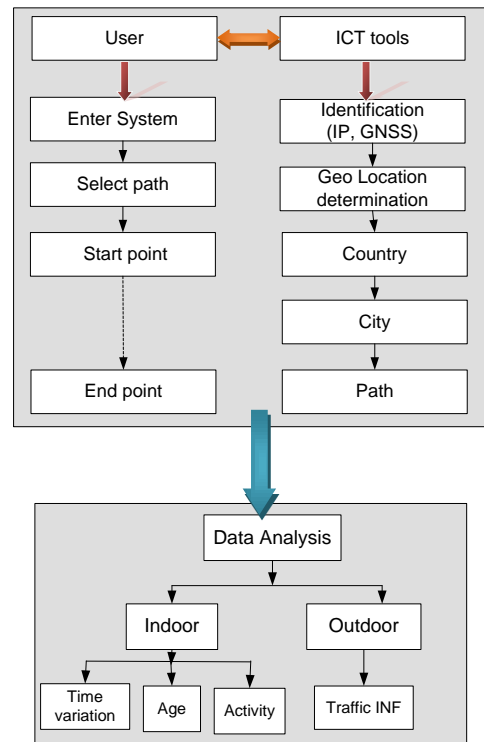

Figure 3: Information Collection

A. Interactive Digital Map

Interactive digital map can be installed in mobile stations or it can be displayed on touch screen for people that do not carry mobile devices, or those who have difficulties is using modern ICT devices, ass older people. User selects start point and the destination of the path trip. Mobile agent calculates the longitude and the altitude of the path of the trip.
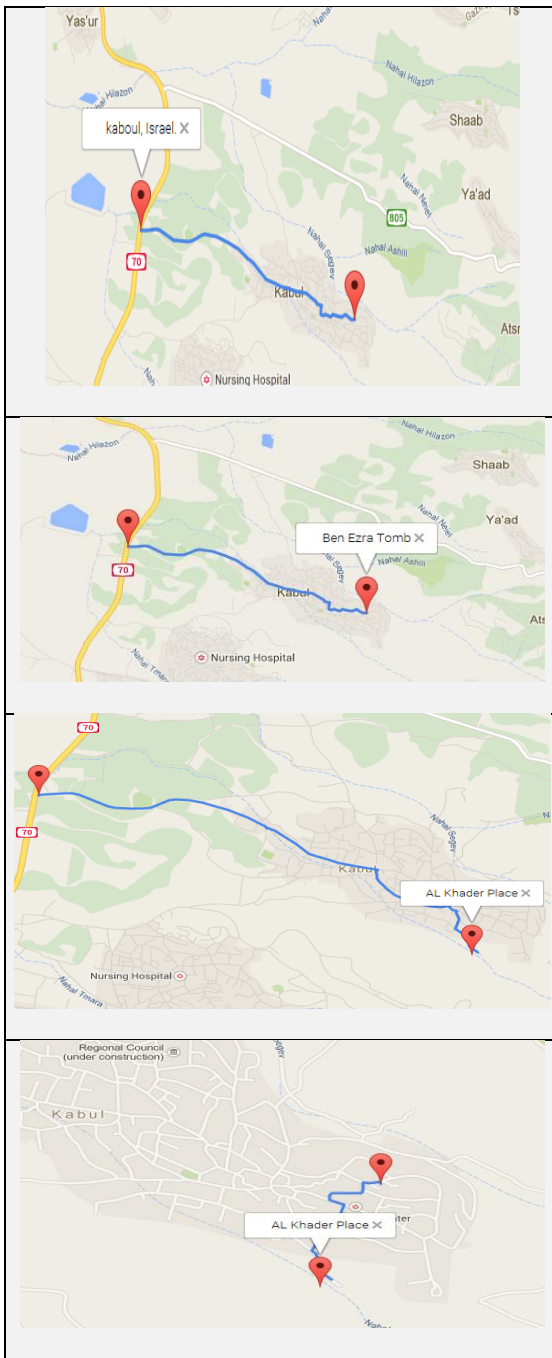
Figure 4: Interactive digital map

VI. CONCLUSION

Several ICT tools have been introduced in this paper. However we interested in developing new scheme to secure the privacy of users. Most of cyber attack detection schemes are fixed and have introduced traditional authenticity strategies with session key agreement. The traditional cyber attack detection schemes do not satisfied the new security requirements. Traditional cyber attacks detection involving cyber defence has limitations. The main limitation of misuse detection based IDSs is that they only can detect known attacks accurately. They are unable to detect previously unseen attacks or novel attacks. Moreover, predefine attack specification has

to be provided to the IDS for misuse detection, which requires human security experts to manually analyze attack related data and formulate attack specifications. Attack specification can be generated automatically by applying various automated techniques.

The novel cyber attack detection scheme is based on cognitive security system. The cognitive security system acts Autonomy, analyzing user behaviors, managing vertical handoff to track suspected cyber attacks, moving over networks, considering anomaly detection, and handling in real-time.

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