Clustered Evaluation of Implementing Fuzziness and Uncertainty in Deception Detection with the Randomness Bridge for the Teenager Communication System

S.Rajkumar, V.Narayani

Abstract:-In the recent era of computer electronic communication we are currently facing the critical impact of Deception which plays its vital role in the mode of affecting efficient information sharing system. Identifying Deception in any mode of communication is a tedious process without using the proper tool for detecting those vulnerabilities. This paper deals with the efficient tools of Deception detection in which combined application implementation is our main focus rather than with its individuality. We propose a research model which comprises Fuzzy logic, Uncertainty and Randomization. This paper deals with an experiment which implements the scenario of mixture application with its revealed results. We also discuss the combined approach rather than with its individual performance.

Keywords: Deception, Detection, Uncertainty, Fuzzy logic, Randomness

I. INTRODUCTION

Detection of Deception is a multi disciplinary process which consumes several soft computing strategies such as Fuzzylogic,Uncertainty and Mathematical randomness which ensures the effective communication syndromes [1].

A. Identifying the Deception

Deception detection between relational partners is extremely difficult, unless a partner tells a blatant or obvious lie or contradicts something the other partner knows to be true [2].

B. Fuzzy logic

Fuzzy sets have movable boundaries, *i.e.*, the elements of such sets not only represent true or false values but also represent the degree of truth or degree of falseness for each input[8]. Fuzzy logic is the part of artificial intelligence or machine learning which interprets a human's actions[3]. Computers can interpret only true or false values but a human being can reason the degree of truth or degree of falseness. Fuzzy models interpret the human actions and are also called intelligent systems [4]

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The reasoning in fuzzy logic is similar to human reasoning[9]. It allows for approximate values and inferences as well as incomplete or ambiguous data (fuzzy data) as opposed to only relying on crisp data (binary yes/no choices)[10]. Fuzzy logic is able to process incomplete data and provide approximate solutions to problems other methods find difficult to solve[11]. Terminology used in fuzzy logic not used in other methods are: very high, increasing, somewhat decreased, reasonable and very low[12]

C. Uncertainty Theory

Uncertainty must be taken in a sense radically distinct from the familiar notion of risk, from which it has never been properly separated. Although the terms are used in various ways among the general public, many specialists in decision theory, statistics and other quantitative fields have defined uncertainty, risk, and their measurement [5].

Uncertainty:

The lack of certainty, A state of having limited knowledge where it is impossible to exactly describe the existing state, a future outcome, or more than one possible outcome.

Measurement of Uncertainty:

A set of possible states or outcomes where probabilities are assigned to each possible state or outcome – this also includes the application of a probability density function to continuous variables

Risk:

A state of uncertainty where some possible outcomes have an undesired effect or significant loss.

Measurement of Risk:

A set of measured uncertainties where some possible outcomes are losses, and the magnitudes of those losses – this also includes loss functions over continuous variables.

D. Randomness

The Dictionary of Oxford defines 'random' as "Having no definite aim or purpose; not sent or guided in a particular direction; made, done, occurring, etc., without method or conscious choice; haphazard." This concept of randomness suggests a non-order or non-coherence in a sequence of steps or symbols, such that there is no intelligible pattern or combination [6].

E. Tools Comparison Analysis

Fuzzy logic and probability are different ways of expressing uncertainty. While both fuzzy logic and probability theory can be used to represent subjective belief, fuzzy set theory uses the concept of fuzzy set membership (i.e., how much a variable is in a set), and probability theory

uses the concept of subjective probability (i.e., how probable do we think that a variable is in a set). While this distinction is mostly philosophical, the fuzzy-logic-derived possibility measure is inherently different from the probability measure, hence they are not directly equivalent.However,any statisticians are persuaded by the work of Bruno de Finetti that only one kind of mathematical uncertainty is needed and thus fuzzy logic is unnecessary. On the other hand, Bart Kosko argues that probability is a sub theory of fuzzy logic, as probability only handles one kind of uncertainty. He also claims to have proven a derivation of Bayes' theorem from the concept of fuzzy subset hood. Lotfi Zadeh argues that fuzzy logic is different in character from probability, and is not a replacement for it. He fuzzified probability to fuzzy probability and also generalized it to what is called possibility theory [7].

II. RESEARCH DESIGN MODEL

The proposed model for the Teenagers deception detection is represented in Fig-1 as follows,

A. Proposed Model

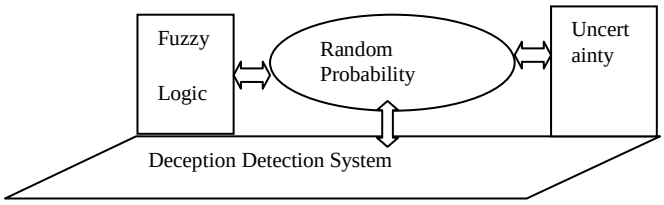

Fig. 1:Proposed Model

Our proposed model Fuzziness evaluation and Uncertainty evaluation with underlying Randomness approach for the computation and evaluation of Teenagers communication system.

III. RESEARCH METHODOLOGY

The implementation of Fuzziness, Uncertainty and Randomness towards the Teenagers communication system is as follows,

A. Fuzziness Approach Evaluation

The fuzzy membership values concurrent with the deception components are provided in Table 1.

Table I: Membership Value Assignments

Factor-X	**Membership Value $\mu_i(x)$**
School/College Phobia/Bullying	0.900-.999
Social Phobia	0.800-0.899
Learning Disabilities	0.700-0.799
Homework's/Assignments/Tests	0.600-0.699
Sports	0.500-0.599
Getting Desired Things from Parents/Friends	0.400-0.499
Self Enchantment	0.300-0.399
Selfish behaviour(Punishments)	0.200-0.299
Extreme Anxiety	0.100-0.199
Exaggeration/Lazy	0.000-0.099

$$\text{Fuzzified Deception Rate - F} = \sum_{i=1}^{10} \mu i(X)/10 \qquad (1)$$

The Fuzzy Deception rate percentage can be calculated as follows

$$\text{FDP} = F/0.549 * 100\ \% \qquad (2)$$

B. Uncertainty Evaluation

The Uncertainty evaluation for the behavioural analysis of Teenagers is represented by the rate UE_i based on the number of disbelief negative aspects as follows,

- Target Environment- Belief/Disbelief = 0.1
- Gestural actions-Belief/Disbelief =0.2
- Medical Symptoms. Belief/Disbelief =0.3
- Divergent response. Belief/Disbelief =0.4
- Abnormal answers. Belief/Disbelief =0.5
- Repeated Answers. Belief/Disbelief =0.6
- Guilty Knowledge. Belief/Disbelief =0.7
- Confession. Belief/Disbelief = 0.8
- Explicitness Belief/Disbelief =0.9
- Argument-Belief/Disbelief =0.99

$$\text{Uncertainty DeceptionRate UE} = \sum_{i=1}^{10} UE_i(X)/10 \qquad (3)$$

The Uncertainty Deception rate Percentage can be calculated as follows,

$$\text{UDP} = UE/0.549 * 100\ \% \qquad (4)$$

C. Randomness Evaluation

The direct approach for evaluating randomness strategy of behavioural responses towards our Teenagers are represented by associating the probableness to the deceptive components by assigning the probability values are represented in Table-2.

Table II: Randomness Evaluation

Components	**Probability-Pi(X)**
Reasons are Medical Symptoms	0.1
Explicit Intentional Hiding/Diversion	0.2
Signs does not support Symptoms	0.3
More Exaggeration	0.4
Verbal DD-Repeated Answers	0.5
Facial Gestures/Body Signs-Contradict	0.6
Nonverbal Mode DD	0.7

Exhibit Fear/Nervousness	0.8
YES/NO Questionnaire	0.9
Contradictory Results	0.99

$$\text{Randomness Deception Rate } R = \sum_{i=1}^{10} Pi(X)/10 \quad (5)$$

The Randomness Deception rate Percentage can be calculated as follows

$$RDP = R / 0.549 * 100\ \% \quad (6)$$

The Final deception detection based on the Fuzziness, Uncertainty and Randomness approach are converged with the maximum rate of deception occur in an Teenagers communication.

$$\text{Deception Detection Rate } Z=\text{Max}(F,UE,R) \quad (7)$$

IV. EXPERTIMENT AND RESULTS

A. Sample Space

Collecting the Teenagers from the classes IX,X,XI and XII from each class of age group 16 to 19 and college students of age group 19 to 22 from abcd higher secondary school and abcd institute of technology- Tirunelveli District Tamilnadu State India. Observation and analysis is done on the subjects for a week.

B. Problem: Selection Strategies

They were selected based upon the leaves, they availed for various reasons. Selected subject's Parents were told about their participation for research work. Children aged between 16-22 years were taken as subjects, since the age groups between 3-5 years are innocent to deliberately exploit their activities, and 6-15 years are semi matured enough to hide the lies, and to manage themselves by telling the repeated answers for a same set of questions .

A total of 105 students were taken for the study out of which 15 students of each age group 16,17,18,19,20,21 and 22 are represented as A-16-S1 to A-16-S15,A-17-S1 to A-17-S15,A-18-S1 to A-18-S15,A-19-S1 to A-19-S15,A-20-S1 to A-20-S15,A-21-S1 to A-21-S15 and A-22-S1 to A-22-S15 respectively and the evaluation are based on the Fuzzy, Uncertainty and Randomness calculations as mentioned in Table-1,Uncertainty evaluation and Table-2 allocation strategies and the values are represented in Table-3.

Table III: Fuzzy, Uncertainty & Random Evaluation

Subject	Fuzziness Value	Uncertainty Value	Randomness Value
A-16-S1	0.12	0.14	0.45
A-16-S2	0.1	0.06	0.36
A-16-S3	0.03	0.09	0.36
A-16-S4	0.13	0.21	0.45
A-16-S5	0.19	0.1	0.45
A-16-S6	0.14	0.06	0.36
A-16-S7	0.15	0.03	0.45
A-16-S8	0.1	0.1	0.45
A-16-S9	0.18	0.12	0.36
A-16-S10	0.1	0.06	0.45
A-16-S11	0.17	0.36	0.06
A-16-S12	0.06	0.45	0.15
A-16-S13	0.03	0.36	0.23
A-16-S14	0.45	0.15	0.24
A-16-S15	0.45	0.14	0.17
A-17-S1	0.45	0.03	0.06
A-17-S2	0.36	0.14	0.15
A-17-S3	0.45	0.09	0.03
A-17-S4	0.36	0.06	0.03
A-17-S5	0.1	0.36	0.15
A-17-S6	0.09	0.45	0.14
A-17-S7	0.03	0.36	0.17
A-17-S8	0.06	0.36	0.1
A-17-S9	0.1	0.09	0.45
A-17-S10	0.03	0.15	0.36
A-17-S11	0.06	0.21	0.549
A-17-S12	0.19	0.17	0.36
A-17-S13	0.15	0.14	0.45
A-17-S14	0.1	0.13	0.36
A-17-S15	0.06	0.19	0.45
A-18-S1	0.36	0.03	0.06
A-18-S2	0.45	0.09	0.03
A-18-S3	0.36	0.1	0.21
A-18-S4	0.36	0.06	0.1
A-18-S5	0.45	0.21	0.15
A-18-S6	0.09	0.36	0.09
A-18-S7	0.06	0.45	0.06
A-18-S8	0.1	0.45	0.1
A-18-S9	0.15	0.45	0.14
A-18-S10	0.21	0.45	0.17
A-18-S11	0.19	0.36	0.19
A-18-S12	0.15	0.03	0.36
A-18-S13	0.06	0.09	0.549
A-18-S14	0.1	0.15	0.45
A-18-S15	0.21	0.15	0.45
A-19-S1	0.36	0.15	0.06
A-19-S2	0.36	0.1	0.09
A-19-S3	0.45	0.21	0.1
A-19-S4	0.45	0.19	0.03
A-19-S5	0.1	0.36	0.17
A-19-S6	0.15	0.36	0.19
A-19-S7	0.14	0.36	0.21
A-19-S8	0.19	0.45	0.06
A-19-S9	0.06	0.45	0.03
A-19-S10	0.09	0.36	0.15
A-19-S11	0.21	0.36	0.1
A-19-S12	0.03	0.549	0.15
A-19-S13	0.21	0.14	0.45
A-19-S14	0.19	0.17	0.45
A-19-S15	0.15	0.21	0.45
A-20-S1	0.36	0.15	0.21
A-20-S2	0.36	0.1	0.06
A-20-S3	0.45	0.09	0.09
A-20-S4	0.36	0.21	0.15
A-20-S5	0.45	0.06	0.1
A-20-S6	0.45	0.03	0.03
A-20-S7	0.36	0.19	0.15
A-20-S8	0.549	0.21	0.14
A-20-S9	0.45	0.21	0.17
A-20-S10	0.15	0.36	0.19
A-20-S11	0.1	0.45	0.21
A-20-S12	0.21	0.36	0.09
A-20-S13	0.15	0.36	0.06
A-20-S14	0.09	0.03	0.36
A-20-S15	0.06	0.15	0.36

A-21-S1	0.36	0.21	0.06
A-21-S2	0.45	0.06	0.03
A-21-S3	0.36	0.03	0.21
A-21-S4	0.36	0.09	0.15
A-21-S5	0.36	0.15	0.14
A-21-S6	0.36	0.1	0.17
A-21-S7	0.45	0.09	0.03
A-21-S8	0.549	0.06	0.19
A-21-S9	0.45	0.03	0.15
A-21-S10	0.549	0.21	0.1
A-21-S11	0.09	0.36	0.1
A-21-S12	0.06	0.45	0.15
A-21-S13	0.03	0.36	0.21
A-21-S14	0.09	0.1	0.36
A-21-S15	0.15	0.21	0.36
A-22-S1	0.36	0.15	0.15
A-22-S2	0.36	0.14	0.1
A-22-S3	0.36	0.17	0.14
A-22-S4	0.45	0.19	0.17
A-22-S5	0.36	0.1	0.19
A-22-S6	0.45	0.15	0.21
A-22-S7	0.549	0.06	0.14
A-22-S8	0.45	0.09	0.06
A-22-S9	0.549	0.14	0.09
A-22-S10	0.36	0.21	0.15
A-22-S11	0.549	0.15	0.17
A-22-S12	0.36	0.1	0.1
A-22-S13	0.17	0.45	0.21
A-22-S14	0.15	0.36	0.15
A-22-S15	0.1	0.15	0.45

Now computing the Deception detection rate for the collection of 105 subjects based on the formula equation (5) ,we obtained the Z values and the corresponding Identification tool is represented in Table-4 as follows,

Table IV: Deception Detection Rate Computations

Subject	**Maximum Value-Z**	**Identifying Tool**
A-16-S1	0.45	Randomness
A-16-S2	0.36	Randomness
A-16-S3	0.36	Randomness
A-16-S4	0.45	Randomness
A-16-S5	0.45	Randomness
A-16-S6	0.36	Randomness
A-16-S7	0.45	Randomness
A-16-S8	0.45	Randomness
A-16-S9	0.36	Randomness
A-16-S10	0.45	Randomness
A-16-S11	0.36	Uncertainty
A-16-S12	0.45	Uncertainty
A-16-S13	0.36	Uncertainty
A-16-S14	0.45	Fuzziness
A-16-S15	0.45	Fuzziness
A-17-S1	0.45	Fuzziness
A-17-S2	0.36	Fuzziness
A-17-S3	0.45	Fuzziness
A-17-S4	0.36	Fuzziness
A-17-S5	0.36	Uncertainty
A-17-S6	0.45	Uncertainty
A-17-S7	0.36	Uncertainty
A-17-S8	0.36	Uncertainty
A-17-S9	0.45	Randomness
A-17-S10	0.36	Randomness
A-17-S11	0.549	Randomness
A-17-S12	0.36	Randomness
A-17-S13	0.45	Randomness
A-17-S14	0.36	Randomness
A-17-S15	0.45	Randomness
A-18-S1	0.36	Fuzziness
A-18-S2	0.45	Fuzziness
A-18-S3	0.36	Fuzziness
A-18-S4	0.36	Fuzziness
A-18-S5	0.45	Fuzziness
A-18-S6	0.36	Uncertainty
A-18-S7	0.45	Uncertainty
A-18-S8	0.45	Uncertainty
A-18-S9	0.45	Uncertainty
A-18-S10	0.45	Uncertainty
A-18-S11	0.36	Uncertainty
A-18-S12	0.36	Randomness
A-18-S13	0.549	Randomness
A-18-S14	0.45	Randomness
A-18-S15	0.45	Randomness
A-19-S1	0.36	Fuzziness
A-19-S2	0.36	Fuzziness
A-19-S3	0.45	Fuzziness
A-19-S4	0.45	Fuzziness
A-19-S5	0.36	Uncertainty
A-19-S6	0.36	Uncertainty
A-19-S7	0.36	Uncertainty
A-19-S8	0.45	Uncertainty
A-19-S9	0.45	Uncertainty
A-19-S10	0.36	Uncertainty
A-19-S11	0.36	Uncertainty
A-19-S12	0.549	Uncertainty
A-19-S13	0.45	Randomness
A-19-S14	0.45	Randomness
A-19-S15	0.45	Randomness
A-20-S1	0.36	Fuzziness
A-20-S2	0.36	Fuzziness
A-20-S3	0.45	Fuzziness
A-20-S4	0.36	Fuzziness
A-20-S5	0.45	Fuzziness
A-20-S6	0.45	Fuzziness
A-20-S7	0.36	Fuzziness
A-20-S8	0.549	Fuzziness
A-20-S9	0.45	Fuzziness
A-20-S10	0.36	Uncertainty
A-20-S11	0.45	Uncertainty

A-20-S12	0.36	Uncertainty
A-20-S13	0.36	Uncertainty
A-20-S14	0.36	Randomness
A-20-S15	0.36	Randomness
A-21-S1	0.36	Fuzziness
A-21-S2	0.45	Fuzziness
A-21-S3	0.36	Fuzziness
A-21-S4	0.36	Fuzziness
A-21-S5	0.36	Fuzziness
A-21-S6	0.36	Fuzziness
A-21-S7	0.45	Fuzziness
A-21-S8	0.549	Fuzziness
A-21-S9	0.45	Fuzziness
A-21-S10	0.549	Fuzziness
A-21-S11	0.36	Uncertainty
A-21-S12	0.45	Uncertainty
A-21-S13	0.36	Uncertainty
A-21-S14	0.36	Randomness
A-21-S15	0.36	Randomness
A-22-S1	0.36	Fuzziness
A-22-S2	0.36	Fuzziness
A-22-S3	0.36	Fuzziness
A-22-S4	0.45	Fuzziness
A-22-S5	0.36	Fuzziness
A-22-S6	0.45	Fuzziness
A-22-S7	0.549	Fuzziness
A-22-S8	0.45	Fuzziness
A-22-S9	0.549	Fuzziness
A-22-S10	0.36	Fuzziness
A-22-S11	0.549	Fuzziness
A-22-S12	0.36	Fuzziness
A-22-S13	0.45	Uncertainty
A-22-S14	0.36	Uncertainty
A-22-S15	0.45	Randomness

V. DISCUSSION

We perform the analysis for the results of 102 subjects for the deception detection using our proposed model combined with Randomness, Uncertainty and Fuzziness, we observed the Tool impact strategies in Table-5 as follows.

Table V: Performance Analysis Table

Subject	Randomness	Uncertainty	Fuzziness
105	29	30	46

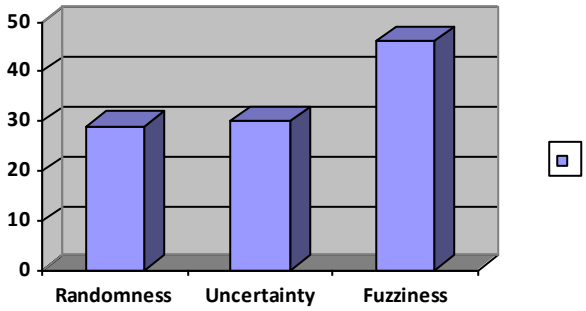

Fig. 2:Performance analysis chart

The comparison analysis discussion of teenagers communication system which will be considered for the entire age group (16 to 22) subjects with its deceptive level percentage.

The deception detection rate percentage can be computed by using the formula or equations from (2),(4) and (6) as follows

Table VI: Deception detection Analysis Table

Subject	Maximum Value-Z	%
A-17-S11	0.549	100
A-18-S13	0.549	100
A-19-S12	0.549	100
A-20-S8	0.549	100
A-21-S8	0.549	100
A-21-S10	0.549	100
A-22-S7	0.549	100
A-22-S9	0.549	100
A-22-S11	0.549	100
A-16-S1	0.45	81.96721
A-16-S4	0.45	81.96721
A-16-S5	0.45	81.96721
A-16-S7	0.45	81.96721
A-16-S8	0.45	81.96721
A-16-S10	0.45	81.96721
A-16-S12	0.45	81.96721
A-16-S14	0.45	81.96721
A-16-S15	0.45	81.96721
A-17-S1	0.45	81.96721
A-17-S3	0.45	81.96721
A-17-S6	0.45	81.96721
A-17-S9	0.45	81.96721
A-17-S13	0.45	81.96721
A-17-S15	0.45	81.96721
A-18-S2	0.45	81.96721
A-18-S5	0.45	81.96721
A-18-S7	0.45	81.96721
A-18-S8	0.45	81.96721
A-18-S9	0.45	81.96721

A-18-S10	0.45	81.96721
A-18-S14	0.45	81.96721
A-18-S15	0.45	81.96721
A-19-S3	0.45	81.96721
A-19-S4	0.45	81.96721
A-19-S8	0.45	81.96721
A-19-S9	0.45	81.96721
A-19-S13	0.45	81.96721
A-19-S14	0.45	81.96721
A-19-S15	0.45	81.96721
A-20-S3	0.45	81.96721
A-20-S5	0.45	81.96721
A-20-S6	0.45	81.96721
A-20-S9	0.45	81.96721
A-20-S11	0.45	81.96721
A-21-S2	0.45	81.96721
A-21-S7	0.45	81.96721
A-21-S9	0.45	81.96721
A-21-S12	0.45	81.96721
A-22-S4	0.45	81.96721
A-22-S6	0.45	81.96721
A-22-S8	0.45	81.96721
A-22-S13	0.45	81.96721
A-22-S15	0.45	81.96721
A-16-S2	0.36	65.57377
A-16-S3	0.36	65.57377
A-16-S6	0.36	65.57377
A-16-S9	0.36	65.57377
A-16-S11	0.36	65.57377
A-16-S13	0.36	65.57377
A-17-S2	0.36	65.57377
A-17-S4	0.36	65.57377
A-17-S5	0.36	65.57377
A-17-S7	0.36	65.57377
A-17-S8	0.36	65.57377
A-17-S10	0.36	65.57377
A-17-S12	0.36	65.57377
A-17-S14	0.36	65.57377
A-18-S1	0.36	65.57377
A-18-S3	0.36	65.57377
A-18-S4	0.36	65.57377
A-18-S6	0.36	65.57377
A-18-S11	0.36	65.57377
A-18-S12	0.36	65.57377
A-19-S1	0.36	65.57377
A-19-S2	0.36	65.57377
A-19-S5	0.36	65.57377
A-19-S6	0.36	65.57377
A-19-S7	0.36	65.57377
A-19-S10	0.36	65.57377
A-19-S11	0.36	65.57377
A-20-S1	0.36	65.57377
A-20-S2	0.36	65.57377
A-20-S4	0.36	65.57377
A-20-S7	0.36	65.57377
A-20-S10	0.36	65.57377
A-20-S12	0.36	65.57377
A-20-S13	0.36	65.57377
A-20-S14	0.36	65.57377
A-20-S15	0.36	65.57377
A-21-S1	0.36	65.57377
A-21-S3	0.36	65.57377
A-21-S4	0.36	65.57377
A-21-S5	0.36	65.57377
A-21-S6	0.36	65.57377
A-21-S11	0.36	65.57377
A-21-S13	0.36	65.57377
A-21-S14	0.36	65.57377
A-21-S15	0.36	65.57377
A-22-S1	0.36	65.57377
A-22-S2	0.36	65.57377
A-22-S3	0.36	65.57377
A-22-S5	0.36	65.57377
A-22-S10	0.36	65.57377
A-22-S12	0.36	65.57377
A-22-S14	0.36	65.57377

The computation percentage categorizes the subjects deception detection rate identification as Maximum level as 100 % ,Optimum level as 81 % and Average level as 65 % based on the implementation of Fuzzy logic, Uncertainty and Randomness tools. The efficiency comparison is said to be prominent only if we perform the analysis in all the possible directions towards the deception detection tools on Teenage communication system. So we discussed with the computations on Fuzzy,Unceratinty and Randomness tool implementation using feasible directions.

Now analysing the results of 102 subjects for the 100 % Maximum level deception detection rate using our proposed model combined with Randomness, Uncertainty and Fuzziness, we observed the following strategies in Table-7.

Here the Fuzzy tool is superior than the Randomness and Uncertainty tools with approximately 45 % and 55 % respectively.

Moreover the Randomness tool is efficient than Uncertainty tool with the significant percentage level of 10 % higher.

The tabulated computations are based on Table-5 and Table-6 results

Table VII: Maximum Deception Detection Analysis

Subject	Randomness	Uncertainty	Fuzziness
9	2	1	6

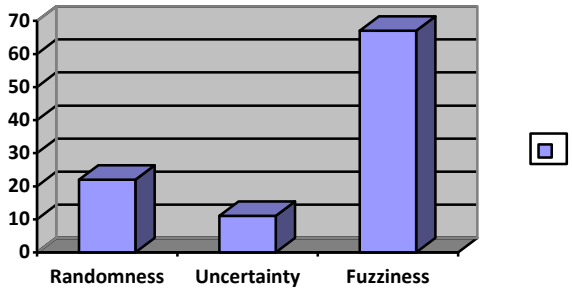

Fig. 3:Performance analysis chart for Maximum deception detection Rate Percentage

Then we analyse the results of 102 subjects for the 81 % Optimum level deception detection rate using our proposed model combined with Randomness, Uncertainty and Fuzziness, we observed the following strategies in Table-8.

Here the Fuzzy tool is superior than the Randomness and Uncertainty tools with approximately 10 % and 20 % respectively.

Moreover the Randomness tool is efficient than Uncertainty tool with the significant percentage level of 9 % higher.

The tabulated computations are based on Table-5 and Table-6 results

Table VIII: Optimum Deception Detection Analysis

Subject	Randomness	Uncertainty	Fuzziness
44	15	11	18

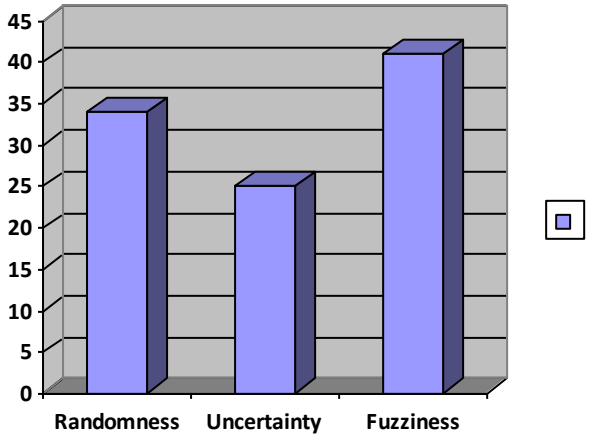

Fig. 4:Performance analysis chart for Optimum deception detection Rate Percentage

Now analysing the results of 102 subjects for the 65 % Average level deception detection rate using our proposed model combined with Randomness, Uncertainty and Fuzziness, we observed the following strategies in Table-9.

Here the Fuzzy tool is superior than the Randomness and Uncertainty tools with approximately 5 % and 20 % respectively.

Moreover the Randomness tool is efficient than Uncertainty tool with the significant percentage level of 13 % higher.

The tabulated computations are based on Table-5 and Table-6 results

Table IX: Average Deception Detection Analysis

Subject	Randomness	Uncertainty	Fuzziness
52	12	18	22

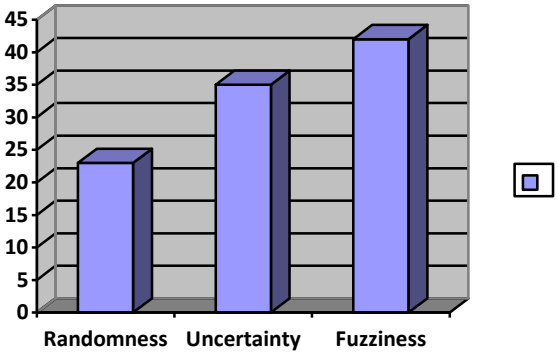

Fig. 5:Performance analysis chart for Average deception detection Rate Percentage

The general observation we obtained through the implementation of our proposed model is the Fuzziness tool is more efficient in identifying the deception detection rate towards Teenagers communication system than with the individual implementation of Uncertainty and Randomness approaches.

The Teen ager groups of different age sets are used in our experiment ,we observed that the age group of 16,17 and 18 are normally felt difficult to maintain their deceptive status whereas the age group of 19 and 20 are strong enough to argue and try to make their hypothesis as true as possible. But the age group of 21 and 22 are very clever in their approaches and they are ready to prove any fallacy as a real fact in their communication system.

The Time consumption for the age group 16,17 and 18 are lesser than with the age group of 19 and 20.But the age group 21 and 22 consumes more time to come with a conclusion such that their datum in their communication system is deceptive or actual.

VI. CONCLUSION

Deception detection for the Teenagers is a difficult process due to the higher level of energetic and spontaneous responses with various level of arguments. In the experiment domain we used a Higher secondary school system and a college system for varying the deceptions. The proposed model can be evaluated in any large sample set for the accuracy of deception detection in its deep nature.

Normal Detecting deception for the Information sharing system is now being a tedious process due to the implementation of advanced techniques. But when we implement the tools of predictability from the unpredictable strategies such as Mathematical randomization, Fuzzy logic, Uncertainty, Genetic algorithm etc, it is possible to detect the deception level with some level of efficiency.

We observed that teen age group of 16 and 17 years are easily identified for their deceptive information by using the Randomness approach of specific field selections but the age group of 18 and 19 are little bit complex and more uncertain features in their responses. The age group of 20,21 and 22 Teenagers are very clever in their speech, communication mode, gestures and providing evidences but our proposed fuzziness model identified them with correctly with a fewer level of significance.

Our proposed schema identifies 70% efficient identification system in which we accept the remaining 30 % may be or may not be with some level of significance in its accuracy. Fuzzy logic plays the vital role in identifying deceptive datum from the complex Teenage minds.

The individual application of predictable tools provide less efficiency than with the combined application In this research we identified that the individual application provides 70 % efficiency.

Identification of Deception is a vast process. Recent trends and techniques postulates to minimize the significance level in accuracy of deception detection but it never acts as a binary state model. We are trying to implement the machine learning system by classifying the modules and training the nodes with stored patterns. In future we focus on optimizing the deception detection techniques which consumes Genetic algorithmic approach to combine several approaches as a single entity.

In near future we will try to implement Deception detection techniques with the combined approach of Mathematical Randomization, Fuzzy logic, Uncertainty, Genetic algorithm and artificial intelligence to attain 100 % efficiency.

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