



**FINAL YEAR PROJECT REPORT**

# **Secure Video Streaming**

**By**

Hafsa Adil  
Umair Ahmed Shah

**Bachelors of Software Engineering**

**Department of Computer Science and Engineering**

**Bahria University, Karachi**

**2007**

## **Acknowledgement**

First of all, we would like to thank Allah Subhana Hu Tala, without His mercy and blessings we could never be able to reach the stage of completion of our project. We are thankful to our previous advisor, Sir S. M. Rizvi, for his continuous support in the successful completion of this project. He showed enthusiasm to undertake the project in the first place.

We would also like to thank our advisor, Sir Rashid Faruqui, for his encouragement and guidance. He was always there in time of need to discuss approaches to meet the project objectives.

Besides our advisors, we would like to thank Dr. Bilal Alvi, project coordinator of the Computer and Engineering Science department, for his support, cooperation and encouragement. We are also thankful to Dr. Shakeel Khoja, Head of the Computer and Engineering Science department and the campus management for their support.

We are also greatly indebted to Sir Usman Waheed for helping us complete this report in the right manner.

Lastly, we are thankful to our parents and classmates their support.

## **Abstract**

The use of technology in everyday life has become a norm. With the increasing inclusion of computers, there is also a threat of security leaks and attacks to the integrity of one's data. Multimedia streaming has become very common and with the number of online resources providing streaming of files, it has become necessary to ascertain the security of these files. For this purpose, the encryption of streaming video files is a field wide open for research. The basic idea behind encrypting "parts" or frames of a video file, as opposed to encrypting the whole file in one operation, is to ensure secure transmission of other parts of the file even if one part of the file is somehow decrypted or becomes insecure. This operation increases the level of security and ensures minimum loss to the user. Since this is just an initial approach towards making streaming of multimedia files secure, limitations do exist and there is always room for improvement. The application can be enhanced to include other multimedia formats in the future. However, it is hoped that this initial step in securing the streaming or video files in this time and age of growing Web services for online video viewing, will achieve its objective of providing security to both users, and content providers.

# Table of Contents

<b>INTRODUCTION</b> .....	<b>1</b>
1.1 OVERVIEW .....	1
1.2 SYSTEM DESCRIPTION.....	2
1.3 DEPENDENCIES .....	3
<b>BACKGROUND &amp; LITERATURE REVIEW</b> .....	<b>5</b>
2.1 BACKGROUND .....	5
2.1.1 <i>Video Encryption</i> .....	6
2.2 LITERATURE REVIEW .....	7
2.2.1 <i>Introduction and History of Video Encryption</i> .....	7
2.2.2 <i>Communication Security</i> .....	9
2.2.3 <i>Communication Security Devices</i> .....	10
2.2.4 <i>Level of protection needed</i> .....	11
2.2.5 <i>Techniques of Video Encryption</i> .....	11
2.2.6 <i>Sample Product: "View-lock II Video Encryption System"</i> .....	13
2.2.7 <i>Secure Multimedia Streaming</i> .....	14
2.3 REAL TIME STREAMING PROTOCOL (RTSP) .....	15
2.3.1 <i>Introduction</i> .....	15
2.3.2 <i>Protocol Operations</i> .....	16
2.3.3 <i>Extending RTSP</i> .....	23
2.3.4 <i>Overall Operation</i> .....	25
2.3.4 <i>RTSP States</i> .....	26
2.3.5 <i>Relationship with other Protocols</i> .....	27
2.3 THE DATA ENCRYPTION STANDARD ALGORITHM .....	31
2.3.1 <i>Introduction</i> .....	31
2.3.2 <i>Overall structure</i> .....	32
2.3.4 <i>The Feistel (F) function</i> .....	34
<b>AIMS AND STATEMENT OF PROBLEM</b> .....	<b>36</b>
3.1 STATEMENT .....	36
(a) <i>Project Justification</i> .....	36
(b) <i>Governance</i> .....	36
3.2 SCOPE .....	37
(a) <i>Product:</i> .....	37
(b) <i>Goal:</i> .....	37
[ (c) <i>Objectives:</i> .....	38
(d) <i>Deliverables:</i> .....	38
3.3 LIMITATION OF SCOPE .....	38
<b>ANALYSIS AND DESIGN</b> .....	<b>39</b>
4.1 REQUIREMENTS SPECIFICATION .....	39
4.1.1 <i>Project Description</i> .....	39
4.1.2 <i>Functional Specifications</i> .....	39
4.1.3 <i>Design Specifications</i> .....	39
4.1.4 <i>Deliverable Items</i> .....	40
4.1.5 <i>Technical Feasibility</i> .....	40

4.1.6 Operational Feasibility.....	40
4.1.7 System Requirements.....	41
4.2.1 UseCase.....	42
4.2.2 Class diagram.....	43
4.2.4 Sequence diagram.....	44
<b>TESTING .....</b>	<b>52</b>
6.1 BLACK BOX TESTING.....	52
6.1.1 Advantages of Black Box Testing.....	53
<b>DISCUSSION.....</b>	<b>61</b>
<b>CONCLUSION .....</b>	<b>62</b>
<b>FUTURE WORK .....</b>	<b>63</b>
9.1 EXTENSION .....	63
9.1.1 Content-Based Digital Watermarking.....	63
9.1.2 Adaptive Multimedia Encryption.....	64
9.1.3 Motion vector encryption in multimedia streaming.....	65
<b>REFERENCES .....</b>	<b>67</b>