Interdisciplinary Description of Complex Systems 17(3-A), 438-443, 2019

THE ROLE OF ADDITIONAL INFORMATION IN OBTAINING INFORMATION

Edina Albininé Budavári* and Zoltán Rajnai

Obuda University, Doctoral School on Safety and Security Sciences
Budapest, Hungary

DOI: 10.7906/indecs.17.3.2
Regular article

Received: 30 December 2018.
Accepted: 31 August 2019.

ABSTRACT

One of the basic components of the smart city concept is the infocommunication infrastructure. The purpose of the infocommunication system is, among others, to transmit information. Generally, besides the necessary information provided in a transmission, some additional information is displayed as well. In public communication the destination of the information is not a specific person or object. Therefore, additional information can be obtained by anyone. Thus, such additional information facilitates the unwanted acquisition of information and its later use. The present study illustrates the role of additional information in obtaining information through an example of an online game. This game is public, therefore, it is an open source of information. The technology of Open Source Intelligence is one of the basic elements of the social engineering information palette.

KEY WORDS

additional information, open source, obtain, OSINT, social engineering

CLASSIFICATION

ACM: J.4, K.4
APA: 4010
JEL: D83

*Corresponding author, η: abepubkut@gmail.com; +36 20 425 4605;
OE-BDI office, Nepszinhaz str. 8, 1081 Budapest, Hungary

INTRODUCTION

The need to disseminate and transmit information is as old as humanity. The first paradigm shift happened with the appearance of printed books. The spread of the Internet among the population and the emergence of rapidly growing portals and social networks have made the second paradigm shift necessary. The emergence of ever-evolving smart devices is constantly changing people's needs [1]. It is now expected that a growing number of devices can be managed electronically. This is important in many areas of daily life, including education [2, 3].

The concept of Smart City includes the extensive serving of city dwellers, improving their quality of life, providing the most benefits with the smallest investment and making the environment more liveable in the long run [4], with the protection of the infrastructure and the individuals [5-7]. The development of the infocommunication infrastructure is essential for the implementation of the smart city concept. One of the purposes of the infocommunication system is the transmission of information. When forwarding information, not only the needed information is transferred, but it is also accompanied by additional information. This additional information is provided without intention [8]. In public communication, the final destination of the transfer is not a specific person or object. This way, anyone can obtain additional information. In the processing of information, additional information is often more important than intentionally transmitted information. The information displayed in this way is suitable for influencing, facilitating decision-making [9] and obtaining further information. Since such additional information comes from a completely open source, this kind of intelligence is called Open Source Intelligence (OSINT), which is one part of the social engineering methodology system [10].

Additional information will be defined in this study. In addition, an internet game will be presented to illustrate additional information. The game's summary is an example of how examining transmitted information from other angles can influence information acquisition. This gives an insight into the role of additional information in obtaining information.

ADDITIONAL INFORMATION

In communication, increasing transmission reliability emphasizes the importance of redundancy. In practical terms, therefore, the amount of data transmitted during communication is always greater than the amount required [8]. The expression of human thoughts and feelings is not exact, therefore, other supplementary clarifying information may appear during the communication containing them [10]. This means that the transmitted information may contain information other than what was intended by the initiator. The extra information that appears in this way has additional value in obtaining information, so it may serve as a basis for further research. There is no particular obstacle to obtaining this information through public communication and the intentional sharing of information. Moreover, this form of obtaining information does not violate the law, as the initiator deliberately shares the information [11-13].

Additional information can be defined as the information that appears alongside the content of the information that is intentionally conveyed, and there is an assay aspect system in which it represents added value.

The research aspects can also be grouped according to the abstract categories of information modelling: storage, processing and transmission [14, 15]. Another possible grouping is based on information architecture layers. Layers of the architecture include the energy layer, the layer of physical devices, the level of logical modeling and human behavior [8].

APPLICATION STAGES

Social engineering is a methodology that involves obtaining information, processing information in a targeted way [16], influencing decision-making [9, 10], and forcing organizational change.[17] One method of obtaining information in the methodology is open source intelligence [10]. This technique is one of the most convenient ways to obtain information.

There are many aspects to consider when processing information. For example, there may be additional information, other than those mentioned above, for a particular post. It can reveal the background of the human relationship, the temporal and spatial parameters of the actions and events, the physical, material and mental state of the actors. At the same time, obtaining information has become easier with the advent of social platforms. Curious acquaintances, journalists, marketing analysts, product development supporters and analysts, recruiters and personal practitioners also use open source intelligence. OSINT is a tool in the employers' repository as it can provide information about lifestyle and habits in addition to the information in the CV. For this reason, it is advantageous for employers to use community portals, which can provide additional information about applicants during the selection process, thus facilitating the decision.

Participation in community portals can also allow intervention. One of the bases of social engineering attacks is open source information. The additional information displayed above the mediated content helps to prepare and carry out a targeted attack. Obtaining and processing additional information can also facilitate targeted marketing, simple deception and fraud [11].

EXAMPLE OF FINDING LOCATION

Social portals and blogs are perfect tools for OSINT practitioners to obtain information. Published photos carry information about daily routines, habits, routes, locations, favorite foods and drinks, social networking and more. To illustrate this, an internet game was created by the authors of the study. During the game, players were required to determine the location of the photos from a series of photos. The photos were taken as dolls' selfies to avoid privacy issues.

The game was published as follows:

- the game was published anonymously using a nickname,
- the photos were publicated in a publicly available, viewable and accessible way,
- the photos did not contain metadata about the parameters of the creation,
- several photos were published during each game event,
- a given doll was used in multiple locations
- it was not announced where the doll was going to go or what the event was.

The photo montage in Figure 1 gives an example of the pictures taken during the game. The following statements were made:

- players responded to the game within 20 minutes,
- the region of the site was guessed within 30 minutes,
- the correct deciphering of the scene of the picture took more than 5 minutes,
- additional information appeared in the replies:
    - identification of the buildings on the site,
    - identification of the landmarks on the site,
    - the maker and the type of the doll used,
    - analysis of the originality of the doll's clothing.

Figure 1. Photo montage from the game.

After viewing the published images, players were also able to find out where the creator of the images was, and how often and in what orientation the creator travelled. Some more information included that the creator of the picture had at least three types of toy dolls in his environment. Collectors can easily determine the dolls' manufacturer and the types of dolls in the photos. Based on the above findings, it can be concluded that the images conveyed a great deal of information beyond the information needed to solve the game.

CONCLUSIONS

Urban development has brought about the need for sustainable and livable cities, which requires renewable infrastructure in the long term. Among others, this demand has led to the emergence of the smart city concept. The appropriate infrastructure is essential to realize this concept [1-4]. Like in other systems, the infocommunication infrastructure remains one of the most important infrastructures of smart cities.

One of the main purposes of the infocommunication system is the transmission of information [8]. When the information is transmitted, it is not only the required information

that is transmitted but some additional information is also disclosed with it. This additional information may be suitable to convey more meaning in a different aspect. For this reason, additional information is a basic source of obtaining information. One of the simplest forms of obtaining information is through public communication, the intentional sharing of information and broadcasting. Moreover, this is not against the law because the information is intentionally provided by the source [11-13]. This form of intelligence is OSINT.

The main driving force behind the need to obtain information is to influence decisions and enforce change. The process include information gathering, targeted processing and intervention. This process is completed by the methodology of social engineering [9, 10]. The game in this study is an example of how OSINT can be applied to obtain information through social media. During the game and at the end of the game, it was found that additional information can be obtained without major obstacles.

REFERENCES

[1] Kiss, M.; Breda, G. and Muha, L.: *Information security aspects of Industry 4.0*. Procedia Manufacturing **32**, 848-855, 2019, http://dx.doi.org/10.1016/j.promfg.2019.02.293,

[2] Szabó, A.; Szucs, E. and Berek, T.: *Illustrating Training Opportunities Related to Manpower Facility Protection through the Example of Máv Co.* Interdisciplinary Description of Complex Systems **16**(3), 320-326, 2018, http://dx.doi.org/10.7906/indecs.16.3.3,

[3] Dobrilovic, D. and Odadzic, B.: *Virtualization Technology as a Tool for Teaching Computer Networks.* International Journal of Educational and Pedagogical Sciences **2**(1), 41-45, 2008,

[4] Tokody, D.; Schuszter, G. and Papp, J.: *Study of How to Implement an Intelligent Railway System in Hungary*. In: Szakál, A., ed.: *IEEE 13th International Symposium on Intelligent Systems and Informatics: Proceedings*. IEEE, New York, 2015, http://dx.doi.org/10.1109/SISY.2015.7325379,

[5] Kiss Leizer, G.K. and Berek, L.: *The Safety Technology Questions of Wastes Arising in the Course of Catastrophes in the Continental Traffic.* In: Bitay, E., ed.: *Proceedings of the XXI-th International Scientific Conference of Young Engineers 2016*. Transylvanian Museum-Society, Cluj Napoca, pp.217-220, 2016, http://hdl.handle.net/10598/29162, accessed 1st February 2019,

[6] Marrone, S.; Rodriguez, R.J.; Nardone, R.; Flammini, F. and Vittorini, V.: *On synergies of cyber and physical security modelling in vulnerability assessment of railway systems.* Computers and Electrical Engineering **47**, 275-285, 2015, http://dx.doi.org/10.1016/j.compeleceng.2015.07.011,

[7] Tokody, D. and Flammini, F.: *Smart Systems for the Protection of Individuals.* Key Engineering Materials **755**, 190-197, 2017, http://dx.doi.org/10.4028/www.scientific.net/KEM.755.190,

[8] Albini, A. and Rajnai, Z.: *General Architecture of Cloud.* Procedia Manufacturing **22**, 485-490, 2018, http://dx.doi.org/10.1016/j.promfg.2018.03.074,

[9] Zamfirescu, C.B.; Duta, L. and Iantovics, L.B.: *The Cognitive Complexity in Modelling the Group Decision Process.* BRAIN Broad Research in Artificial Intelligence and Neuroscience **2010**(1), 69-79, 2010,

[10] Bansla, N.; Kunwar, S. and Gupta, K.: *Social Engineering: A Technique for Managing Human Behavior.* Journal of Information Technology and Sciences **5**(1), 18-22, 2019, http://dx.doi.org/10.5281/zenodo.2580822,

[11] Rajnai, Z. and Rubóczky, E.S.: *Moving Towards Cloud Security.*
Interdisciplinary Description of Complex Systems **13**(1), 9-14, 2015,
http://dx.doi.org/10.7906/indecs.13.1.2,
[12] Pető, R.: *Security of Smart City.*
Interdisciplinary Description of Complex Systems **17**(1), 13-19, 2019,
http://dx.doi.org/10.7906/indecs.17.1.3,
[13] Kovács, Z.: *Cloud Security in Terms of the Law Enforcement Agencies.*
Hadmérnök **7**(1), 144-156, 2012,
[14] Kasac, J.; Stefancic, H. and Stepanic, J.: *Comparison of social and physical free energies on a toy model.*
Physical Review E **70**(1), 16117-16124, 2004,
http://dx.doi.org/10.1103/PhysRevE.70.016117,
[15] Albini, A. and Rajnai, Z.: *Modeling general energy balance of systems.*
Procedia Manufacturing **32**, 374-379, 2019,
http://dx.doi.org/10.1016/j.promfg.2019.02.228,
[16] Mester, G. and Rodic, A.: *Sensor-Based Intelligent Mobile Robot Navigation in Unknown Environments.*
International Journal of Electrical and Computer Engineering Systems **1**(2), 1-8, 2010,
[17] Pokorádi, L. andVányi, G.: *Sensitivity Investigation of Failure Mode and Effect Analysis.*
In: Jármai, K. and Bolló, B., eds.: *Vehicle and Automotive Engineering 2. Proceedings of the 2nd VAE2018.* Springer International Publishing, Heidelberg, pp.497-502, 2018,
http://dx.doi.org/10.1007/978-3-319-75677-6_43.