

Informatics: An Introduction

MNO Sadiku¹, SM Musa¹, Sudarshan R Nelatury²

¹College of Engineering Prairie View A&M University

²School of Engineering and Engineering Technology Pennsylvania State University

Abstract We live in a digital world and are overwhelmed by the massive information we are surrounded with. Informatics is a discipline that deals with information. It is the study and practice of creating, storing, manipulating and sharing information. This paper provides a brief introduction to the field of informatics. It covers health informatics, cognitive informatics, business informatics, security informatics, and social informatics.

Keywords Informatics, health informatics, cognitive informatics, business informatics, security informatics, social informatics.

Introduction

The term “informatics” was adopted in the 1960s in some European countries (such as Germany and France) what other countries (such as USA) knew as computer science. Informatics is the study of information through its lifetime, relating to the creation, distribution, and utilization of information in social, economic, and scientific activities. Informatics differs from computer science and computer engineering due to its focus on the human use of computing. While computer science is focused on designing hardware and software technology that provides computation, informatics studies the intersection of people, information, and technology systems. Since individuals, computers, and organizations all process information, informatics encompasses cognitive, social, and computational aspects [1-2].

It is a broad field of interest, covering multidisciplinary areas. Informatics requires a domain which may be medicine, economics, or security. Thus, we have health informatics, nursing informatics, cognitive informatics, business informatics, social informatics, forensic informatics, legal informatics, security informatics, etc. All of these fields refer to the information pyramid [3], shown in Figure 1. Information provides context for managing data, while knowledge provides guidance for action to take.

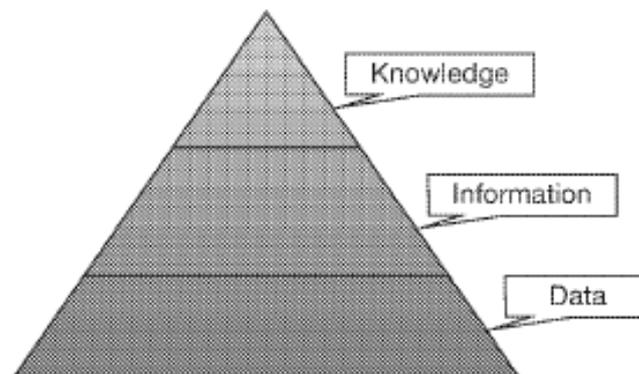


Figure 1: Informatic pyramid [3].



Health Informatics

The disciplines of health informatics and biomedical engineering complement each other. Health or medical informatics involves the collection and utilization of information from all aspects of health care. It is the systematic application of information and technology to health care. In other words, health informatics applies information science methods to analyze and understand health care information. It is also known as biomedical informatics or healthcare informatics. The goal of health informatics is the quality of care that can be given to the patients [4]. Information scientists may find this branch of informatics especially appealing because it involves gathering, managing, and processing large datasets [5]. Given the pressure on the healthcare sector to apply technology to reduce errors and be more efficient, there is prospect for employment in health informatics.

Cognitive Informatics

Cognitive informatics provides the theory and philosophy for the next generation computers and computer technologies. These future computers are known as cognitive computers and are capable of thinking and feeling [6]. Software development requires high level of cognitive capability of abstraction. It is conventionally perceived as a concrete product in software engineering. In cognitive informatics, software is regarded as formally design information. Software obeys the laws of informatics, because it is a mathematical entity, a special type of information.

Business Informatics

The rapidly changing business environment is compelling business executives to strategize for sustenance and growth. For a business to be successful and competitive, it must obtain reliable, relevant, and timely information. Business informatics deals with creating and analyzing data to create better business intelligence. It plays an inevitable role in the strategic planning process by providing accurate information on-demand. Businesses are expected to invest an ever-increasing sum of money in business informatics [7].

Security Informatics

Homeland security is a concerted national effort to prevent terrorist attacks within the US. Many existing information systems techniques need to be adapted for homeland security. Security informatics is the study of the development of advanced information systems for national security related applications [8]. While health informatics has become a major field of study, security informatics is just an emerging field motivated by national and homeland security related applications.

Social Informatics

Social computing represents a new computing paradigm. Social or community informatics is a discipline which links economic and social development efforts with emerging opportunities in areas such as electronic commerce. It portrays information technology as a socio-technical phenomenon. It is driven by the need to computerize aspects of human society [9]. Social informatics creates information and information technologies that bridge cultural gaps. Thus, it may be regarded as the study of the impacts of information and communications technologies on society [10].

Conclusion

Informatics is a relatively young field. It is still in its development. It is evolving and developing its own literature. As an academic field, informatics involves the practice of information processing and engineering of information system. Informatics education can occur at several levels—high school, baccalaureate, master's and doctoral. It has undergone a rapid growth in the US and other nations. Over 175 institutions in the US have offered courses of study in informatics. Informatics students study how people interact with information and technology.

References

- [1]. White, S., & Irons, A. D. (2007). Informatics in the UK: current perspective. *Innovation in Teaching and Learning in Information and Computer Sciences*, 6(3), 12-26.
- [2]. Groth, D., & Mackie-Mason, J. (2010). "Education: why an informatics degree?" *The Communications of ACM*, 53(2), 26-28.
- [3]. Dalrymple, P. W. (2011). Data, information, knowledge: The emerging field of health informatics. *Bulletin of the American Society for Information Science and Technology*, 37(5), 41-44.
- [4]. Herland, M., Khoshgoftaar, T. M., & Wald, R. (2013, December). Survey of Clinical Data Mining Applications on Big Data in Health Informatics. In *Machine Learning and Applications (ICMLA), 2013 12th International Conference on* (Vol. 2, pp. 465-472). IEEE.



- [5]. White, M. (2013). Public health informatics: An invitation to the field. *Bulletin of the American Society for Information Science and Technology*, 39(5), 25-29.
- [6]. Wang, Y. (2006, July). Cognitive informatics: towards future generation computers that think and feel. In *Cognitive Informatics, 2006. ICCI 2006. 5th IEEE International Conference on* (Vol. 1, pp. 3-7). IEEE.
- [7]. Maryska, M., & Wagner, J. (2015). Reference model of business informatics economics management. *Journal of Business Economics and Management*, 16(3), 621-637.
- [8]. Chen, H., Wang, F. Y., & Zeng, D. (2004). Intelligence and security informatics for homeland security: information, communication, and transportation. *Intelligent Transportation Systems, IEEE Transactions on*, 5(4), 329-341.
- [9]. Wang, F. Y., Carley, K. M., Zeng, D., & Mao, W. (2007). Social computing: From social informatics to social intelligence. *Intelligent Systems, IEEE*, 22(2), 79-83.
- [10]. McIver, W. J., & Rachell, T. (2002). Social informatics and service learning as teaching models. *Technology and Society Magazine, IEEE*, 21(3), 24-31.

