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Research Tools :A Survey

Ankur Singh Bist
Govind Ballabh Pant University of Agriculture And Technology, India
ankur1990bist@gmail.com

Abstract

Research tools are very beneficial for researchers to perform and analyze their research activities . Various research tools are available that are giving benefits in simulation , data analysis and various other type of activities . Our purpose is to make a collective study of these tools .

Keywords: Simulation , Data Analysis ..

Introduction

There are various tools now a days that are used by researchers for their work . Various reasons are there to use the research tools . One main reason are cost factors like if we consider the case of research in which original setup is very costly so normal research person cannot grow so in this case these freeware simulator and other type of tools provide good help.

Matlab is one of the widely used tool it contains various features.

Applications of Matlab

1. Aerospace
2. Bio informatics
3. Curve fitting
4. Fuzzy Logic
5. Image Processing
6. Optimization
7. Neural Network
8. Image Acquisition
9. Database
10. Filter Design
11. Virtual Reality
12. Hidden Markov Model and other also....

CrypTool includes examples of classical encryption methods and various examples that can be seen interactively are as follows[2]:----

1.Encryption with RSA / Prime number test / Hybrid encryption and digital certificates / SSL

2. Digital signature visualized

3. Attack on RSA encryption

4. Analysis of encryption in PSION 5

5. Weak DES keys

6. Locating key material ("NSA Key")

7. Attack on digital signature through hash collision search

8. Authentication in a client-server environment

9. Demonstration of a side channel attack (on hybrid encryption protocol)

10. RSA attack using lattice reduction

11. Random analysis with 3-D visualization

12. Secret Sharing using the Chinese Remainder Theorem (CRT) and Shamir

13. Implementation of CRT in astronomy (solving linear modular equation systems)

14. Visualization of symmetric encryption methods using ANIMAL

15. Visualization of AES

16. Visualization of Enigma encryption

17. Generation of a message authentication code (MAC)

18. Hash demonstration

19. Learning tool for number theory and asymmetric encryption

20. Point addition on elliptic curves

21. Password quality mete (PQM) and password entropy
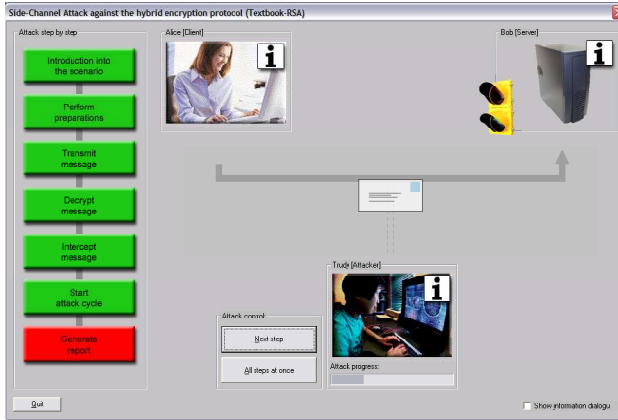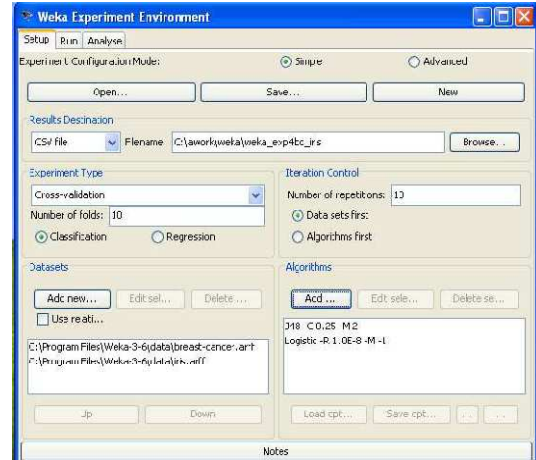
22. Brute-force analysis

23. CrypTool online help
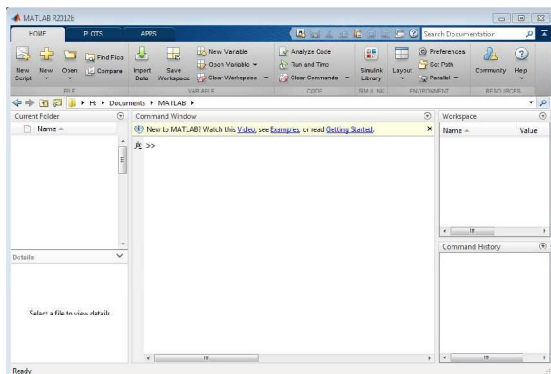
Figure2:[2]

Demonstration of a Side-Channel Attack (on a hybrid encryption protocol)

Weka Application Interfaces[3]-----
• Explorer
– preprocessing, attribute selection, learning, visualization
• Experimenter
– testing and evaluating machine learning algorithms
• Knowledge Flow
– visual design of KDD process
– Explorer
• Simple Command-line
– A simple interface for typing commands

Weka Functions and Tools[3]-----
• Preprocessing Filters
• Attribute selection
• Classification/Regression
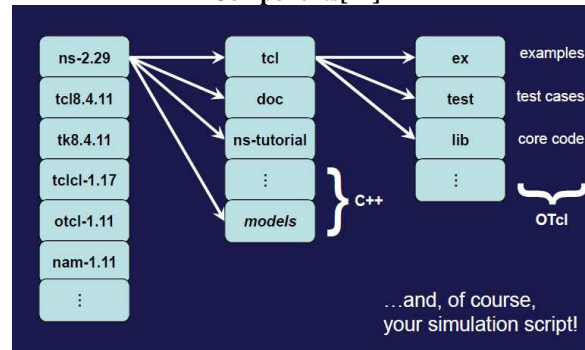• Clustering
• Association discovery
• Visualization
Feature classification ,clustering , regression are the issues that are handled by this tool .
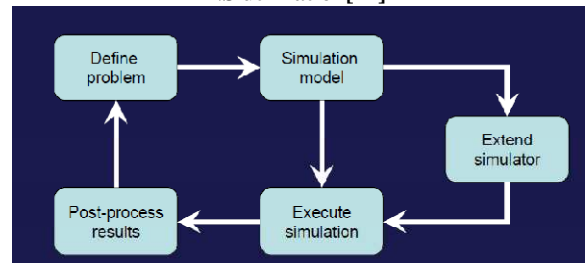

Figure3:[3]

Weka Experimenter [3]

Network simulator are very much helpful for network people , ns2 is enriched with various qualities ,basic component structure and utilization is shown blow.
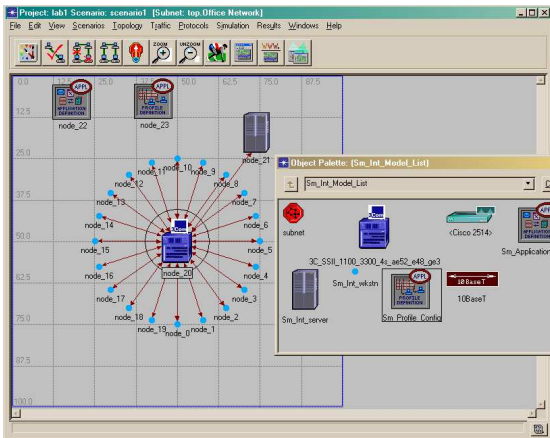

Components[4]

NS utilization[4]

The Opnet is a very strong tool used in many disciplines of network design . With this tool the network parameters and their effect on the network performance can be deduced . As with any new tool, one must learn the basics, and the only way to learn the tool is to use them. Please expect to give some time with the software.

Major Pull DownTabs[6]

References
[1] www.mathworks.com
[2] www.cryptool.com ,Prof. Bernhard Esslinger and CrypTool-Team, Feb. 2009
[3] Dr. Wenjia Wang: Tutorial for DM tool Weka
[4] Dr. Osman ghazali , ns2 tutorial .
[5] OmNet++ use manual pdf .
[6] Opnet tutorial pdf.

OMNet++ is one of the widely used tool used for various essential deductions and simulation activities . A block diagram of building and running simulation is shown below.
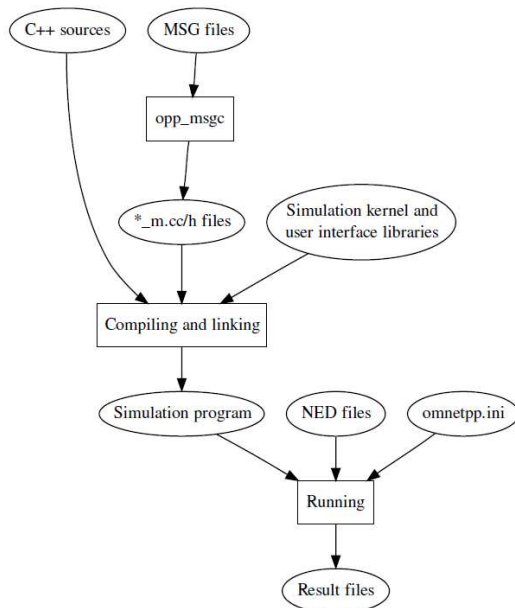
Building and running simulation[5]

Conclusion

In this paper firstly we discuss about the various research tools . We make a summarised look on various issues and

approaches adopted in this domain . Different simulators like ns2 , CrypTool , weka are very strong tool for networks , cryptography ,data mining applications respectively . Tools like Matlab is a multipurpose tool . There are various other emerging tools are there and also existing tools are upgrading for better analysis .
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