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Software reusabilitydevelopment through NFL approach For identifying security based innerrelationships of affectingfactors

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ABSTRACT

In component based software reusability development process, the software developers have to choose the best components which are self adaptive future to overcome the functional errors, framework mismatches, violation of user level privacy issues and data leakage feasibilities. The software developers can build high quality software applications by taking the consideration of the reusable components which are more suitable to provide high level data security and privacy. This paper has proposing the neural based fuzzy framework based approach to estimate the reusable components which are directly and indirectly involve the security and privacy to improve the quality of the software system. This approach has considered the twenty effecting factors and fifty three attribute matrices. It has formed with three stages of execution scenarios. The first stage has executed with eleven effecting factors and eighteen attribute matrices for identification of supporting software reusability components, the second stage has executed with four effecting factors and thirty five attribute matrices for identification of sub-internal relationships in terms of security-privacy, and the third stage has executed with eight effecting factors and six attribute matrices for identification of sub of sub-internal relationships in terms of security risk estimation. This analytical finding proposes a fuzzy logic model to evaluate the most feasible effecting factors that influence the enterprise level data security-privacy practices at real time environment.

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1. INTRODUCTION

In today's fast growing web world, the component based software reusability development process is acting the key role objective for building the new software applications with high compatible, user friendly, high securable and more privacy. By selecting the most suitable software components whose overall software quality is good in terms of software compatibility, security and privacy. In present scenario, data security and privacy is a challenging issue for building the new software applications. Software component based security (SCS) is framed with the defence of the information, possessions and various individual components of computational belongings of software. The security implicated software components are much reliant on the function which the components will acting as major role in a particular secure based applications [1]. The software based reusability components (SRC) necessitate being adapted with the concern application setup where it is organized. The SCS are categorized with two types of execution modes by implicating with the security, privacy functionalities such as non-operational security based components functionalities (NOSCF) and operational security based components functionalities (OSCF) [1].

1.1. Non-operational security component functionalities (NOSCF)

The NOSCF is executed with the internal performance of the concern required components. In NOSCF, the various security based component characteristics are implicated with the functionalities which the components provides. In the implementation level, the security based properties are rooted in an assortment of structures with the component functionality. The NOSCF implemented with the extremely advanced security objectives which are proposed to counter the certain security threats and vulnerabilities. In this type of execution, the NOSCF secure objective based properties are blended with the various concerns of different layers of the component functionalities. The each objective base secure layer signifying a specific level of idea to accomplish the convinced security concerns.

1.2. Operational security component functionalities (OSCF)

The OSCF is willing to provide securing sheathing to the objectives of the components. It will protect the considered components from all types of security threats and vulnerabilities from outside of the non-secure environment. In OSCF environment, the exterior security characteristics are the supplementary to the concern components which are added internal functionalities. It will take support and measured some exterior protection method of components which are not straight associated to the concern component functionality properties. The OSCF are intended and supplementary to the existing component of security concerns [1].

1.3. Operational secure-privacy and privacy-laws

The secure-privacy and privacy-laws will protect the information of individuals and enterprises. In secure-privacy, it is potential to recognize the end-users along with their realistic efforts based on the information that the system or network gathers and then it applies to adapted systems [2]. The many countries formed the privacy laws for processing and restricting the personal data in the regional-global-regional territory. In present days, most of software designers are willing to design the software applications with higher quality of secure and privacy execution [2]. In addition of identification of secure based components, it is mandatory to identify the privacy based components to avoid the various internal-external-internal secure threads and vulnerabilities.

In SRC, Many researchers on software quality model have considered on an about some basic factors for estimating overall quality [3]. Up to now the researchers are described some combinational effecting factors. The software developers have to choose the best components which are self adaptive future to overcome the functional errors, framework mismatches, violation of user level privacy issues and data leakage feasibilities. By selecting the most suitable software components whose overall software quality is good in terms of software compatibility, security and privacy. In present scenario, data security and privacy is a challenging issue for building the new software applications. The software developers can build high quality software applications by taking the consideration of the reusable components which are more suitable to provide high level data security and privacy. This paper has proposing the neural based fuzzy framework based approach to estimate the reusable components which are directly and indirectly involve the security and privacy to improve the quality of the software system.

2. PAPER OBJECTIVES

This paper has proposing the neural based fuzzy framework based approach to estimate the reusable components which are directly and indirectly involve the security and privacy to improve the quality of the software system. This approach has considered the twenty effecting factors and fifty three attribute matrices. It has formed with three stages of execution scenarios.

a. The first stage has executed with eleven effecting factors and eighteen attribute matrices for identification of supporting software reusability components.
b. The second stage has executed with four effecting factors and thirty five attribute matrices for identification of sub-internal relationships in terms of security-privacy.
c. The third stage has executed with eight effecting factors and six attribute matrices for identification of sub of sub-internal relationships in terms of security risk estimation.

This analytical finding proposes a fuzzy logic model to evaluate the most feasible effecting factors that influence the enterprise data security practices at real time environment. This approach is proposing the new ideological scenario and it more helpful for the software code writers for building high authenticated software applications. This research helps to fulfil the gap by investigating the concern supporting effecting factors for reusing the software components for building the software applications with high end securable and privacy parameters for avoiding uncertainties while the data is in storage, accessible and executable modes.

3. SOFTWARE REUSABILITY COMPONENTS AND ITS RELATIONAL SUPPORTING EFFECTING FACTORS

This approach has considered the twenty effecting factors and fifty three attribute matrices. It has formed with three stages of execution scenarios.

3.1. The first stage of associated effecting factors and implicated attribute metrics

The first stage considered eleven effecting factors along with their eighteen attribute matrices such as shown in the Table 1 and Figure 1, in this stageevery affecting factor has holding its internal affecting sub-factors as described in Table 2.

Table 1. The first stage of associated effecting factors and implicated attribute metrics

Affecting Factors	Supporting Attribute Matrices
Complexity	Easy Adaptable, Easy Understandable
Quality	High Performance, Bug-Free, Error-Free, Test Cases
Portability	Platform Independent, Machine Independent
Maintainnability	Easy Adaptable, Self-Mould
Cohesion	Module Bound
Flexibility	Platform Independent, Machine Independent, Easy Adaptable, Self-Mould
Efficiency	Fast Execution, Minimum Resources
Reliability	Less Time, High Performance
Cost	Low Price
Availability	Fast Retrieve, Easy Retrieve
Security	High Privacy, High Defence

3.2. The second stage of associated effecting factors and implicated attribute metrics

The Information Systems Security is a process to defend against the unconstitutional and intentional exploitation of assets of the local, global enterprise information system by individuals, including breach against the data, software, hardware, resources, services and networks. The developers are willing to design the efficient security software components would reduce security-privacy-risks and it defend infrastructure resources from various vulnerabilities. It would accomplish with self moulded mechanism planned to do next task and it will self establish the right-controls to prevent various security breaches. That’s why, the software developers are always planning to identify the correlated affecting factors and its attribute metrics which are able to have the functionalities-features to avoid the secure, privacy based uncertainties. The second stage considered four effecting factors such as compatibility, security, privacy and regional factors along with their thirty five attribute matrices as shown in the Table 2 and Figure 1. The considered second stage affecting factors are enhanced from first stage affecting factor of security: high-privacy, high-defence along with two affecting factors of compatible and regional factors. Here the high-privacy is mentioned as privacy and high-defence is mentioned as security. In this stage, the first stage attribute metric has considered as affecting factors for enhancing the futures and characteristics.

Table 2. The second stage of associated effecting factors and implicated attribute metrics

Affecting Factors	Supporting Attribute Matrices
Compatible	Machine-Dependent (MaD), Machine-Independent (MaI), Platform-Dependent (PaD), Platform-Independent (PaI)
Security	Awareness-Training (AT), Access Control Methods (ACM), Certification (Ce), Authorization (Au), Auditing (Ad), Defence Assessments (DA), Risk Estimation (RE), Configuration Management (CM), Contingency Planning (CP), Identification-Authentication (IA), Response of Occurrence (IO), System Maintenance (SM), Media Defence (MD), Physical-Environmental Protection (PE), Defence Planning (DP), System and Services Acquisition (SA), System and Communications Defence (SCD), Information Integrity (II)
Privacy	Personnel Protection (PP), Name-Address (NA), Cookies (C) [4], Sessions (S), Browsed pages (BP) [4], Social Media Plugins (SMP) [4], Usage logs of different services (UDS) [3]
Regional Factors	SSN, DOB, SNAME(SN), OTP, MAC, Private-IP (PIP)

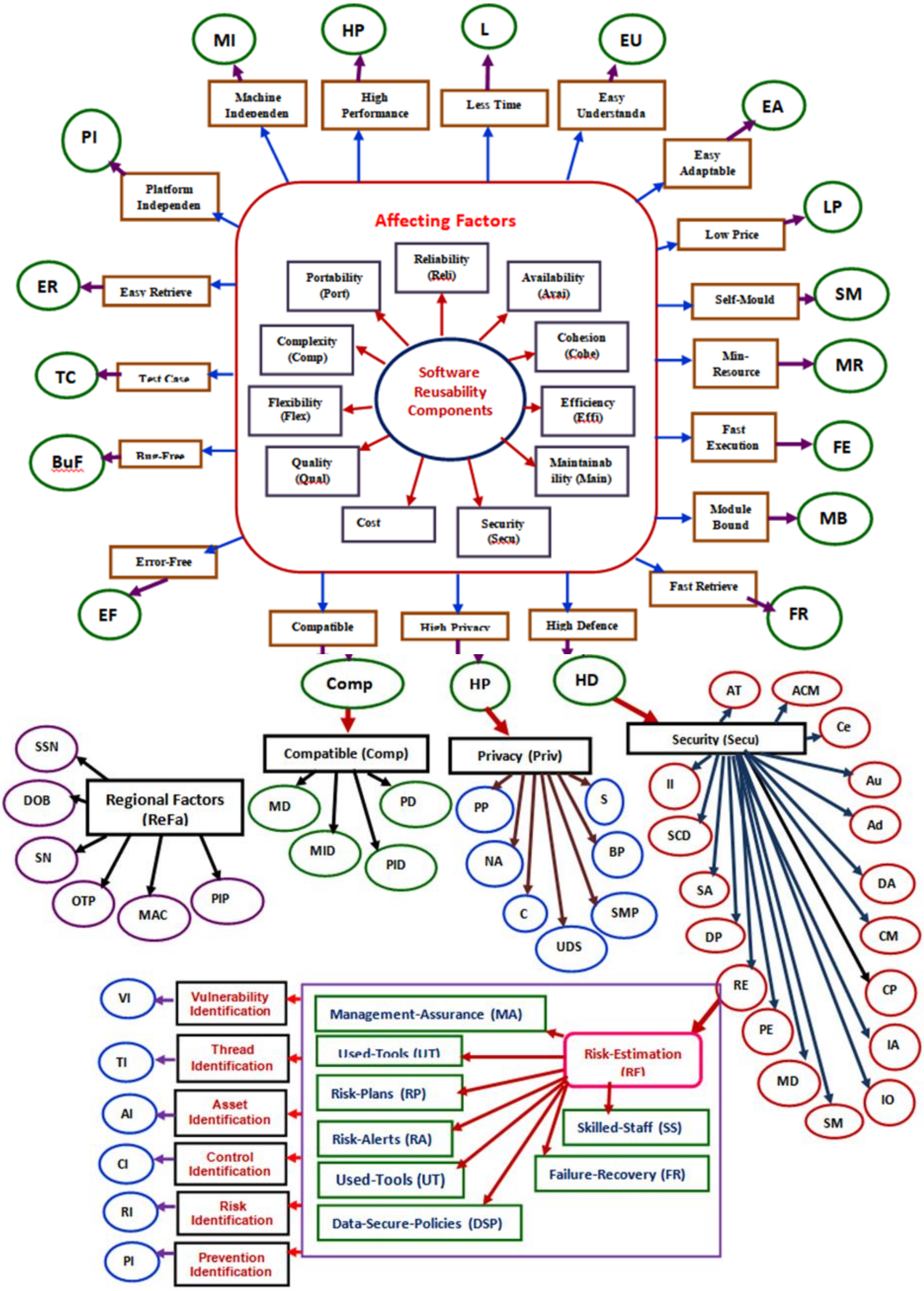


Figure 1. SRC affecting factors: first, second and third stage affecting factors along with their attribute metrics

3.3. The third stage of associated effecting factors and implicated attribute metrics

The third stage of associated the risk-estimation (RE) effecting factors and its concern supporting attribute metrics. The risk-estimation scheme is subjective by eight significant effecting factors [5] along with six attribute metrics such as shown in the Table 3 and Figure 1. These combinational based prepared applications helped extremely in discovering the vulnerabilities and recognizing the suitable controlling mechanisms were important. It institute to have chipped in to all six stages of the risk-estimation mechanism. The considered third stage affecting factors are enhanced from second stage affecting factor of security along with one affecting factors of Risk Estimation (RE).In this stage, the second stage attribute metric has considered as related affecting factor. Here the RE is classified into eight affecting factors along with its six affecting factors.

Table 3. All supporting software reusability effecting factors are represented as row-wise execution and all supporting related effecting factors implicated attribute metrics are represented as column-wise execution

	Platform Independent (PI)	Machine Independent (MI)	High Performance (HP)	Less Time (LT)	Easy Understanable (EU)	Easy Adaptable (EA)	Low Price (LP)	Self-Mould (SM)	Min-Resources (MR)	Fast Execution (FE)	Module Bound (MB)	Fast Retrieve (FR)	Error-Free (EF)	Bug-Free (BuF)	Test Cases (TC)	High Defence (HD)	High Privacy (HP)	Easy Retrieve (ER)
Portability (Port)	1	0.9	0.75	0.4	0.8	0.85	0.7	0.65	0.63	0.58	0.6	0.5	0.1	0.2	0.3	0.45	0.34	0.52
Reliability (Reli)	0.9	0.65	1	0.95	0.6	0.5	0.45	0.4	0.3	0.85	0.2	0.1	0.82	0.8	0.75	0.73	0.7	0.55
Availability (Avai)	0.35	0.3	0.25	0.85	0.2	0.15	0.1	0.8	0.78	0.12	0.75	0.9	0.7	0.65	0.55	0.45	0.4	1
Cohesion (Cohe)	0.65	0.6	0.55	0.2	0.72	0.7	0.1	0.5	0.9	0.95	1	0.45	0.85	0.8	0.75	0.4	0.35	0.3
Efficiency (Effi)	0.45	0.4	0.65	0.75	0.6	0.55	0.35	0.5	1	0.9	0.7	0.65	0.88	0.85	0.8	0.3	0.2	0.1
Maintainability (Main)	0.8	0.75	0.3	0.25	0.85	1	0.1	0.95	0.9	0.2	0.7	0.65	0.45	0.4	0.35	0.55	0.5	0.6
Security (Secu)	0.9	0.85	0.8	0.5	0.4	0.75	0.35	0.7	0.45	0.25	0.65	0.3	0.6	0.55	0.1	1	0.95	0.2
Cost	0.9	0.85	0.4	0.35	0.45	0.5	1	0.55	0.95	0.3	0.6	0.2	0.7	0.65	0.15	0.8	0.75	0.1
Quality (Qual)	0.6	0.55	0.8	0.5	0.2	0.3	0.25	0.25	0.75	0.7	0.65	0.35	1	0.9	0.85	0.45	0.4	0.1
Flexibility (Flex)	0.95	1	0.75	0.7	0.8	0.85	0.65	0.9	0.6	0.55	0.35	0.3	0.25	0.2	0.1	0.5	0.45	0.4
Complexity (Comp)	0.75	0.7	0.3	0.2	1	0.9	0.25	0.85	0.55	0.35	0.4	0.8	0.5	0.45	0.15	0.65	0.6	0.1

4. PROPOSED NEURAL BASED FUZZY LOGIC (NFL) BASED METHODOLOGY IMPLICATION

The blend characteristics of NFL can defeat the disadvantages of individual systems by combing the both into one. The advantages [6] of NFL:

a. The NFL can reduce the time and cost of projected design architecture.
b. It can preserve the self decision approach and computational calculations are performed quickly with fuzzy numeric operations [6].
c. It performs the self-learning, self-tuning and self-organizing functionalities.
d. It can manage the imprecise, partial, informal data or imperfect.
e. It gives more reliable outcome results.
f. It can hold all kinds of data values such as numeric, logical and linguistic

The NFL is trained with driven data learning method derived from the theory of neural network. In NFL, the fuzzy logic system determines the parameters by processing data samples by using learning algorithm generated from the theory of ANN [6]. The set of fuzzy rules can represent at every stage of leaning process when it is before, during or after. Fuzzy rules can be interpreted as imprecise prototypes of training data. The underlying fuzzy system and leaning procedure in build for ensuring the semantic properties [6] as shown in the Figure 2.

4.1. Execution of first stage of associated affecting factors and its correlated attribute metrics

The first stage has considered eleven effecting factor along with their eighteen attribute matrices and furthureexecuted for identification and classification of software reusability components with help of their fuzzy set values. In this approach, all effecting factors are considered as input parameters which is converted into neural inputs and transmitted to the fuzzy logic controller which is used generates the linguistic values based on the neural inputs, the fuzzification inference rules implicated to derive the relationships then transmitted it to defuzzification stage to generate the outputs of accurate reusable components, then transmitted it final stage of neural mode to generated the output responses as shown in the Figure 2.

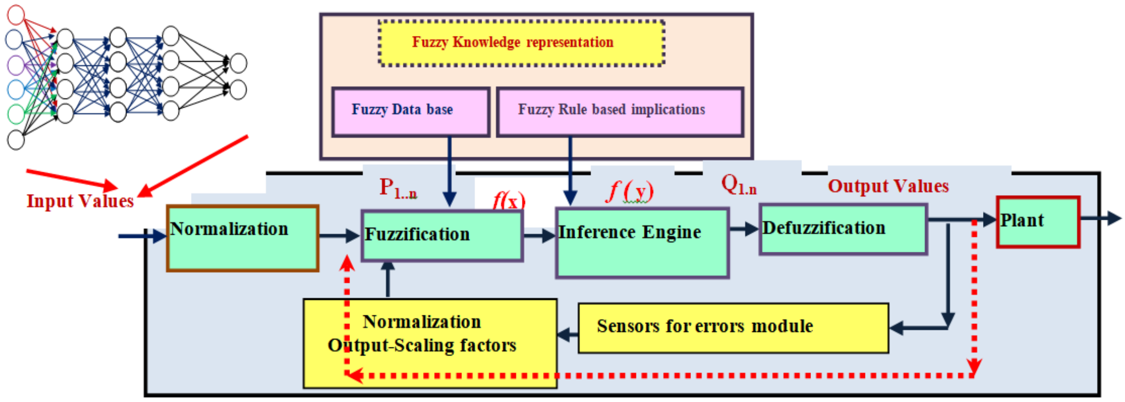


Figure 2. The NFL with error computing module of closed loop fuzzy controlling system [6]

4.2. Takagi-sugeno-kang fuzzy inference (TSK-FI)

In above table, all weights are performed with help of the TSK-FI reasoning method. The membership function $\mu Pil(Q_i)$ resembles to the input Q=[q_1, q_2, q_3,… q_m] of the rule-l [7]. The TSK-FI is a method for the fuzzy inference rules which are characterized in the form of IF - THEN, which the output responses of consequentscheme does not form fuzzy set, but in the form of a linear or constant equations [8, 9]. It has implicated with the various rules with AND and OR conditions [7]. For an AND rule with Input 1 = *x* and Input 2 = *y*, the firing strength is

$$\text{Strength}w_i=\text{And-Method}(F_1(x),F_2(y))$$

$F_{1,2}(.)$ are the membership functions for Inputs 1 and 2.
The final output of the system is the weighted average of all rule outputs, computed as

$$Final\ Output = \frac{\sum_{i=1}^{N} w_i z_i}{\sum_{i=1}^{N} w_i}$$

Here N has considered as the number of rules, From the equation [8, 9], if the system consists of several rules, the inference derived from the collection and correlation between rules. The method used in performing fuzzy inference system, the method Min (Minimum) on this method, a solution of fuzzy sets obtained by taking the minimum value of rules, and then use that value to modify the fuzzy region and applying it to the output using the AND operator. In general it can be written:

$$(xi) = \max(\mu sf(xi),\mu kf(xi))$$

with (xi) = fuzzy membership value solutions to order to-(xi) = membership value of fuzzy rule consequent to-i.

4.3. Single valued inter-relationship: execution of second stage of associated affecting factors and its correlated attribute metrics

The second stage considered four effecting factors such as compatibility, security, privacy, regional factors along with their eighteen attribute matrices. In this stage, all eighteen attribute matrices are executed to identify the inter-relationship of each sub-effecting factors with their correlated attribute matrices as shwon in Table 4. The fuzzy set values 0, 1 are considered for specifying the inter-relationships among the attribute matrices as shown in Table 5. In this stage, inter-relational lattices and nodes are generated based on the fuzzy set values by using the Add-Intent mechanism. All supporting effecting factors are experimented with various analysis methods such as min intersection layout, choosing best arranged position and Lat-Viz Mechanism.

Figure 3 show binary form of representation of second stage software reusability effecting factors and attribute metrics retrieved from Table 4. That Figure 4 show Lattice of Inner-relationships of binary form representation of 3rd node of second stage software reusability effecting factors and attribute metrics. Figure 5 show Lattice of Inner-relationships of binary form of AOCPOSET representation of second stage affecting factors, and total 35 implications with their intent and extend inter-relationships can see in Figure 6.

Table 4. Single valued inter-relationship of binary form of representation: Second stage software reusability effecting factors represented as row-wise and attribute metrics as represented as column-wise

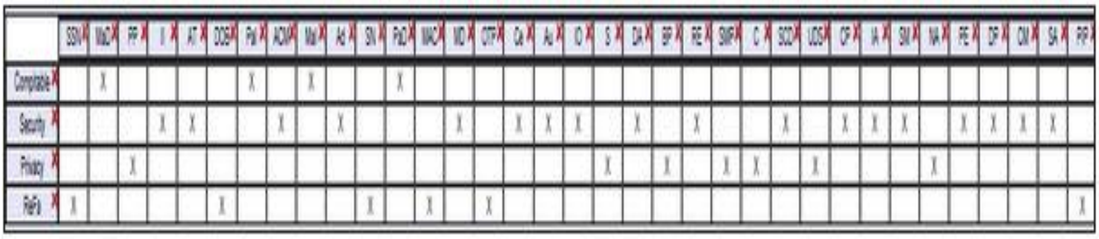
	Compatible (Comp)	Security (Secu)	Privacy (Priv)	Regional Factor (ReFa)
SSN				x
MaD	x			
PP			x	
II		x		
AT		x		
DOB				x
PaI	x			
ACM		x		
MaI	x			
Ad		x		
SN				x
PaD	x			
MAC				x
MD		x		
OTP				x
Ce		x		
Au		x		
IO		x		
S			x	
DA		x		
BP			x	
RE		x		
SMP			x	
C			x	
SCD		x		
UDS			x	
CP		x		
IA		x		
SM		x		
NA			x	
PE		x		
DP		x		
CM		x		
SA		x		
PIP				x

Table 5. Fuzz form of representation: Second stage software reusability effecting factors and attribute metrics

	Compatible (Comp)	Security (Secu)	Privacy (Priv)	Regional Factor (ReFa)
SSN	0	0	0	1
MaD	1	0	0	0
PP	0	0	1	0
II	0	0	0	0
AT	0	1	0	0
DOB	0	0	0	1
PaI	1	0	0	0
ACM	0	1	0	0
MaI	1	0	0	0
Ad	0	1	0	0
SN	0	0	0	1
PaD	1	0	0	0
MAC	0	0	0	1
MD	0	1	0	0
OTP	0	0	0	1
Ce	0	1	0	0
Au	0	1	0	0
IO	0	1	0	0
S	0	0	1	0
DA	0	1	0	0
BP	0	0	1	0
RE	0	1	0	0
SMP	0	0	1	0
C	0	0	1	0
SCD	0	1	0	0

Table 5. Fuzz form of representation: Second stage software reusability effecting factors and attribute metrics *(Continue)*

	Compatible (Comp)	Security (Secu)	Privacy (Priv)	Regional Factor (ReFa)
UDS	0	0	1	0
CP	0	1	0	0
IA	0	1	0	0
SM	0	1	0	0
NA	0	0	1	0
PE	0	1	0	0
DP	0	1	0	0
CM	0	1	0	0
SA	0	1	0	0
PIP	0	0	1	0



	SSN	MaD	PP	II	AT	DOB	Pal	ACM	Mal	Ad	SN	PaD	MAC	MD	OTP	Ce	Au	IO	S	DA	BP	RE	SMP	C	SCD	UDS	CP	IA	SM	NA	PE	DP	CM	SA	PIP
Compitable		X					X		X			X																							
Security				X	X			X		X				X		X	X	X		X		X			X		X	X	X		X	X	X	X	
Privacy			X																X		X		X	X		X				X					
ReFa	X					X					X		X		X																				X

Figure 3. Binary form of representation of second stage software reusability effecting factors and attribute metrics retrieved from Table 4

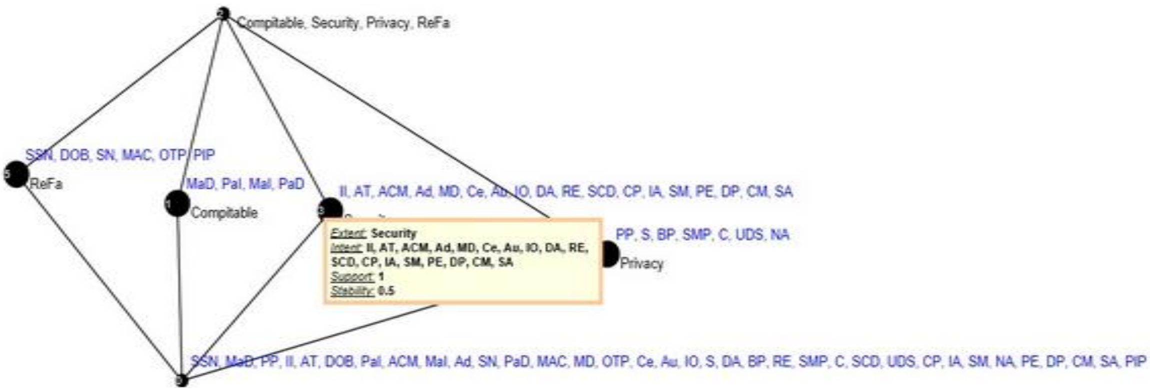


Figure 4. Lattice of Inner-relationships of binary form representation of 3^{rd} node of second stage software reusability effecting factors and attribute metrics

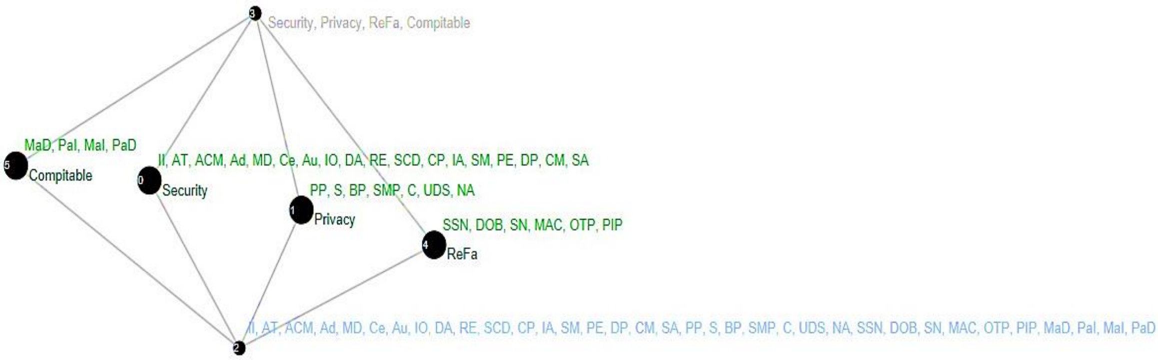


Figure 5. Lattice of Inner-relationships of binary form of AOCPOSET representation of second stage affecting factors

Impl 0: MaD --> PaI, MaI, PaD	Lift: 4	Support: 0.25
Impl 1: PaI --> MaD, MaI, PaD	Lift: 4	Support: 0.25
Impl 2: MaI --> MaD, PaI, PaD	Lift: 4	Support: 0.25
Impl 3: PaD --> MaD, PaI, MaI	Lift: 4	Support: 0.25
Impl 4: II --> AT, ACM, Ad, MD, Ce, Au, IO, DA, RE, SCD, CP, IA, SM, PE, DP, CM, SA	Lift: 4	Support: 0.25
Impl 5: AT --> II, ACM, Ad, MD, Ce, Au, IO, DA, RE, SCD, CP, IA, SM, PE, DP, CM, SA	Lift: 4	Support: 0.25
Impl 6: ACM --> II, AT, Ad, MD, Ce, Au, IO, DA, RE, SCD, CP, IA, SM, PE, DP, CM, SA	Lift: 4	Support: 0.25
Impl 7: Ad --> II, AT, ACM, MD, Ce, Au, IO, DA, RE, SCD, CP, IA, SM, PE, DP, CM, SA	Lift: 4	Support: 0.25
Impl 8: MD --> II, AT, ACM, Ad, Ce, Au, IO, DA, RE, SCD, CP, IA, SM, PE, DP, CM, SA	Lift: 4	Support: 0.25
Impl 9: Ce --> II, AT, ACM, Ad, MD, Au, IO, DA, RE, SCD, CP, IA, SM, PE, DP, CM, SA	Lift: 4	Support: 0.25
Impl 10: Au --> II, AT, ACM, Ad, MD, Ce, IO, DA, RE, SCD, CP, IA, SM, PE, DP, CM, SA	Lift: 4	Support: 0.25
Impl 11: IO --> II, AT, ACM, Ad, MD, Ce, Au, DA, RE, SCD, CP, IA, SM, PE, DP, CM, SA	Lift: 4	Support: 0.25
Impl 12: DA --> II, AT, ACM, Ad, MD, Ce, Au, IO, RE, SCD, CP, IA, SM, PE, DP, CM, SA	Lift: 4	Support: 0.25
Impl 13: RE --> II, AT, ACM, Ad, MD, Ce, Au, IO, DA, SCD, CP, IA, SM, PE, DP, CM, SA	Lift: 4	Support: 0.25
Impl 14: SCD --> II, AT, ACM, Ad, MD, Ce, Au, IO, DA, RE, CP, IA, SM, PE, DP, CM, SA	Lift: 4	Support: 0.25
Impl 15: CP --> II, AT, ACM, Ad, MD, Ce, Au, IO, DA, RE, SCD, IA, SM, PE, DP, CM, SA	Lift: 4	Support: 0.25
Impl 16: IA --> II, AT, ACM, Ad, MD, Ce, Au, IO, DA, RE, SCD, CP, SM, PE, DP, CM, SA	Lift: 4	Support: 0.25
Impl 17: SM --> II, AT, ACM, Ad, MD, Ce, Au, IO, DA, RE, SCD, CP, IA, PE, DP, CM, SA	Lift: 4	Support: 0.25
Impl 18: PE --> II, AT, ACM, Ad, MD, Ce, Au, IO, DA, RE, SCD, CP, IA, SM, DP, CM, SA	Lift: 4	Support: 0.25
Impl 19: DP --> II, AT, ACM, Ad, MD, Ce, Au, IO, DA, RE, SCD, CP, IA, SM, PE, CM, SA	Lift: 4	Support: 0.25
Impl 20: CM --> II, AT, ACM, Ad, MD, Ce, Au, IO, DA, RE, SCD, CP, IA, SM, PE, DP, SA	Lift: 4	Support: 0.25
Impl 21: SA --> II, AT, ACM, Ad, MD, Ce, Au, IO, DA, RE, SCD, CP, IA, SM, PE, DP, CM	Lift: 4	Support: 0.25
Impl 22: PP --> S, BP, SMP, C, UDS, NA	Lift: 4	Support: 0.25
Impl 23: S --> PP, BP, SMP, C, UDS, NA	Lift: 4	Support: 0.25
Impl 24: BP --> PP, S, SMP, C, UDS, NA	Lift: 4	Support: 0.25
Impl 25: SMP --> PP, S, BP, C, UDS, NA	Lift: 4	Support: 0.25
Impl 26: C --> PP, S, BP, SMP, UDS, NA	Lift: 4	Support: 0.25
Impl 27: UDS --> PP, S, BP, SMP, C, NA	Lift: 4	Support: 0.25
Impl 28: NA --> PP, S, BP, SMP, C, UDS	Lift: 4	Support: 0.25
Impl 29: SSN --> DOB, SN, MAC, OTP, PIP	Lift: 4	Support: 0.25
Impl 30: DOB --> SSN, SN, MAC, OTP, PIP	Lift: 4	Support: 0.25
Impl 31: SN --> SSN, DOB, MAC, OTP, PIP	Lift: 4	Support: 0.25
Impl 32: MAC --> SSN, DOB, SN, OTP, PIP	Lift: 4	Support: 0.25
Impl 33: OTP --> SSN, DOB, SN, MAC, PIP	Lift: 4	Support: 0.25
Impl 34: PIP --> SSN, DOB, SN, MAC, OTP	Lift: 4	Support: 0.25

Figure 6. Total 35 Implications with their intent and extend inter-relationships

4.4. Multi valued inter-relationship: execution of second stage of associated affecting factors implicated attribute metrics

The third stage considered eight effecting factors such as Used-Tools (UT), Risk-Plans (RP), Failure-Recovery (FR), Risk-Alerts (RA), Data-Secure-Policies (DSP), Management-Assurance (MA), Awareness (Aw) and Skilled-Staff (SS) along with their six correlated attribute matrices such as Vulnerability Identification (VI), Thread Identification (TI), Asset Identification (AI), Control Identification (CI), Risk Identification (RI) and Prevention Identification (PI) as shown in Table 6. All these supporting third stage effecting factors are formed and generated from the risk-estimation effecting factor, which is one of second stage effecting factor. In this stage, the fuzzy set values 0, 1 are considered for specifying the inter-relationships among the attribute matrices as shown in Table 7. In this stage, inter-relational lattices and nodes are generated based on the fuzzy set values by using the Add-Intent mechanism. This stage is experimented the test case tables by observing more than fifty thousand Vulnerabilities along with concern tread identification family.

Table 6. Multi valued inter-relationship: Binary form of representation of second stage software reusability effecting factors represented as row-wise and attribute metrics as represented as column-wise

	VI	TI	AI	CI	RI	PI
Used-Tools (UT)	X			X		
Risk-Plans (RP)	X	X	X	X	X	
Failure-Recovery (FR)	X	X			X	
Risk-Alerts (RA)	X	X			X	
Data-Secure-Policies (DSP)		X	X	X	X	
Management-Assurance (MA)	X	X	X	X	X	X
Awareness (Aw)		X				
Skilled-Staff (SS)	X	X		X	X	X

Figure 7 show Binary form of representation of second stage software reusability effecting factors and attribute metrics retrieved from Table 6. That Figure 8 show Lattice of Inner-relationships of binary form of AOCPOSET representation of second stage affecting factors and total extends and intends, and Lattice of Inner-relationships of binary form of AOCPOSET representation of second stage affecting factors and total extends and intends with help of “LaViz Choosing-Best-Arranged-Position Method” can see in Figure 9.

Table 7. Fuzz form of representation: Second stage software reusability effecting factors and attribute metrics

	VI	TI	AI	CI	RI	PI
Used-Tools (UT)	1	0	0	0	0	0
Risk-Plans (RP)	1	1	1	1	1	0
Failure-Recovery (FR)	1	1	0	0	1	0
Risk-Alerts (RA)	1	1	0	0	1	0
Data-Secure-Policies (DSP)	0	1	1	1	1	0
Management-Assurance (MA)	1	0	1	1	1	1
Awareness (Aw)	0	1	0	0	0	0
Skilled-Staff (SS)	1	1	0	1	1	1

	VI	TI	AI	CI	RI	PI
UsedTools	X			X		
RiskPlans	X	X	X	X	X	
FailureRecov	X	X			X	
RiskAlerts	X	X			X	
DataSecPol		X	X	X	X	
ManAss	X	X	X	X	X	X
Awareness		X				
SkilledStaff	X	X		X	X	X

Figure 7. Binary form of representation of second stage software reusability effecting factors and attribute metrics retrieved from Table 6

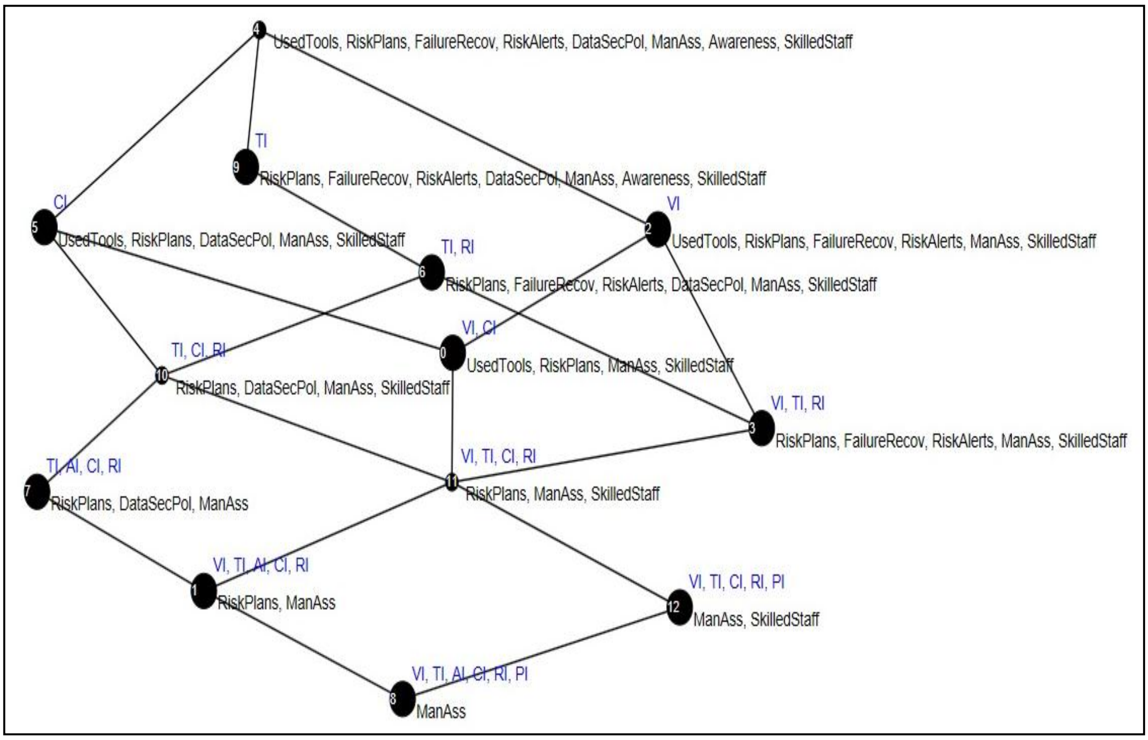
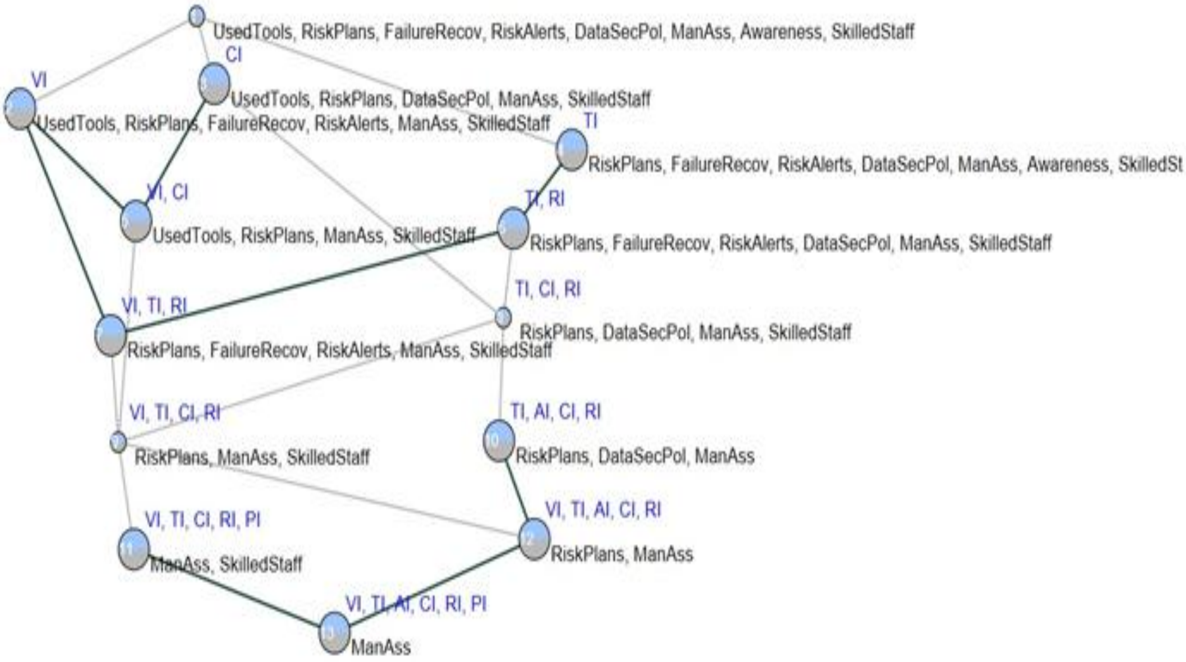


Figure 8. Lattice of Inner-relationships of binary form of AOCPOSET representation of second stage affecting factors and total extends and intends



All concepts of AOC poset:

2 - **Extent:** UsedTools, RiskPlans, FailureRecov, RiskAlerts, ManAss, SkilledStaff , **Intent:** VI	Support: 6	Stability: 0.375
3 - **Extent:** UsedTools, RiskPlans, DataSecPol, ManAss, SkilledStaff , **Intent:** CI	Support: 5	Stability: 0.25
4 - **Extent:** RiskPlans, FailureRecov, RiskAlerts, DataSecPol, ManAss, Awareness, SkilledStaff , **Intent:** TI	Support: 7	Stability: 0.5
5 - **Extent:** UsedTools, RiskPlans, ManAss, SkilledStaff , **Intent:** VI, CI	Support: 4	Stability: 0.5
6 - **Extent:** RiskPlans, FailureRecov, RiskAlerts, DataSecPol, ManAss, SkilledStaff , **Intent:** TI, RI	Support: 6	Stability: 0.375
7 - **Extent:** RiskPlans, FailureRecov, RiskAlerts, ManAss, SkilledStaff , **Intent:** VI, TI, RI	Support: 5	Stability: 0.75
10 - **Extent:** RiskPlans, DataSecPol, ManAss , **Intent:** TI, AI, CI, RI	Support: 3	Stability: 0.5
11 - **Extent:** ManAss, SkilledStaff , **Intent:** VI, TI, CI, RI, PI	Support: 2	Stability: 0.5
12 - **Extent:** RiskPlans, ManAss , **Intent:** VI, TI, AI, CI, RI	Support: 2	Stability: 0.5
13 - **Extent:** ManAss , **Intent:** VI, TI, AI, CI, RI, PI	Support: 1	Stability: 0.5

Figure 9. Lattice of Inner-relationships of binary form of AOCPOSET representation of second stage affecting factors and total extends and intends with help of “LaViz Choosing-Best-Arranged-Position Method”

5. CONCLUSION

The software developers have to choose the best components which are self adaptive future to overcome the functional errors, framework mismatches, violation of user level privacy issues and data leakage feasibilities. By selecting the most suitable software components whose overall software quality is good in terms of software compatibility, security and privacy.This paper has proposing the neural based fuzzy framework based approach to estimate the reusable components which are directly and indirectly involve the security and privacy to improve the quality of the software system. This approach has considered the twenty effecting factors and fifty three attribute matrices. It has formed with three stages of execution scenarios. This analytical finding proposes a fuzzy logic model to evaluate the most feasible effecting factors that influence the enterprise data security practices at real time environment. This approach is proposing the new ideological scenario and it more helpful for the software code writers for building high authenticated software applications. This research helps to fulfil the gap by investigating the concern supporting effecting factors for reusing the software components for building the software applications with high end securable and privacy parameters for avoiding uncertainties while the data is in storage, accessible and executable modes.

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