CHAPTER 3

DEVELOPMENT OF PERSONALIZED PROFILING SYSTEM

3.1 INTRODUCTION

This chapter discusses about research methodology, primary dataset description, statistical measures and applied data mining techniques that are used in descriptive and predictive analysis. Rule-based classification technique is used to understand the individual's innate ability (Model-1 Datasets) and their holistic characteristics (Model-2 Datasets). Using these two data models the Personalized Profiling System (PPS) is built. PPS generates the psychometric profile to describe an individual in a self-referential method.

Research methodology incorporated to bridge the gap between educational psychology and the educational technology in the virtual world is prearranged as follows:

1) Psychology data collection that are primary in nature
2) Data pre-processing
3) Data transformation using rule based mining method
4) Data modelling
5) Building a Personal Profiling System (PPS) using rule based mining

6) PPS robustness verification

7) Statistical analysis: Chi-square, Pearson inter and intra correlation and regression analysis

8) Clustering techniques k-means, DBSCAN and a newly proposed method Mean Difference Clustering Method

9) Predominant feature identification using Random Forest (RF) algorithm

10) In order to build the predictive model categorical data and numerical data sets are used in classification. In the experimental analysis, there are 11 different classifiers are trained and tested to identify an efficient classifier.

11) Multiple criteria decision making method using Analytical Hierarchy process (AHP) algorithm.

12) Finally, Framework model is proposed for an Intelligent Tutoring System (ITS) in order to provide a personalized education considering individual's thinking style, learning style, multiple intelligences and personality traits.

3.2 PSYCHOMETRIC ASSESSMENTS AND ITS GLOBAL ACCEPTANCE

In general, psychometric tests are accepted as a diagnostic tool only when it fulfils three major criterions that are, standardization, reliability and validity. Global acceptances of four psychometric theories are shown in the Table 3.1.

Table 3.1 Standardization, Reliability and Validity of Four Theories

Inventory Name	Standardization	Validity	Reliability	Number of Research Papers	Empirical Research
Thinking Style Assessment	Yes	More than 10,000 people were scanned over ten years through MRI and PET	More Stable	2	Yes
Learning Style Identification	Yes	More	Relatively Stable	More than 1500	Yes
Multiple Intelligence Identification	Yes	Lesser	Relatively Stable	More Influential in school education	MI often called as 'Pseudoscience' due to its lack of empirical research evidences
Big Five personality Assessment	Yes	Moderate	Moderately Stable	More than 2000	The BIG-Five model is acquired the status of a reference model for trait research.

3.3 SURVEY EXECUTION

A short personalized letter was sent in advance to collect the primary data. There are 16 colleges were responded positively. Free talk free on 'Principles of Learning Sciences and Psychometric Assessments' are intended for each session. In this survey, there are 29 batches were participated.For each participant psychometric test results were given based on their cognitive traits, emotional quotients, strengths and weaknesses.

3.3.1 Data Sampling and Survey Method

The targeted population of this research study is taken from undergraduate engineering students. The samples are drawn from the southern region of India, namely, Tamil Nadu, Kerala and Pondicherry. Random and convenience sampling method was adopted.

3.3.2 Sample Size

Mathematical principle, law of large numbers and the central limit theorem recommends larger sample size for the precise estimation. Hence, in this study a larger sample size is considered (n=1145).

3.3.3 Questionnaire Layout

The native language translation is also provided to support the native speakers for the effective participation. Sufficient amount of instructional page and navigation paths are provided.

3.3.4 Pilot Test

Pilot test is carried-out with the sample size of 60. Pilot test enabled to check the validity of the survey questionnaire, clarity of instructions, psychometric results, interpretations and feedback from participants etc.

3.4 DATA PRE-PROCESSING

Traditional survey method as well as e-survey methods is used in primary data collection and the e-survey. Data are collected into CSV file format. In the phase of pre-processing, the missing or incomplete data records are eliminated.Survey typology is shown in the Table 3.2.

Table 3.2 Survey Typology

	Typology of Survey	Advantages	Disadvantages
Face-to-Face	**Traditional** Use of Material – Paper based survey using 'Printed Booklets'	Time Consuming and Easy Calculation	Manual Data Entry, Expensive
	Number of samples – 845		
Computer - Assisted	**E-Survey**	Cost Effective	Additional efforts are taken in developing the software for the data collation. using JDK 1.1 - HSSF Apache POI Packages and Net Beans 7.4 IDE
	Number of samples – 300		
	Digital Questionnaire Design and Planning considerations Notepad is used for creating the questionnaire. GIFT Format is used to upload the file into LMS an open source Educational Software named Modular Object Oriented Dynamic Learning Environment (MOODLE)		

3.5 DATA MODELING

Rule based classification method is used in data modelling. The transformed data models are named as, Model-1 and Model-2. Data classification is done using four psychometric data sets namely, thinking style, learning styles, multiple intelligences, and personality types. These two data models are used in developing Personal Profiling System (PPS).

3.5.1 Model-1 Data

The classification is done based on the leading characteristics or predominant traits of the participants in each inventory. From the Chapter 1 using the Equation 1.1 μ1, μ2, μ3 and μ4 are calculated. Table 3.3 shows the

list of rules used in thinking style assessment based on the leading preferences.

Table 3.3 BD Labels and Its Interpretation

Leading Brain Dominance
Basal Left High(BLH): If (μ_1>(μ_2 and μ_3 and μ_4 and 15))
Basal Right High (BRH): If (μ_2>(μ_1 and μ_3 and μ_4 and 15))
Frontal Right High (FRH): If (μ_3>(μ_1 and μ_2 and μ_4 and 15))
Frontal Left High (FLH): If (μ_4>(μ_1 and μ_2 and μ_3 and 15))
Basal Left Low (BLL): If (μ_1>(μ_2 and μ_3 and μ_4 and <=15))
Basal Right Low (BRL): If (μ_2>(μ_1 and μ_3 and μ_4 and <=15))
Frontal Right Low (FRL): If (μ_3>(μ_1 and μ_2 and μ_4 and <=15))
Frontal Left Low (FLL): If (μ_4>(μ_1 and μ_2 and μ_3 and <=15))

Table 3.4 exhibit the classification results based on brain dominances.

Table 3.4 Brain Dominance Classification Result

CID	**BTSA SCORE**				**Brain Dominance (BD)**
	μ_1	**μ_2**	**μ_3**	**μ_4**	
C1	17	19	16	15	BRH
C10	18	17	12	18	BLH
C1000	11	9	13	7	FRH
C1005	7	11	9	13	FLH
C972	11	9	9	11	BLL

From the Table 3.4 the candidate ‘C10’ is classified as ‘BLH’.This profile description of this candidate is asfollows; disciplined and ordered nature; will follow the instructions to meet his/her deadlines; He or She is

reliable but highly dependable on the instructions of the higher authorities; He or she prefers working in a sequential order and doesn't encourage multitasking or pipelined activities; His/her working style is bureaucratic and behaves diplomatically; He/she is more interested in having an organized and detail plan or activity; He/she rely on written communication to oral communication; Finally, he/she does the assigned task systematically and accurately; The Table 3.5 indicates the result of learning style identification.

Table 3.5 Learning Style Classification Results

CID	KOLB				X	Y	LSI
	CE	RO	AC	AE	AE-RO	AC-CE	
C1	10	18	17	13	-5	7	AE
C1000	19	20	13	10	-10	-6	CE
C1002	19	12	17	15	3	-2	RO
C1005	12	14	18	18	4	6	AC

The last two columns of the Table 3.6 exhibit the Prime-1 and Prime-2 intelligences of few participants.

Table 3.6 Identification of Prime Two Intelligences

CID	MULTIPLE INTELLIGENCE								Prime-1	Prime-2
	LI	LMI	MUI	BKI	VSI	II1	II2	NI		
C1	34	37	35	25	32	34	35	36	LMI	LI
C10	34	33	38	30	28	31	37	34	MUI	LMI
C100	27	24	27	26	24	25	29	36	NI	LMI
C1000	33	33	26	31	32	33	35	26	II2	NI
C1001	36	34	33	33	32	32	32	27	LI	II2
C1003	27	29	33	28	35	32	27	34	VSI	LI
C1004	32	25	39	30	32	32	29	33	MUI	LI

C1005	30	32	31	29	32	35	30	31	II1	II2

Table 3.7 shows the set of rules, class labels and interpretations used in BIG-Five personality assessment.

Table 3.7 BIG-Five Class Labels and its Interpretation

Personality Notations and its interpretations
If (F1 < 20) then N1 is "S" else "R";
If (F2 < 20) then N2 is "C" else "L";
If (F3 < 20) then N3 is "O" else "U";
If (F4 < 20) then N4 is "A" else "E";
If (F5 < 20) then N5 is "I" else "N";

Table 3.8 shows some of the individual's personality type.

Table 3.8 BIG-Five Personality Type Classification Result

CID	**Factor**					**LABELS**					**BIG-Five**
	F1	**F2**	**F3**	**F4**	**F5**	**N1**	**N2**	**N3**	**N4**	**N5**	
C1	6	10	15	13	9	*S*	*C*	*O*	*A*	*I*	SCOAI
C10	17	23	19	28	24	*S*	*L*	*O*	*E*	*N*	SLOEN
C100	18	17	14	13	18	*S*	*C*	*O*	*A*	*I*	SCOAI
C1000	24	26	8	17	26	*R*	*L*	*O*	*A*	*N*	RLOAN
C1001	16	16	12	12	24	*S*	*C*	*O*	*A*	*N*	SCOAN
C1002	16	23	24	20	21	*S*	*L*	*U*	*E*	*N*	SLUEN

The big five score for the participant *C1*is *(6, 10, 15, 13, 9)* which gives a personality notation *SCOAI.*The *SCOAI*personality describe, in

general, as: ‘Social’, ‘Calm’, ‘Orderly’, ‘Accommodating’, ’Inquisitive’. On the basis of personality analysis, participant*C1*is strongly *‘Social’.*

3.5.2 Model-2 Data

The classification is done based on the competency level and holistic characteristics of an each individual. From the Chapter 1 using the Equation (1.1) μ1, μ2, μ3 and μ4 are calculated. Table 3.9 discusses about the various labels involved in the brain dominance analysis.

Table 3.9 Classes Used in Brain Dominance Analysis

Labels and Interpretations
WBD: Whole Brain Dominance is when the high score (>15) is found in all the four quadrants of the brain
TBD:Triple Brain Dominance is when the high score (>15) is found in any of the three quadrants. For instance, *T1:* (BL, BR and FR) *T2:* (BR, FR and FL) *T3:* (FR, FL and BL) *T4:* (FL, BL and BR)
DBD: Double Brain Dominance is when the high score (>15) is found in any of the two quadrants. For instance, *DB:* Double Basal (BL and BR), DF: Double Frontal (FR and FL) *DR:* Double Right (BR and FR), DL: Double Left (BL and FL)
SBD: Single Brain Dominance is when the high score (>15) is found in any one of the quadrant. *BL:* Basal Left, *BR:* Basal Right, *FR:* Frontal Right, *FL:* Frontal Left
BPBD: Better than Poor Brain Dominance is identified with the score value is less than 15 and greater than 10 in all the quadrants.
PBD: Poor Brain Dominance is identified with the score value less than 10 in all the quadrants.
FBD: Falsified Brain Dominance is classifies the quadrants having high score are treated as Falsified Brain Dominance (BR and FL) and (BL and FR).

There are 16 different classes are used in the brain dominance analysis.Katherine Benziger stated that worldwide 5% of people only possess WBD. In this study also, results are found in align with the statement.The percentage of WBD shows only 4.4% of the samples.Table 3.10 shows the set of rules used in classification.

Table 3.10 Brain Dominance Analysis Class Labels and its Interpretation

Labels and Scores µ-Original Score for Each Brain Quadrant
Single Brain Dominance (SBD)
BL: If (($\mu_1 > \mu_2$ and μ_3 and μ_4) and ($\mu_1 \geq 15$)); *BR:* If (µ2>µ1 and µ3 and µ4 and (µ2 ≥ 15)); *FR:* If (µ3>µ1 and µ2 and µ4 and (µ3 ≥ 15)); *FL:* If (µ4>µ1 and µ2 and µ3 and (µ4 ≥ 15))
Double Brain Dominance (DBD)
DB: If ((µ1 and µ2)> (µ3 and µ4) and (µ1 and µ2) ≥ 15); *DR:* If ((µ2 and µ3)> (µ1 and µ4) and (µ2 and µ3) ≥ 15); *DF:* If ((µ3 and µ4)> (µ1 and µ2) and (µ3 and µ4) ≥ 15); *DL:* If ((µ1 and µ4) > (µ2 and µ3) and (µ1 and µ4) ≥ 15)
Triple Brain Dominance (TBD)
T1: If (µ1 and µ2 and µ3) ≥ 15; *T2:* If (µ2 and µ3 and µ4) ≥ 15; *T3:* If (µ3 and µ4 and µ1) ≥ 15; *T4:* If (µ1 and µ2 and µ4) ≥ 15
Whole Brain Dominance (WBD)
WBD: If the individual modes namely µ1 and µ2 and µ3 and µ4 are more than (≥) 15
Falsified Brain Dominance (FBD)
FBD: If ((µ1 and µ3) or (µ2 and µ4)) ≥15
Better than Poor Brain Dominance (BPBD)
BPBD: If ((μ_1 and μ_2 and μ_3 and μ_4) > =15 and < 10)
Otherwise Poor Brain Dominance (PBD)

The Table 3.11 displays some of the scores of participants on the 16 types of brain dominances out of the total samples (n = 1145).

Table 3.11 BTSA Scores and Labels

Sl. No.	Candidate ID	BTSA SCORE				LABELS
		μ_1	μ_2	μ_3	μ_4	
1	C1054	16	4	11	9	BL
2	C103	11	15	15	7	BPBD
3	C1037	3	16	9	12	BR
4	C146	19	16	7	13	DB
5	C230	14	13	17	17	DF
6	C166	16	13	8	17	DL
7	C101	14	16	16	14	DR
8	C363	12	16	11	18	FBD
9	C523	13	13	14	17	FL
10	C1026	7	8	17	8	FR
11	C1009	7	11	13	9	PBD
12	C1	17	19	16	15	T1
13	C138	13	16	17	15	T2
14	C126	19	14	15	16	T3
15	C10	18	17	12	18	T4
16	C127	17	18	19	17	WBD

The participant ‘C127’ belongs to Whole Brain Dominance (WBD).For this candidate, noticeably all the four modes µ1, µ2, µ3 and µ4 scores are more than ‘15’. These personalities are capable to excel in any field as well as they possess leadership quality and be able to manage larger size of projects and manpower likewise, the participant ‘C1009’ belongs to PBD and noticeably all the four modes having scores less than ‘15’. Poor Brain

Dominance (PBD) personalities are prone to have 'Prolonged Adaptation Stress Syndrome (PASS)' when they handle challenging tasks.

Table 3.12 shows the set of rules, labels and its interpretations used in the multiple intelligence analysis. Humans have different types of dominant intelligences, and each individual's ability is based on different combinations of intelligences in certain levels. The higher the competency level is associated with the M1 and the lower level is got by M5. Out of eight intelligences, M6 is mixed with the extremely well performed and extremely poor performed intelligences.

Table 3.12 Class Labels Used in MI Analysis

Class Labels	Set of Rules	Interpretation
Note: *The labelling priority starts from M1 to M6. At the end of every label creation records are filtered and the next label follows with the remaining records.*		
M1	If the scores of all the eight intelligences are above 30	Highly Advanced
M2	If the scores of all the eight intelligences are above 25	Advanced
M3	If the scores of all the eight intelligences are above 20	Moderately Advanced
M4	If the scores of all the eight intelligences are above 15	Slightly Advanced
M6	If the scores of any five intelligences are above 15	Poor Level
M5	Otherwise	Mixed Level

Table 3.13 shows the results of "MI" classification results.

Table 3.13 Multiple Intelligences Classification Result

CID	Multiple Intelligences								MI
	LI	LMI	MUI	BKI	VSI	II1	II2	NI	
C133	38	38	39	36	38	37	40	36	M1
C10	34	33	38	30	28	31	37	34	M2
C108	24	24	25	31	27	23	31	25	M3
C127	32	20	39	22	25	30	26	32	M4
C468	26	15	23	24	32	25	25	22	M5
C134	15	20	22	21	21	19	19	18	M6

Understanding about individual's leading intelligence in the learning environment provides the direction to exemplify the skills of an individual' as well as provide the avenue to understand about the lack/grey area of an individual. For instance, the participant 'C127' is tending towards 'Linguistic Intelligence-(LI)' and 'Musical Intelligence-MUI'. Table 3.14 shows the classes/labels and its interpretations used in BIG-Five analysis.

Table 3.14 Labels Used in BIG-Five Classification

P1: SCOA	**P2:** RCOAI	**P3:** SCOAN	**P4:** SCO	**P5:** COA	**P6:** OAI	**P7:** SC
P8: CO	**P9:** OA	**P10:** AI	**P11:** SI	**P12:** RI	**P13:** S	**P14:** LUEN

Table 3.15 shows the results of "BIG-Five" classification. P1 to p14 indicates the better to worsen personality type.

Table 3.15 BIG-Five Personality Type Classification Result

CID	Factor					LABELS					Personality Type	BIG-Five
	F1	F2	F3	F4	F5	F1	F2	F3	F4	F5		
C100	18	17	14	13	18	*S*	*C*	*O*	*A*	*I*	SCOAI	P1
C1002	16	23	24	20	21	*S*	*L*	*U*	*E*	*N*	SLUEN	P13
C1003	8	13	16	12	23	*S*	*C*	*O*	*A*	*N*	SCOAN	P3
C1004	18	23	16	18	16	*S*	*L*	*O*	*A*	*I*	SLOAI	P6
C1005	11	25	15	15	25	*S*	*L*	*O*	*A*	*N*	SLOAN	P9

Learners those who belong to the categories P1, P2, P6, P10, P11, P12 are ‘Ambitious and Creative’ whereas, the categories P7, P13, P14 are ‘Gregarious and Impulsive’. The remaining is ‘Dim and Egotistical’ attitude. Several empirical researches are shown that individuals’ personality, attitudes and beliefs are more strongly associated with school performances and test scores.

3.6 DATASET DESCRIPTION

Table 3.16 shows the primary data sets and transformed data namely Model-1 and Model-2. These two sets are used in developing the PPS. Using four psychometric inventories, 48 different labels are obtained using rule based data classification technique and it is named as Model-1 dataset. This dataset signifies individual’s innate tendencies.

Subsequently, in Model-2 dataset 40 different labels are obtained using rule based data classification technique. Model-2 dataset signifies individual’s competency level and holistic characteristics.

Table 3.16 Dataset Description

Primary Dataset																				
CID	**Thinking Style**				**Learning Style**				**Multiple Intelligences**								**Big-Five Factors**				
	μ_1	**μ_2**	**μ_3**	**μ_4**	**CE**	**RO**	**AC**	**AE**	**LI**	**LMI**	**MUI**	**BKI**	**VI**	**II1**	**II2**	**NI**	**F1**	**F2**	**F3**	**F4**	**F5**
C1	17	19	16	15	10	18	17	13	34	37	35	25	32	34	35	36	6	10	15	13	9
C10	18	17	12	18	13	22	15	15	34	33	38	30	28	31	37	34	17	23	19	28	24
C100	17	17	17	13	15	17	15	14	27	24	27	26	24	25	29	36	18	17	14	13	18
C1000	11	9	13	7	19	20	13	10	33	33	26	31	32	33	35	26	24	26	8	17	26
C1001	12	8	13	7	13	17	14	18	36	34	33	33	32	32	32	27	16	16	12	12	24

Model-1 Dataset					
CID	**Leading Brain Dominance**	**Learning Style Preferences**	**First Leading Intelligence**	**Second Leading Intelligence**	**Big-Five Elements**
C1	BR	AE	LMI	LI	SCOAI
C10	BL	AE	MI	LMI	SLOEN
C100	BL	AE	NI	LMI	SCOAI
C1000	FR	CE	II2	NI	RLOAN
C1001	FR	AE	LI	II2	SCOAN

Model-2 Dataset			
CID	**Brain Dominance Type**	**Multiple Intelligence Competency Level**	**BIG-Five Personality Labels**
C1	T1	M2	P1
C10	DB	M2	P13
C100	T1	M3	P1
C1000	PBD	M2	P9
C1001	PBD	M2	P3

3.7 DESCRIPTIVE STATISTICAL ANALYSIS

Statistics is a mathematical study used in data collection, transformation, analysis, interpretation and presentation of the data. Data transcribing is a process of transferring the data into Software Package for the Social Sciences (SPSS v20) for the data analysis. Dual test is done based on the decision rule that is, obtained chi-square value is compared with the Chi-

square table value and in parallel with the p-value. If the obtained value is less than the significance level 0.05 then the null hypothesis gets rejected.

Decision Rule: If $\chi^2_{Obtained\ value} > \chi^2_{Table\ value}$ or $_{\alpha,}\ \rho$ – value < α, the null hypothesis is rejected. Where α is level of significance, which can be 1%, 5% or 10%. In this research study 5% (0.05) is considered in testing all hypotheses as a level of significance.

3.7.1 Chi-Square Analysis on Model-1 Data

In this study, Chi-square statistical measure is done across all the relationship analysis. The list of variables used in Model-1 data classification is shown in the Table 3.17.

Table 3.17 List of Dependent and Independent Variables Used inModel -1 Dataset

Independent Variable	Dependent Variable
Brain Dominance (BD)	BL, BR, FR, FL
Learning Style Inventory (LSI)	RO, CE, AC, AE
Multiple Intelligence (MI)	LI, LMI, MUI, BKI, VI, II1, II2, NI
Big Five Personality (BIG-Five)	F1, F2, F3, F4, F5

3.7.2 Consolidated Results Of Chi-Square Test For Model -1 Data

Table 3.18 shows the consolidated Chi-Square analysis results. Outcome results are shown the significance association is seen only between the bi-models (BD, MI, Prime-II), (BD, BIG-Five) and (LSI, BIG-Five) in Model-1 dataset.

Table 3.18 Consolidated Results of Chi-Square Test

	LSI	MI, Prime – I	MI, Prime – II	BIG-Five
BD	0.042	0.368	0.031	0.001
	LSI	0.172	0.088	0.003
			MI, PRIME – I	0.062
			MI, PRIME – II	0.189

3.7.3 Chi-Square Analysis on Model-2 Data

The list of variables used in Model-2 data classification is shown in the Table 3.19.

Table 3.19 List of Dependent and Independent Variables Model -2 Dataset

Independent Variable	Dependent Variable
Brain Dominance (BD)	BL, BR, FR, FL, DB, DR, DL, DF, T1, T2, T3, T4, WBD, PBD, BPBD, FBD
Learning Style Inventory (LSI)	RO, CE, AC, AE
Multiple Intelligence (MI)	M1, M2, M3, M4, M5, M6
Big Five Personality (BIG-Five)	P1, P2, P3, P4, P5, P6, P7, P8, P9 P10, P11, P12, P13, 114,

3.7.4 Consolidated Results of Chi-Square Test for Model -2 Data

Table 3.20 shows the consolidated Chi-Square analysis of Model-2 dataset.Chi-square analysis is carried out using cross tabulation. Outcome results are shown that, the significance association between the bi-models (BD, LSI), (BD, MI) and (BDI, BIG-Five) in Model-2 dataset.

Table 3.20 Consolidated Results of Chi-Square Test

Chi-Square Test	LSI	MI	BIG5
BD	0.534	0.000	0.000
	LSI	0.848	0.019
		MI	0.789

Outcome results of chi-square statistical analyses are shown that, no significance association between the bi-models (BD and LSI), (LSI and MI), (MI and BIG-Five) in Model-2 dataset.

3.7.5 Pearson Coefficient Intra Class Analysis

Strength of intra-classrelationship is predicted with the significant level 0.05 and 0.01 (2-tailed).

1. No correlation among four variables of brain dominance analysis such as, μ_1, μ_2, μ_3 and μ_4.
2. The highest correlation is found between (RO, AC) and the medium correlation is found between (AC, AE) among the variables of learning style identification.
3. No correlation among eight variables of multiple intelligence analysis such as, LI, LMI, MUI, BKI, VI, II1, II2 and NI.
4. No correlation among five variables of big five personality analysis such as, F1, F2, F3, F4 and F5.

3.7.6 Inter Correlation Analysis within Model-1 Data

Strength of inter-class relationship is predicted with the significant levels 0.05 and 0.01 (2-tailed). The inter-correlation analyses between BD and

LSI the correlation measure shown positive.The remaining all other analysesare shown no significance among the paired categories, it is neither p <0.01 nor p <0.05.

- The inter-correlation analysis between BD and MI indicate there is no significance.
- The inter-correlation analysis between BD and BIG-Five are shown low correlation.
- The inter-correlation analysis between LSI and MI are shown no significance.
- The inter-correlation analysis between LSI and BIG-Five are shown no significance.
- The inter-correlation analysis between MI and BIG-Five are shown no significance.

3.7.7 Regression Analysis

Regression analysis is used to predict the relationship between dependent and independent variables. Table 3.21 shows the positive influential factors between the dependent variables of big five and learning styles.

Table 3.21 Positive Influential Factors - BIG-Five v/s Learning Styles

Learning Style Preferences	Characteristics	BIG-Five Factor Positive Relation
AC	Thinking is dominant	F3: Conscientiousness and F5: Openness to Experience
RO	Watching is dominant	F2: Neuroticism, F3: Conscientiousness and F4: Agreeableness
CE	Feeling is dominant	F1: Extroversion and F4: Agreeableness
AE	Doing is dominant	F1: Extroversion

Since this research, administer four different inventories, understanding the inter relationship is essential. Chi-Square analyses are to examine the dependencies and Pearson correlation analyses are to examine the strength of association and direction of the association is carried out. In this chapter quantitative inferences are presented. In the Model-2 data analysis, between the paired variables (BD and MI) dependency is observed. Henceforth, these two theories are considered in clustering and classification algorithms. Regression analysis is used in relationship analysis between learning style and big five personality.

3.8 QUALITATIVE INTERPRETATION OF MODEL-1 & MODEL-2 DATASET

Qualitative researchgenerates a self referential profileusing Model-1 and Model-2 datasets. The data that is obtained is streamlined to describe about an individual.

Table 3.22 shows the Model-1 dataset consists of five attributes such as, Brain Dominance (BD), Learning Style Identification (LSI), First Prime Intelligence of MI (MI-I), Second Prime Intelligence of MI (MI-II) and Big Five Personality Types (BIG-Five) respectively. This dataset is formed on the basis of rule based classification method in order to identify the innate traits of participants.

Table 3.22 Model-1 Dataset for Qualitative Interpretation

Candidate ID	BD	LSI	Prime-I	Prime-II	BIG-Five
C10	BL	AE	MUI	LMI	SLOEN
C1000	FR	CE	II2	NI	RLOAN
C1002	FR	RO	II1	LI	SLUEN
C105	BL	CE	LMI	MUI	RLUEN

The Personal Profiling System (PPS) is developed using qualitative interpretations. The qualitative interpretations of few samples are discussed as follows:

For instance '*Candidate - C1*' possesses:

Basal Right (BR) means that highly feeling cantered, respects traditional values, ethical, seeks harmony and more intuitive

*Active Experimentation (AE)*signifies active in doing experimentations and seeks for evident learning

Logical-Mathematical Intelligence (LMI) suggests that the First Prime Intelligence (MI-I)

Linguistic Intelligence (LI) means that the Second Prime Intelligence (MI-II):

*SCOAI*signifies five attitudes per se Social (S), Emotionally Calm (C), Orderliness (O), Accommodative (A) and Inquisitive (I). In general this type of personality is more appreciated by both family and in professional life. This type of personality seems to be harmonious within themselves in all the circumstances. Tend to accept the challenges.

'Candidate –C105' possesses:

Basal Left (BL) signifies that this candidate would like to be precise and consistent in all his/her duties, orderly nature, seek for more details, not ready to accept frequent changes, accepts routine work.

*Concrete Experiencing (CE)*means that this individual seeks for concrete evidences to learn things, like demonstrations and simulations, with less imaginative powers.

Logical-Mathematical Intelligence (LMI) prominently displays in First Prime Intelligence (MI-I)

Musical Intelligence (MUI) signifies about musical knowledge, easy able to grasp verbal phonetics quickly (MI-II):

*RLUEN***:** displays five attitudes, Reserved (R), Emotional Imbalanced (L), Unorganized (U), Egocentric (E) and Non-Curious (N). In general this personality type is more intricate to understand both family and official life. This type of personality seems to be dissonant within themselves in all the circumstances. He/she is not ready to accept the challenges.

Table 3.23 indicates the Model-2 dataset with four attributes such as Brain Dominance (BD), Learning Style Identification (LSI), Multiple Intelligence (MI) and Big Five Personality Types (BIG-Five) respectively. This dataset is formed using rule based classification method. In this model, holistic characteristicsare considered.

Table 3.23 Model-2 Dataset for Qualitative Interpretation

Candidate ID	BD	LSI	MI	BIG-Five
C1	T1	AE	M2	P1
C10	DB	AE	M2	P13
C1000	PBD	CE	M2	P9
C1002	PBD	RO	M3	P13
C105	BL	CE	M3	P14

The qualitative interpretations of few samples are discussed as follows:

For instance ‘Candidate - C1’ possesses:

Triple Brain Dominance(BL, BR and FR) **(T1)** signifies triple brain mode dominances, ease to work with any type of work, able to achieve efficiently whatever he/she has to do, competent, open to admit something, willingness to do

Active Experimentation (AE)means that he/she is active in doing experimentations and seeks for evident learning

Advanced (M2) signifies proficient, talented and gifted in all the eight intelligences

*SCOA (P1)*signifies four elements per se Social (S), Emotionally Calm (C), Orderliness (O), and Accommodative. In general this personality type is more appreciated by both family and official life. This type of personality seems to be harmonious within themselves in all the circumstances. Tend to accept the challenges.

'Candidate – C105' possesses:

Single Brain Dominance (BL) signifies single brain mode dominances, difficult to work with additional type of work except their routine work, afraid of taking up challenges, lesser competent, resistant to admit new things and dynamic activities.

*Concrete Experiencing (CE)*means that seeks for concrete evidences to learn things, like demonstrations and simulations, reduced imaginative power.

Moderately Advanced (M3) signifies inadequate in all the eight intelligences.

LUEN (P14) signifies four attitudes par Emotional Imbalanced (L), Unorganized (U), Egocentric (E) and Non-Curious (N). In general this personality type is more intricate to understand both family and official life.

This type of personality seems to be dissonant within themselves in all the circumstances. He/she is not ready to accept the challenges.

The above inferences are obtained through observational, experiential and qualitative outcome. Personal interrogation is carried out with more than 600 candidates among the sample of n=1145 in order to develop PPS through observations.

3.9 SUMMARY

Rudimentary analysis is necessary to understand about the temperament, abilities and characteristics of the learners. There are 84 class labels are used in PPS. The complete profile of the candidate is generated based on psychometric assessment. Sensitive analysis also carried out in order to understand the consistency and validity of PPS.