

## Chapter 12

# Data Modelling of a Multifaceted Electronic Card-Based Secure E-Governance System

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### **ABSTRACT**

*In the current climate of global economic decline, the developing countries are facing severe challenges in maintaining an efficient administration within an affordable budget. If this economic slowdown continues, there will be serious difficulties which will hamper the socio-economic development of the entire region. To respond to the situation, the governments must reduce budget expenses and still maintain efficiency and openness. To do so, the administration must deploy ICT-based mechanisms to fulfil the desired objectives. In this chapter, the authors present the development of a multifaceted electronic card-based secured e-governance mechanism to attempt to redress the inherent issues and explore new dimensions of interdisciplinary research. The proposed system will also act as the all-purpose electronic identity of the Citizen and hopefully replace the existing identity instruments such as Voter Card, Permanent Account Number Card, Driving License, Ration Card, Below Poverty-Line Card, Employment Card, Health Card, Insurance Card, etc. Moreover, this electronic instrument will also enable Citizen to perform financial transactions. Clearly, the authentication procedure of the proposed mechanism must also exist otherwise the intruders will be able to breach the system and execute their ill intentions. To ensure appropriateness of security features of the mechanism, the authors have also implemented a user authentication technique using object-oriented modelling of RSA digital signature algorithm for a Government-Citizen (G2C) type of e-governance. For better management of such a huge amount of sensitive information, the authors also discuss data modelling techniques used during user authentication of the proposed model.*

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## **INTRODUCTION**

In the current global economic meltdown, the governments of the developing countries like India are facing severe challenges in maintaining an efficient administration throughout its jurisdiction within an affordable budget. In our country the government is facing real hardship in maintaining this costly administration especially when the Indian Rupee (INR) is facing new highest of inflation on regular basis due to natural outcome of this global recession phenomenon. If this economic meltdown process continues in future, ongoing developmental projects may stop abruptly and the socio-economic development of the entire region may reach to a state of permanent coma. There can be a long drawn debate among the economists about the cause and cure of such economic issues; however no one will disagree that, to respond to this global recession the government must reduce their budget expenses thereby maintaining its efficiency. To do so, the administration must deploy Information and Communication Technology based mechanism which will fulfil the desired objectives. This generates the necessity of electronic mode of governance called e-governance, which will help to reduce the budget expenses of the government with the application of advanced technologies. The desired electronic mechanism must provide efficient administration in all respect, especially in terms of money, time, target output, etc, by bridging the gap during intra and inter departmental communications among various governmental agencies. Realizing the necessity of e-governance in Indian perspective (Roy & Karforma, 2011, 2012; Hoda, et al., 2012; Roy, Banik, Karforma & Pattanayak, 2010; Sur, Roy, & Banik, 2010), we have proposed a Citizen centric multifaceted smart card based e-governance mechanism (Roy & Karforma, 2013a, 2013b) which will solve our problems and explore new dimensions of interdisciplinary research works. This electronic instrument will replace all the existing identity instruments of the Citizen like,

Voter Card, Permanent Account Number (PAN) Card, Driving License, Ration Card, BPL (Below Poverty Line) Card, Employment Card, Health Card, Insurance Card, Tour & Travels Record, etc and will perform their functions under one head. As a value addition, using this electronic instrument the Citizen can perform various financial transactions, which they usually perform with the help of various debit cards, credit cards, etc. as the service server of the proposed mechanism will connect to the server of multiple banks of the Citizen. Since, it is an ICT (Information and Communication Technology) based electronic instrument, it will perform the intra and inter departmental communications among various governmental agencies instantly. Moreover, the Government will be able to communicate with the citizen in a timely manner at a nominal cost and citizen will also be able to access the resultant benefits very easily. Hence, it is clear that this proposed instrument will need to manage huge amounts of sensitive information about the Government and the Citizen, which may be tampered if an intruder successfully breaches the security parameters of this electronic mechanism and escalates its privileges in subsequent phases. To guard against this weakness, focus must be placed over the proper identification of the original users by deploying standard verification (Sarkar & Roy, 2012, 2013; Roy, et al., 2013; Roy, Sarkar, et al., 2012) procedures. Hence, to prevent this menace, we have already implemented the user authentication mechanism using an object oriented approach of RSA digital signature algorithm (Roy & Karforma, 2012a, 2012b; Roy, Banik, & Karforma, 2011) in a G2C type of e-governance transactions.

The organisation of this chapter is as follows. The importance of e-governance in terms of efficient administration is discussed in the next section. Then, the vital security parameters of standard e-governance mechanism are discussed. Here, we have presented a literature review on the relevant topic for better understanding of the

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