

Developer Tool Box

SikandarKhan¹, KavyaNR², MamathaT³, VinayHegde⁴

^{1,2}B.E. Students, Department of Computer Science and Engineering, R V College of Engineering, Bengaluru

^{3,4}Professor, Department of Computer Science and Engineering, R V College of Engineering, Bengaluru

Abstract – As a pioneer in data aggregation services in India, there are new category of solution (like Real-time credit decisions, Personal Finance Management related products etc.) that leverages the power of aggregation of structured and unstructured data, providing deep analytics on top of the aggregated data all while eliminating the security risks too in process. Every single day developers deal with several formats of data and perform various quick operations before sharing or consuming it further. All this involves a lot of data interaction with developers. The data is confidential and should remain within the workspace tech infrastructure. The raw data coming in from the client needs to go through various processes such as decryption, decoding, validation etc. The idea of having one different IDE plugin for each of the above operations is time-consuming and also poses a security risk as many plugins and websites often cache the inputs fed to them. Hence the need arises to have an all-in-one Web-Application that encompasses these processes as robust web tools.

Key Words: Spring Boot, JSON Toolkit, Bootstrap, Curl Builder, Encoder, Cryptography Tool, Responsive, Web application

1. INTRODUCTION

Developer Tool Box is a web-based application which encompasses a varied set of operations that would be frequently used by the developer into a single web application such as encryption-decryption, encoding-decoding and validation of Json data, Json to XML, Json to YAML converting etc. This tool helps to reduce the time required to visit different website to perform different operation and to improve the security of the data with single IDE and avoiding multiple plugins to avoid security risk caused by as many plugins and websites often cache the inputs fed to them. This paper proposes web-based application called Developer Tool Box which includes seven tools for performing different types of operations during software development process. The tools are Curl Builder, JSON Toolkit, Encoder-Decoder, Cryptography Tool, Regex Tool, Cron Generator, Escaping De-Escaping Tool.

This web app utilizes the power of Spring Boot as a backend while Bootstrap, HTML 5, JavaScript make up the front-end. Ajax is used to Establish connection between JavaScript and Spring Boot controller. The AIM of this tool

Is the ease of access with no dependencies i.e. the tool can be run on any machine irrespective of its underlying OS.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

The Existing System uses different IDE plugins for different operations including Encryption, Decryption, Encoding, Decoding, JSON Validation etc.

Let us discuss some existing solutions and the problems they carry along with them:

1. IDE plugins: The idea of having one different IDE plugin for each of the above operations is time consuming, cumbersome. The installation process and familiarization with its working takes up some of your development time.

2. Online Tools: VIZ operations such as decryption. Since the sole purpose of encrypting the response body is to prevent the man-in-the middle from reading it, using Online tools would defeat the said purpose. The reason being websites often cache the inputs fed to them. Hence any person having access to the website's back-end DB could take into possession this data and decrypt it. Therefore, gaining access to sensitive data.

Author [1] defines Data encryption is process of converting a plain text to another format known as cipher text. This process protecting information from eavesdropping using encryption key [1]. Compression and Encryption methods are play a major role in protecting secret information and currently these two methods are done separately [1]. According to author [2] storing or sending a smaller number of bits is known as Data Compression. Compression save space or transmission time by performing reduction on size of data [2]. Author [3] explains compression techniques and cryptography techniques example DES, RC4 etc. Author [4] compare the open source tools such as Vera Crypt, Disk Cryptor etc. intended for data encryption. Author [5] defines Symmetric and Asymmetric encryption and compression.

3. THE PROPOSED METHODOLOGY

In order to improve the performance and secure the data in the software development process, the proposed web

application called Developer Tool Box plays a major role. It includes following tools.

JSON Toolkit, Encoder- Decoder, Escape De-escape Tool, Cron Expression Generator, Cryptography Tool, Curl Builder, Regular Expression Tool.

3.1 System Architecture

The figure below (Fig-1) shows the System Architecture. In which user can interact with Developer Tool Box User Interface (UI). The server handles the Exception and performs the operations on data such as Encoding, Decoding, validation of data etc.

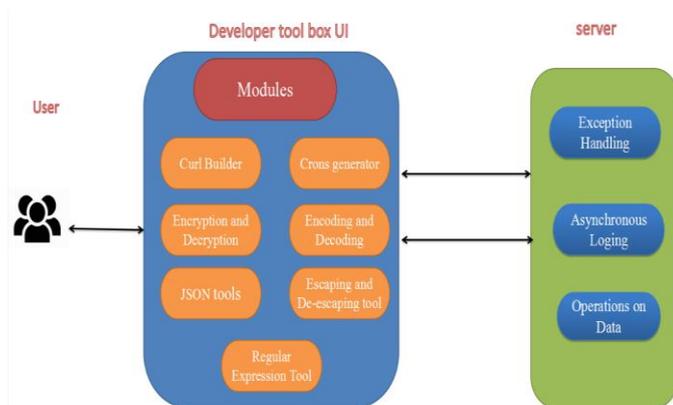


Fig -1: System Architecture

3.2 JSON Tool Kit

Java script object notation (JSON) is a syntax for exchanging and storing data. It is easy for users to read, write and understand. Machines easily understand JSON because machines deal with objects. There are plenty of standard json operations but some of the most common use cases are beautifying, minifying, and converts such as Json to YAML etc.

JSON Tool kit checks whether the given input JSON data is a valid JSON or not and also beautifies, minifies the JSON data. The JSON Toolkit also includes converters such as JSON to XML and JSON to YAML. The Above Fig-2 shows the flowchart of JSON Toolkit. We are using some inbuilt Java libraries to validate, beautify, minify and to convert JSON data.

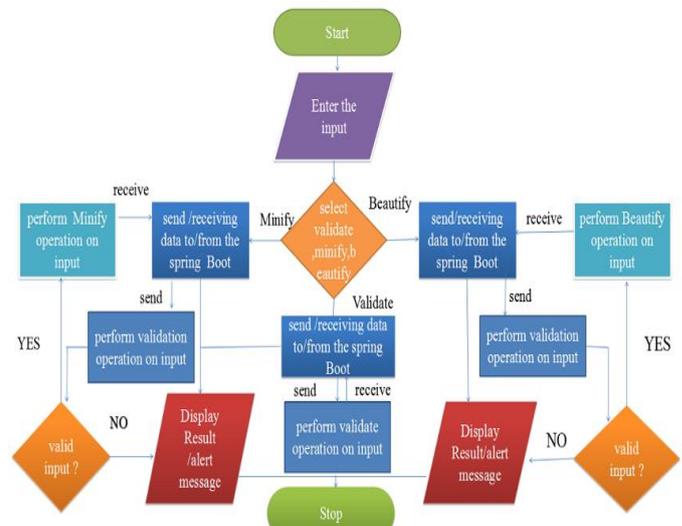


Fig -2: JSON Toolkit Flow Chart

3.3 Encoder-Decoder

Encoder and Decoder Tool is used to encoding the given input or to decoding the given encoded input. This can support various encodings and decoding's such as Base64, URL and HTML Encoding and Decoding.

The figure below (Fig-3) i.e. Encoder Decoder flow Chart shows Encoding and Decoding of input step by step. URL encoding encodes non-ASCII characters in a URL input by replacing them with percent character “%” followed by two hexadecimal digits. The two-hexadecimal digits represents the numeric values of the replaced non-ASCII character. In HTML encoding certain characters such as “<” and “>” are replaced with particular escape sequence of characters. This will help the browser to display ensuring text accurately and ensure that don't interfere with browser rendering.

User is allowed to enter the input. After entering the input, the user needs to select required encoding and decoding type from given list. Then user needs to select whether to encode or decode the input. Once the selection is done the input is sent to the controller. The controller performs the required operation and display the result.

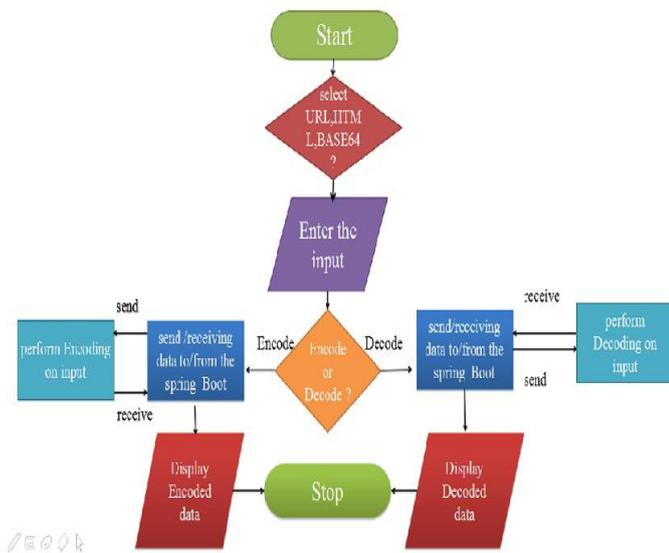


Fig -3: Encoder-Decoder Flow Chart

3.4 Escape and De-escape Tool

Escape and De-escape tools are used to remove the traces of offending character that could prevent interpretation. This tool includes 4 types of Escaper and De-escaper.

- HTML Escape De-escape Tool
- JAVA Escape De-escape Tool
- XML Escape De-escape Tool
- JAVASCRIPT Escape De-escape Tool

The HTML Escape and De-escape Tool Escapes or De-escapes an HTML input by removing traces of characters that could be wrongly interpreted as markup. The following offending characters are escaped with their corresponding HTML entities.

- “ is escaped with "
- & is escaped with &
- < is escaped with <
- > is escaped with >

The JAVA Escape De-escape Tool Escapes or De-escapes a JAVA input string by removing characters that could prevent compiling. The following offending characters are must be escaped correctly to be used within string.

- Back space is escaped with \b
- Tab space is escaped with \t

- Newline is escaped with \n
- Double quote is escaped with \”
- Back slash is escaped with \\

The XML Escape and De-escape Tool Escapes or De-escapes an XML input string by removing characters that could be wrongly interpreted as markup. The following offending characters are properly escaped with their corresponding XML entities:

- ‘ is escaped with '
- “ is escaped with "
- & is escaped with &
- < is escaped with <
- > is escaped with >

The JAVASCRIPT Escape and De-escape Tool Escapes or De-escapes a JAVASCRIPT input by removing characters that could prevent compiling. The following offending characters are must be correctly escaped to be used within string.

- Back space is escaped with \b
- Horizontal Tab space is escaped with \t
- Vertical Tab space is replaced with \v
- Newline is escaped with \n
- Double quote is escaped with \”
- Single quote is escaped with \’
- Back slash is escaped with \\
- Null character is escaped with \0

Once the input is entered, the user have to select one option from a list of escaping de-escaping tools available. After selecting the required option, the input is sent to the controller. Controller performs required operation on input and display the result.

3.5 Cron Expression Generator

This can be used to generate Quartz cron expressions and also Unix crontab expressions. A cron expression consist of 7 fields and fields are separated by a white space in order to represent a schedule. This expression includes some special character such as *,?, , and /.

- * is used to selects all the values within a field.
- ? is used to specify no specific values.
- , is used to specify additional values.
- / is used to specify increments.

Format of Cron Expression:

<Seconds> <Minutes> <Hours> <Days of month> <Months>
<Days of week> <Years>

Cron Expression Generator includes five tabs and user is allowed to select the values in the tabs in order to generate schedules.

3.6 Cryptography Tool

Cryptography tool is used to secure the confidential information. The proposed system secures the information by encrypting the information using one of two algorithms (AES-Advanced Encryption Standard, RSA-Rivest Shamir Adleman). We can get the information back by decrypting the encrypted information.

The proposed system uses two types encryption and decryption algorithms. They are AES and RSA.

AES algorithm is can encrypt and decrypt the information using the same secret key.

RSA algorithm is an asymmetric encryption algorithm. In asymmetric encryption and decryption are done using two different keys. One is a public key and another one is a private key. Public key is used for the encryption and private key is used for the decryption.

In proposed system user is allowed to select whether to encrypt or decrypt information, once the option is selected user needs to choose one of two algorithm and enter the input. After entering the input controller performs operation on data and display the result.

If AES option is selected by the user, he needs to enter the input to encrypt/decrypt and select the one option from three options available i.e. 128-bytes, 192-bytes and 256-bytes and must enter a password.

If RSA option is selected by the user, he only needs to enter the input to encrypt/decrypt.

3.7 Curl Builder

Curl Builder tool helps in generating curl commands using UI forms. In this tool user is allowed to choose HTTP methods and content -type and user needs to enter URL and Body to request. once all these is done data sent to Backend for processing and result will be displayed.

3.8 Regular Expression (Regex) Tool

A regex is a special type of text string. It is used to describe a search pattern. This Regular Expression tool helps in counting of Matching String with regular expression and to generating language specific code with respect to regular expression.

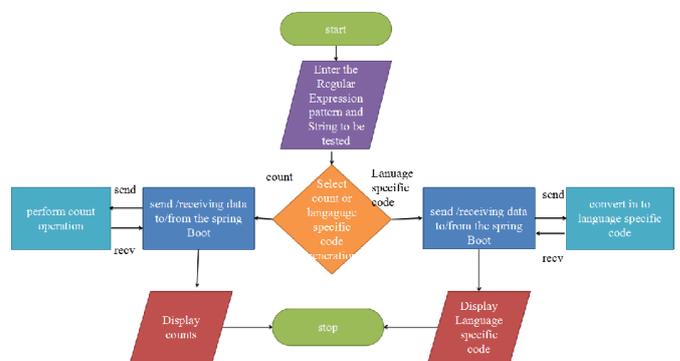


Fig-4: Regular Expression Tool flow chart

The Fig-4 shows step by step, flow of execution of Regular Expression Tool. In this tool after entering the regular expression pattern and string to be tested the count operation is performed or language specific code is generated and displayed.

4. RESULTS

The figure (Fig-5) below shows the Home Page of Developer Tool Box. Which Consist of Responsive Side Bar with all the tools listed in it. The Developer/user can select any tool he wants. The home page gives the brief introduction about the Developer Tool Box.



Fig -5: Developer Tool Box Home Page

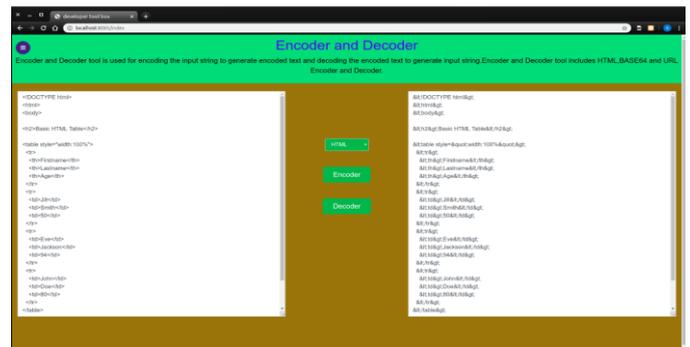


Fig-8: HTML Encoded output

4.1 JSON Toolkit Result

The figure (Fig-6) below shows the Beautified output of json data.

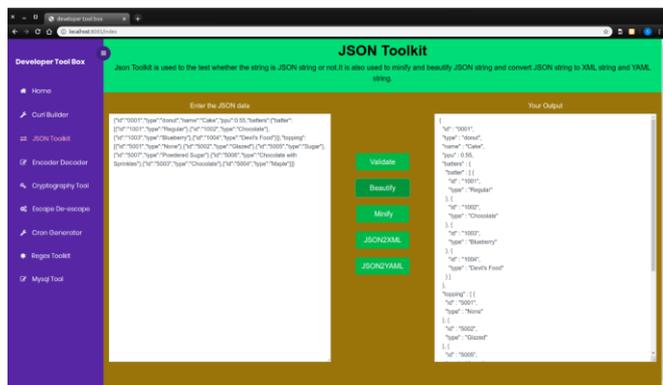


Fig -6: JSON Toolkit Beautify output

The figure (Fig-9) below shows the Decoded output of html encoded input.

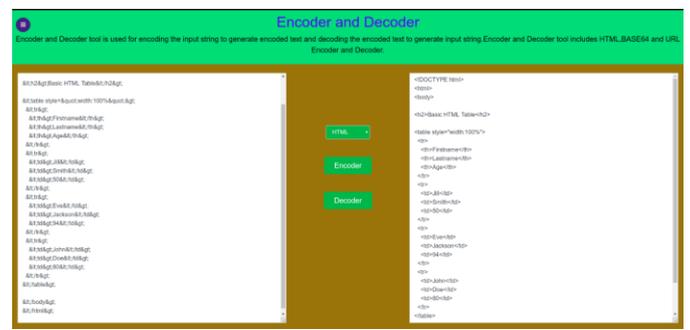


Fig -9: HTML Decoded output

The figure (Fig-7) below shows the Validation output of json data. We can see that output "Valid json" is displayed.

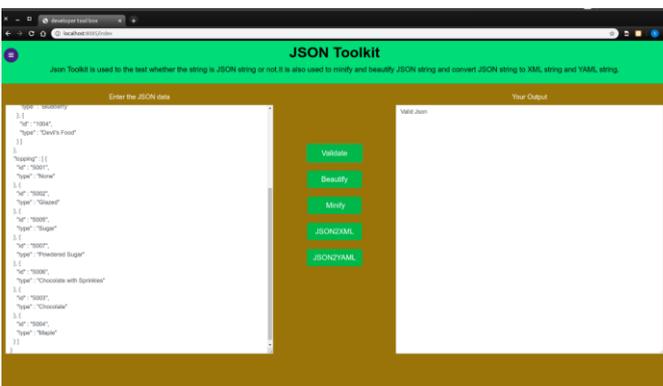


Fig -7: JSON Toolkit Validation output

4.2 Encoder-Decoder output

The figure (Fig-8) below shows the html encoded output.

The figure (Fig-10) below shows the XML escaping output.

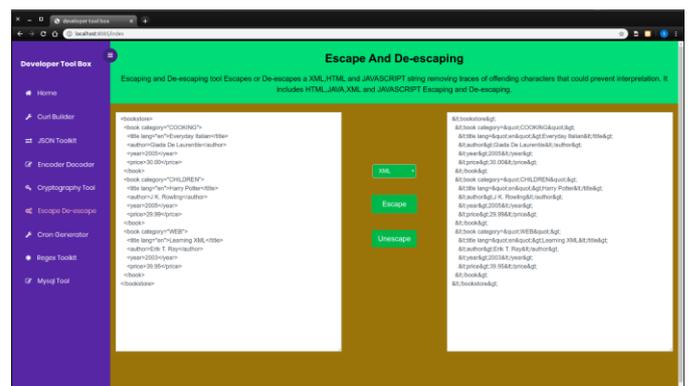


Fig -10: XML Escaping output

The figure (Fig-11) below shows the XML De-escaping output.

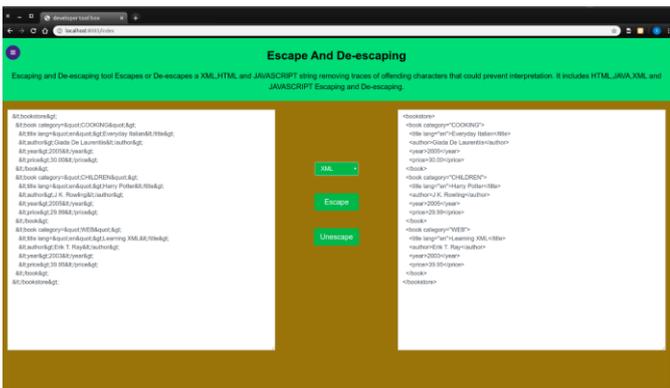


Fig -11: XML De-escaping output

4.4 Cron Expression Generator output

The figure (Fig-12) below shows the Cron Expression Generator output.

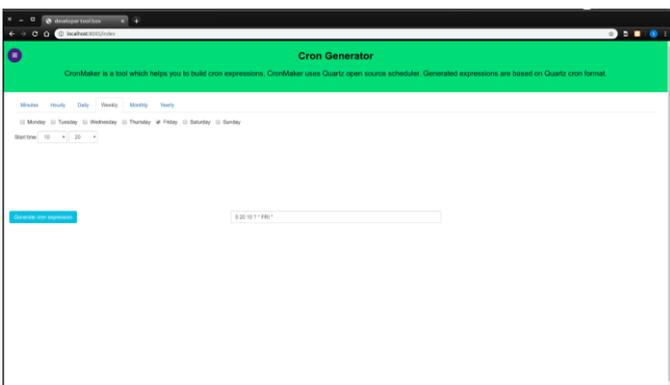


Fig -12: Cron Expression Generator output

4.5 Cryptography Toolkit output

The figure (Fig-13) below shows the AES 128 bytes Encryption and Decryption output.

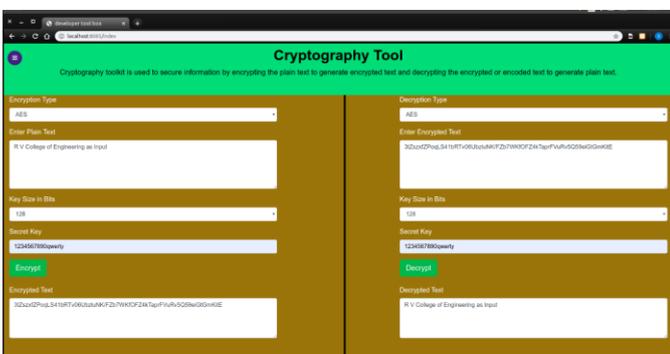


Fig -13: AES Encryption and Decryption output

4.6 Curl Builder output

The figure (Fig-14) below shows the Curl command generated by Curl Builder.

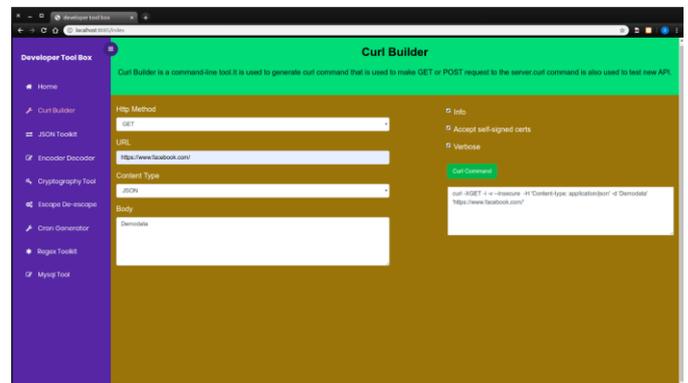


Fig -14: Curl Builder output

4.7 Regular Expression Tool output

The figure (Fig-15) below shows the Number of Matches counts of string with Regular Expression. Here the output "Total 3 matches Found" is displaying in the output.

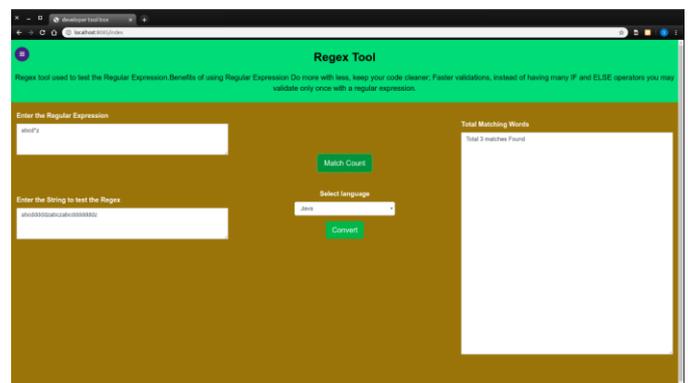


Fig -15: Regex Tool String Matching Count output

The figure (Fig-16) below shows the output of Regex Tool language specific code generator. In which Java Code is generated.

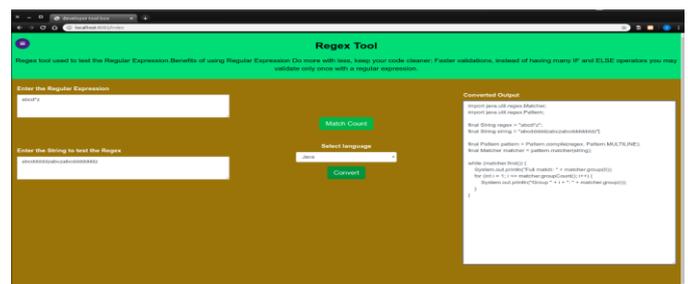


Fig -16: Regex language specific code generator output

5. CONCLUSIONS

The Developer Tool Box helps to reduce the time required to visit different websites, to perform different operations and to improve the security of the data with single IDE and avoiding multiple plugins to avoid security risk caused by as many plugins.

The Developer Tool box provides an all-in-one web application to perform various operations with a single IDE. By using this Tool Box Developers/users save some of their development time by avoiding visiting different web applications for different operations. The tool encompasses seven frequently using tools in software development process and reducing all the software dependencies and security risks.

This Tool Box provide ease of access with no dependencies i.e. the tool can be run on any machine irrespective of its underlying OS.

REFERENCES

- [1] T.SubhamastanRao, M.Soujanya, T.Hemalatha, T.Revathi, "Simultaneous data compression and encryption" (IJCSIT) International Journal of Computer Science and Information Technologies, ISSN 0975-9646, Volume-2(5), 2011.
- [2] Haroon Altarawneh, Mohammad Altarawneh "Data Compression Techniques on Text Files: A Comparison Study" International Journal of Computer Applications, (0975 – 8887), Volume 26– No.5, July 2011.
- [3] Ruchita Sharma, Swarnalata Bollavarapu "Data Security using Compression and Cryptography Techniques" International Journal of Computer Applications (0975 – 8887) Volume 117 – No.14, May 2015.
- [4] M. Bursać, R. Vulović and M. Milosavljević "Comparative Analysis of the Open Source Tools Intended for Data Encryption" International Conference on Information Technology and Development of Education – ITRO 2017 June, 2017. Zrenjanin, Republic of Serbia.
- [5] Sarita Kumari "A research Paper on Cryptography Encryption and Compression Techniques" International Journal of Engineering And Computer Science ISSN:2319-7242 Volume 6 Issue 4 April 2017, Page No. 20915-20919.