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Research Papers

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EVALUATION OF GENOTYPES AGAINST MAIZE STEM BORER (*CHILO PARTELLUS* SWINHOE) IN KHARIF SEASON

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ABSTRACT
Twenty five genotypes were screened for verifying susceptibility to stem borer (Chilo partellus) infesting under natural field condition during Kharif season 2010-11 in research farm of Birsa Agricultural University, Ranchi, Jharkhand. KDMH017, X88557, X88691, KMH218+, JH31285 (IR), MUKHYA108, EC3160, KH717, KH9452, VMH4060 had minimum leaf injury level (1.0-2.0). The five genotypes viz. KMH3426, JH31292, SAPUNCH171, VEH09-2, JH31242 showed leaf injury level of 2.0-3.0. Altogether 15 genotypes were found to be in the least susceptible category and rest ten was grouped into the moderately susceptible category which showed mean leaf injury score above 3.0 per plant.

Keywords: Genotypes and Stem borer (Chilo partellus)

I. INTRODUCTION
Zea mays L., a cereal crop of Gramineae family is referred to as the "Queen of Cereal" due to its inherent high genetic yield potentials and can be cultivated widely in all Agro-ecological zones of arid, semi-arid, temperate and tropical regions of the world (*Ferdu et al*., 2002). It can be grown in all the season in India, but *Kharif* (monsoon) is the main growing season in Northern India. Maize grain contains about 10 percent protein, 4 percent oil, 70 percent carbohydrates, 2-3 per cent crude fiber, 10.4 percent albuminoides, 1.4 percent ash. Its protein "ZEIN" is deficient in two essential amino acids, tryptophan and lysine. It also contains significant quantities of vitamin E calcium and phosphorus. It can be used for manufacturing starch, alcohol, acetic acid, lactic acid, syrup, vinegar, resin powder, fuel for torpedoes, artificial leather, boot polish etc. the green cob is roasted and consumed by the people with great interest. Maize grains are milled into broken grits for making grovel for human consumption (Singh *et al.,* 2006). Chaudhary (1983) reported that maize is used as raw material in the paper, textile, laundry, refining and food industries (sweetening of candies, ice-creams or bakery products) and chemical industries. He also mentioned that maize oil contains vitamins, is used in pharmacy and has a hypocholestermic effect in man and animals. The intending input of maize is high nutritive potential food for human being utilization (UN, 2000). The maize crop is popularly grown in following states in India viz., Andhra Pradesh, Bihar, Madhya Pradesh, Maharashtra, Karnataka, Punjab, Rajasthan, and West Bengal. The Karnataka, state occupies an area of 9.60 lakh ha with the annual production of about 27.20 lakh tonnes and an average productivity of 2833 kg /ha in maize cultivation (Anonymous, 2009). In Jharkhand, maize is grown in about 1.86 lakh ha. with a production of 2.69 million tonnes and productivity of 1.45 ton/ha, which is again nearly 13.2 per cent less than the national average (Shabnam, 2009). *Chilo partellus* (Swinhoe) is a major pest of maize and sorghum and also infests other crops like sugarcane, millets and paddy. Yield loss due to this pest is about of 26.7 to 80.4 per cent in different agro-climatic regions of India (Chatterji *et al.,* 1969, Singh and Kanta 2006). During *Kharif* season the pest maize stem borer is widespread. This pest infests the plant at all stages (Pradhan, 1969). According to Bhanukiran and Panwar, (2000) the maize stem borer (*Chilo partellus* Swin.) is a key pest and able to cause losses between 24.3 and 36.3 % in different agro-climatic regions of India. The insecticides have residual effects and insect pests may develop resistance against certain insecticides due to indiscriminate use of insecticides (Raynolds, 1970). The technology regarding maize germplasm resistant to insect pests can be the economical, more productive and free from any environmental pollution and other biohazards as in case of pesticides.

II. MATERIALS AND METHODS
The experiment was conducted on maize crop at research farm BAU, Kanke, Ranchi during *Kharif* 2010-11. Twenty-five genotypes were taken viz. KDMH017, X88557, X88691, KMH218+, KMH3426, JH31292, JH31285(1R), NMH803, MUKHYA108, SAPUNCH171, HKH313, VEH09-2, MCH42, BL2802, EC3160, EH1858, JH31242, KH717, KH9452, KMH3712, MCH37, VMH4060, HM8, HM9 and Suwan which was the entry as a control. All the genotypes were grown uniformly with proper agronomical practices and special attention was given to keep the plots free from insecticidal contamination. The crop was grown in *Kharif* seasons in the year 2010 and 2011 with a randomized block design (RBD). Each genotype replicated twice and each replication divided into three rows. Row length, row to row and plant to plant distances were kept at 5.0m, 0.75m, and 0.25m respectively. The observations, concerning with the number of healthy as well as infested plants and completely dried whorls (caused by stem borer) were recorded at 2-3 leaf and 6-7 leaf stages of the

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plant in every plot. On the basis of the observations, mean per cent plant infestation was worked out. The other parameters viz., mean per cent stem tunneling, mean tunnel length and mean number of exit hole were counted by following steps: At the harvest, six randomly selected plants were uprooted from each entry, the stems were split open, the total number of exit holes on the stem due to borer were counted the entire stem, the total length of stem and tunnel length were measured. The extent and intensity of pest infestation for each genotype were determined by using following formulae.

$$\text{Percent infestation} = \frac{\text{No. of infested plants / plot}^{-1}}{\text{Total number of plants / plot}^{-1}} \times 100$$

$$\text{Percent stem tunneling} = \frac{\text{Average length of tunnel}}{\text{Average plant height}} \times 100$$

The obtained data were statistically analyzed. Finally, the maize genotypes were separated into the group of resistance / moderately susceptible / least susceptible / highly susceptible on the basis of leaf injury rating of the 1-9 scale of Sarup *et al.* (1979). The leaf injury rating was recorded at 30-35 days after sowing. The leaf injury rating scale (1-9) was used for evaluating genotypes against damage of maize stem borer. There are one to nine descriptive visual rating scales which are as follows.

Table-2.1: Leaf Injury Rating Scale

Visual rating	Description
1	Apparently healthy plant.
2	Plant showing slightest damage on leaf or few pinholes on 1-2 leaves.
3	Plant showing more pin holes or shot holes on 3-4 leaves.
4	Plants showing injury (pin holes, shot holes, slits) in about one-third of total number of leaves and mid-rib tunneling on 1-2 leaves, if any.
5	Plants showing 50% of leaf damage (pin-holes, shot-holes, slits, streaks) and mid-rib damage, if any.
6	Plants showing varied types of leaf injury in about two-third of the total number of leaves.
7	Plants with every type of leaf injury and almost all the leaves damaged.
8	The entire plant showing maximum leaf injury and likely to form dead-heart (such plants usually show stunted growth).
9	Dead-heart

III. RESULT AND DISCUSSION

Genotypes viz. KDMH017, X88557, X88691, KMH218+, JH31285 (IR), MUKHYA108, EC3160, KH717, KH9452, VMH4060 had minimum leaf injury level (1.0-2.0). The five genotypes viz. KMH3426, JH31292, SAPUNCH171, VEH09-2, JH31242 showed leaf injury level of 2.0-3.0. Altogether 15 genotypes were found to be in the least susceptible category. The remaining genotypes showed leaf injury level above 3.0 and were observed as a moderately susceptible category. Pal and Bandopadhyay (2006) also screened 14 maize germplasms against stem borer and found that 5 germplasms had no infestation of stem borer but others were either moderately susceptible or susceptible. Similar observations were also reported by Rao and Panwar, 1996; Arabjafari and Jalali, 2007 and Tafera *et al.*, 2011). The four genotypes viz. KDMH017, X88557, EC3160, VMH4060 had a mean incidence of stem borer ranging from 20 to 30 per cent whereas X88691, JH31285 (IR), KH717 and KH9452 received 30-40 per cent incidence of stem borer. The remaining 17 genotypes received more than 40 per cent mean plant infestation. The genotypes KDM017 & KH717 received 4.5 and 4.8 per cent stem tunneling respectively whereas 5-10 per cent tunneling were noted in X88557, X88691, KMH218+, KMH3426, JH31296, JH31285 (IR), MUKHYA108, SAPUNCH171, HKH313, MCH42, BL2802, EC3160, EH1858, KH9452 and HM8. The remaining 8 genotypes received more than 10 per cent stem tunneling (*Table 3.1*). These types of stem tunneling record also found by Mulye (2000). The mean number of exit hole ranged between1.75 to 6.79. The genotypes which had mean number of exit hole less than 5 were KDMH017 (1.75), X88691 (2.06), KH717 (2.06), X88557 (2.39), KMH218+ (2.39), KH9452 (2.39), EH1858 (2.39), VMH4060 (2.74), KMH3426 (3.11), JH31285 (IR) (3.11), MUKHYA108 (3.11), MCH37 (3.11), SAPUNCH171 (3.50), BL2802 (3.50), HM8 (3.50), JH31292 (3.91), MCH42 (3.91), VEH09-2 (4.79) and KMH3712 (4.79). The

remaining genotypes had more than 5 mean number of exit holes. They were EC3160 (5.26), NMH803 (5.75), HM9 (5.75), JH31242 (6.26), HKH313 (6.79) and Suwan (6.79) (*Table 3.2*). The present findings are in accordance with the findings of earlier workers (Tefera *et al.*, 2011; Uma *et al.*, 2000; Dass *et al.*, 2006).

Table 3.1: Screening of different genotypes against Chilo partellus

Sl. No.	Hybrid Name	Mean plant infestation (%)	Mean Stem tunneling (%)	Mean leaf injury score/plant
1	KDMH017	20.3 (26.78)	4.5 (12.25)	1.0
2	X88557	24.3 (29.53)	5.2 (13.18)	1.5
3	X88691	30.7 (33.65)	6.0 (14.18)	1.7
4	KMH218+	48.5 (44.14)	7.3 (15.68)	1.0
5	KMH3426	55.6 (48.22)	8.2 (16.64)	2.5
6	JH31292	53.3 (46.89)	6.1 (14.30)	2.5
7	JH31285(1R)	30.6 (33.58)	6.5 (14.77)	1.5
8	NMH803	56.2 (48.56)	12.4 (20.62)	3.5
9	MUKHYA108	51.8 (46.03)	8.6 (17.05)	2.0
10	SAPUNCH171	57.1 (49.08)	7.4 (15.79)	2.5
11	HKH313	52.8 (46.61)	9.6 (18.05)	3.5
12	VEH09-2	54.5 (47.58)	10.5 (18.91)	2.5
13	MCH42	59.2 (50.30)	8.3 (16.74)	3.5
14	BL2802	49.8 (44.89)	5.8 (13.94)	3.5
15	EC3160	21.0 (27.28)	10.0 (18.44)	1.5
16	EH1858	60.3 (50.94)	6.8 (15.12)	3.5
17	JH31242	48.7 (44.25)	11.8 (20.09)	3.0
18	KH717	31.4 (34.08)	4.8 (12.66)	1.5
19	KH9452	35.2 (36.39)	7.4 (15.79)	1.5
20	KMH3712	53.6 (47.06)	11.1 (19.46)	3.5
21	MCH37	66.2 (54.45)	14.2 (22.14)	4.0
22	VMH4060	29.3 (32.77)	10.7 (19.09)	1.5
23	HM8	62.5 (52.24)	8.7 (17.16)	3.5
24	HM9	62.8 (52.42)	11.6 (19.91)	3.5
25	Suwan	73.5 (59.02)	15.5 (23.19)	4.5
SEm(±)		3.81	1.44	-
CD (P=0.05)		11.18	4.23	-
CV (%)		12.38	12.04	-

*Figures in parentheses are the values of angular transformation.

Table-3.2: Screening of different genotypes to find out tolerant/ resistance sources against maize stem borer

Sl. No.	Hybrid Name	Mean plant height (cm)	Mean tunnel length (cm)	Mean number of exit hole
1	KDMH017	236.7	6.2	1.75 (1.5)
2	X88557	236.3	5.8	2.39 (1.7)
3	X88691	243.6	7.5	2.06 (1.6)
4	KMH218+	202.9	8.4	2.39 (1.7)
5	KMH3426	209.9	9.8	3.11 (1.9)
6	JH31292	239.5	8.7	3.91 (2.1)
7	JH31285(1R)	217.4	8.0	3.11 (1.9)
8	NMH803	198.9	14.0	5.75 (2.5)
9	MUKHYA108	217.9	9.2	3.11 (1.9)
10	SAPUNCH171	211.0	8.0	3.5 (2.0)
11	HKH313	206.4	11.3	6.79 (2.7)
12	VEH09-2	201.8	12.4	4.79 (2.3)
13	MCH42	211.5	9.7	3.91 (2.1)
14	BL2802	190.1	6.5	3.5 (2.0)
15	EC3160	185.0	11.2	5.26 (2.4)

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16	EH1858	205.0	7.8	2.39 (1.7)
17	JH31242	190.6	12.6	6.26 (2.6)
18	KH717	180.1	5.4	2.06 (1.6)
19	KH9452	177.3	8.6	2.39 (1.7)
20	KMH3712	203.7	11.9	4.79 (2.3)
21	MCH37	208.1	15.0	3.11 (1.9)
22	VMH4060	200.3	11.9	2.74 (1.8)
23	HM8	176.5	9.4	3.5 (2.0)
24	HM9	169.1	12.5	5.75 (2.5)
25	Suwan	195.0	17.5	6.79 (2.7)
	SEm(±)	13.86	0.67	0.41
	CD (P=0.05)	40.69	1.97	1.22
	CV (%)	9.58	9.49	7.17

* Figures in parentheses are the value of $\sqrt{X+0.5}$ transformation.

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HEART DISEASE DIAGNOSIS AND PREDICTION

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ABSTRACT
Cardiovascular sickness remains the greatest reason for passings worldwide and the Heart Disease Prediction toward the starting time frame is criticalness. As substantial measure of information is created in restorative associations (healing facilities, therapeutic focuses) however as this information isn't legitimately utilized. There is an abundance of concealed data introduce in the datasets. This unused information can be changed over into valuable information. For this reason we can utilize diverse information mining strategies. In this paper we discuss diverse estimation approachs of data mining that have been utilized for Heart ailment figure.[11][12] Information mining is a notable strategy utilized by wellbeing associations for characterization of infections, for example, dengue, diabetes and growth in bioinformatics examine. In the proposed approach we have utilized WEKA with 10 cross approval to assess information and analyze comes about. Weka has a wide assembling of different machine learning and information mining calculations. In this paper we have right off the bat characterized the Heart informational collection and after that looked at the changed information mining strategies in weka through Explorer, learning stream and Experimenter interfaces. Besides keeping in mind the end goal to approve our approach we have utilized a Heart dataset with 303 examples no of qualities 76 and utilized 14 ascribes to decide the forecast of sickness and their exactness utilizing characterizations of various calculations to discover the best execution. The essential objective of this paper is to describe data and help the customers in removing significant information from data and easily perceive a fitting figuring for exact judicious model from it. From the revelations of this paper time taken to construct the model in 0.01 seconds in Naïve Bayes and time taken to assemble the model in 0.19 seconds in SMO.The Naïve bayes and SMO are the best execution counts for requested exactness since they achieved most noteworthy accuracy= 100% with 84 precisely gathered cases, most extraordinary ROC = 0.904 , had smallest mean inside and out bungle and it required slightest speculation for building this model through Explorer and Knowledge stream comes about.

Keywords: Weka; Heart disease prediction; Data mining; Classification

I. INTRODUCTION
"Data Mining is a non-irrelevant extraction of obvious, in advance dark and potential important information about data". Essentially, it is a strategy of examining data from substitute perspective and amassing the gaining from it. The discovered learning can be used for different applications for example restorative administrations industry. Nowadays social protection industry makes considerable measure of data about patients, infection examination et cetera. Data mining gives a game plan of frameworks to discover disguised cases from data. An imperative test facing Healthcare industry is nature of organization. Nature of organization proposes diagnosing affliction precisely and gives suitable solutions to patients. Poor finding can provoke stunning results which are unsuitable. [10][11][12]

According to survey of WHO, 17 million total overall passings are a direct result of heart ambushes and strokes.[10][11] The passings due to coronary ailment in various countries happen due to work over-load, mental weight and various distinctive issues. As a rule it is found as fundamental reason for death in adults. Examination is jumbled and basic errand that ought to be executed accurately and successfully. The conclusion is frequently made, in light of pro's understanding and data. This prompts unwanted results and extreme restorative costs of meds provided for patients

II. HEART DISEASE
The heart is important organ of human body part. It is nothing more than a pump, which pumps blood through the body. If circulation of blood in body is inefficient the organs like brain suffer and if heart stops working altogether, death occurs within minutes. Life is completely dependent on efficient working of the heart. The term Heart disease refers to disease of heart & blood vessel system within it. A number of factors have been shown that increases the risk of Heart disease.[10][11]

- Family history
- Smoking
- Poor diet
- High blood pressure

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• High blood cholesterol

• Obesity

• Physical inactivity

• Hyper tension

Variables like these are utilized to break down the Heart malady. As a rule, analysis is for the most part in view of patient's present test outcomes and specialist's involvement. In this way the determination is a mind boggling undertaking that requires much experience and high aptitude. [13]

[3][4][7]Weka remains for Waikato Environment for Knowledge Analysis created at the college of Waikato in New Zealand and was executed in 1997 the product unreservedly accessible at http://www.waikato.ac.nz/ml/weka and written in java dialect. There are a few unique levels at which weka can be utilized. Weka contains modules for information characterization and precision to foresee infections. Weka has been utilized as a part of bioinformatics for findings and examination of coronary illness datasets. Weka has 49 apparatuses for preparing, 76 calculations for order and relapse, 8 calculations for grouping, and 3 calculations for discovering affiliation rules. Weka calculations are appropriate for producing prescient model precisely by removing valuable data from heart dataset through WEKA. Aside from weka scientists are presently moving towards distributed computing for sickness forecasts. It additionally offers offices, for example, grouping and investigation of tremendous datasets. The fundamental focal point of this paper is coronary illness expectation utilizing weka information mining apparatus and its utilization for order in the field of therapeutic bioinformatics. It right off the bat groups dataset and after that figures out which calculation performs best for analysis and forecast of coronary illness. From the discoveries of the trials directed it was uncovered that Naïve Bayes and SMO are the best calculations.

III. LITERATURE SURVEY

Different examinations have been done that have base on investigation of coronary sickness. [10][11]They have associated unmistakable data burrowing systems for conclusion and achieved assorted probabilities for different methods. An Intelligent Heart Disease Prediction System (IHDPS) is made by using data mining strategies Naive Bayes, Neural Network, and Decision Trees was proposed by Sellappan Palaniappan et al .[3]. Each system has its own quality to get legitimate results. To gather this structure disguised illustrations and association between them is used. It is on the web, straightforward and expandable. The desire for Heart affliction, Blood Pressure and Sugar with the guide of neural frameworks was proposed by Niti Guru et al. [13]. The dataset contains records with 13 properties in each record. The managed frameworks i.e. Neural Network with back inducing count is used for getting ready and testing of data The issue of perceiving obliged association rules for coronary disease estimate was considered by means of Carlos Ordonez [16]. The resultant dataset contains records of patients having coronary disease. Franck Le Duff et al. [9] develops a decision tree with database of patient for a remedial issue. Latha Parthiban et al. [10] foreseen an approach on preface of coactive neuro-fleecy derivation system (CANFIS) for gauge of coronary ailment. The CANFIS show uses neural framework limits with the soft basis and innate estimation. Kiyong Noh et al. [14] uses a portrayal methodology for the extraction of multiparametric incorporates by assessing HRV (Heart Rate Variability) from ECG, data pre-getting ready and coronary ailment outline. The dataset involving 670 social orders, appropriated into two get-togethers, to be particular ordinary people and patients with coronary sickness, were used to finish the trial for the agreeable classifier.

IV. PROPOSED PREDICTION SYSTEM

Today, various specialist's offices direct therapeutic administrations data using social protection information system; as the structure contains goliath measure of data, used to expel covered information for making shrewd remedial conclusion. The standard objective of this examination is to develop Intelligent Heart Disease Prediction System that gives finish of coronary ailment using recorded heart database. To develop this system, restorative terms, for instance, sex, circulatory strain, and cholesterol like 14 input characteristics are used. To get additionally fitting results, two more attributes i.e. bulkiness and smoking are used, as these characteristics are considered as fundamental properties for coronary disease. The data mining request strategies viz. SMO, REPTree, J48 and Naive Bayes are used.

V. DATA SOURCE

The publicly available heart disease database is used. The Cleveland Heart Disease database [11] consists of 303 records. The data set consists of 3 types of attributes: Input attribute which are listed below.[10]

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Attribute Information

% -- Only 14 used

% -- 1. #3 (age)

% -- 2. #4 (sex)

% -- 3. #9 (cp)

% -- 4. #10 (trestbps)

% -- 5. #12 (chol)

% -- 6. #16 (fbs)

% -- 7. #19 (restecg)

% -- 8. #32 (thalach)

% -- 9. #38 (exang)

% -- 10. #40 (oldpeak)

% -- 11. #41 (slope)

% -- 12. #44 (ca)

% -- 13. #51 (thal)

% -- 14. #58 (num) (the predicted attribute)

Input attributes

@relation cleveland-14-heart-disease

@attribute 'age' real

@attribute 'sex' { female, male}

@attribute 'cp' { typ_angina, asympt, non_anginal, atyp_angina}

@attribute 'trestbps' real

@attribute 'chol' real

@attribute 'fbs' { t, f}

@attribute 'restecg' { left_vent_hyper, normal, st_t_wave_abnormality}

@attribute 'thalach' real

@attribute 'exang' { no, yes}

@attribute 'oldpeak' real

@attribute 'slope' { up, flat, down}

@attribute 'ca' real

@attribute 'thal' { fixed_defect, normal, reversable_defect}

@attribute 'num' { '<50', '>50_1', '>50_2', '>50_3', '>50_4'}

"Detail input attributes"

VI. METHODOLOGY

With a particular ultimate objective to finish experimentations and executions [2][4][7]Weka was used as the data mining gadget. [12][13]Weka (Waikato Environment for Knowledge Analysis) is a data mining instrument written in java made at Waikato. WEKA is a better than average data burrowing mechanical assembly for the customers to bunch the exactness in light of datasets by applying differing algorithmic techniques and took a gander at in the field of bioinformatics. Voyager, Experimenter and Knowledge stream are the interface available in WEKA that has been used by us. In this paper we have used these data mining techniques to envision the survivability of coronary sickness through request of different computations precision.

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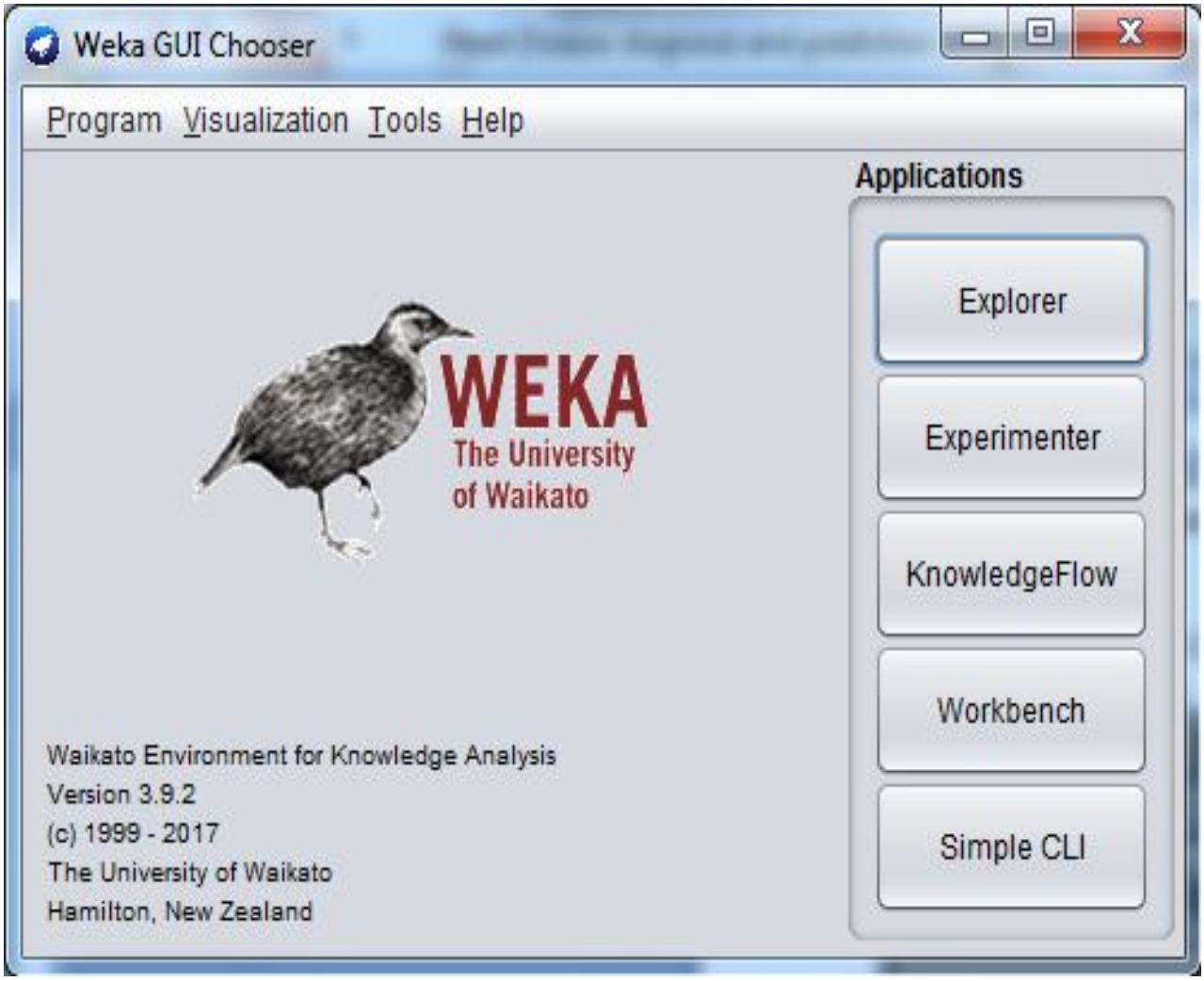
Envisions the interface of WEKA Data mining instrument. It has four applications:[12][13]

(1) Explorer: The explorer [2][4][7] interface has a couple of sheets like preprocess, organize, gathering, relate, select quality and picture. In any case, in this interface our central spotlight is on the Classification Panel

(2) Experimenter: This interface offers office to exact examination of different figurings on start of given datasets. Each figuring pursues 10 times and that the accuracy uncovered

(3) Knowledge Flow: It is a differentiating choice to the pioneer interface. The principle qualification among this and others is that here customer picks Weka section from toolbar and interfaces them to make a configuration for running the figurings

(4) Simple CLI: Simple CLI infers summon line interface. Customer performs exercises through a request line interface by offering bearings to the working system.



"Figure -1 Screenshot of Weka GUI Application"

Arrangement In information mining instruments grouping manages recognizing the issue by watching attributes of ailments among patients and analyze or foresee which calculation indicates best execution based on WEKA's measurable yield Table 1 demonstrates the WEKA information mining systems that have been utilized as a part of this paper alongside different requirements like informational index organize and so on by utilizing diverse calculations.[11][12]

Software	Datasets	Weka Data Mining Technique	Classification Algorithms	Operating System	Dataset File Format	Purpose
Weka	Clevelan d	Explorer Experimenter	Naïve Bayes J48 SMO REPTree	Windows 7	ARFF	Classificatio n

"Table-2: Different types of Weka Data Mining Techniques"

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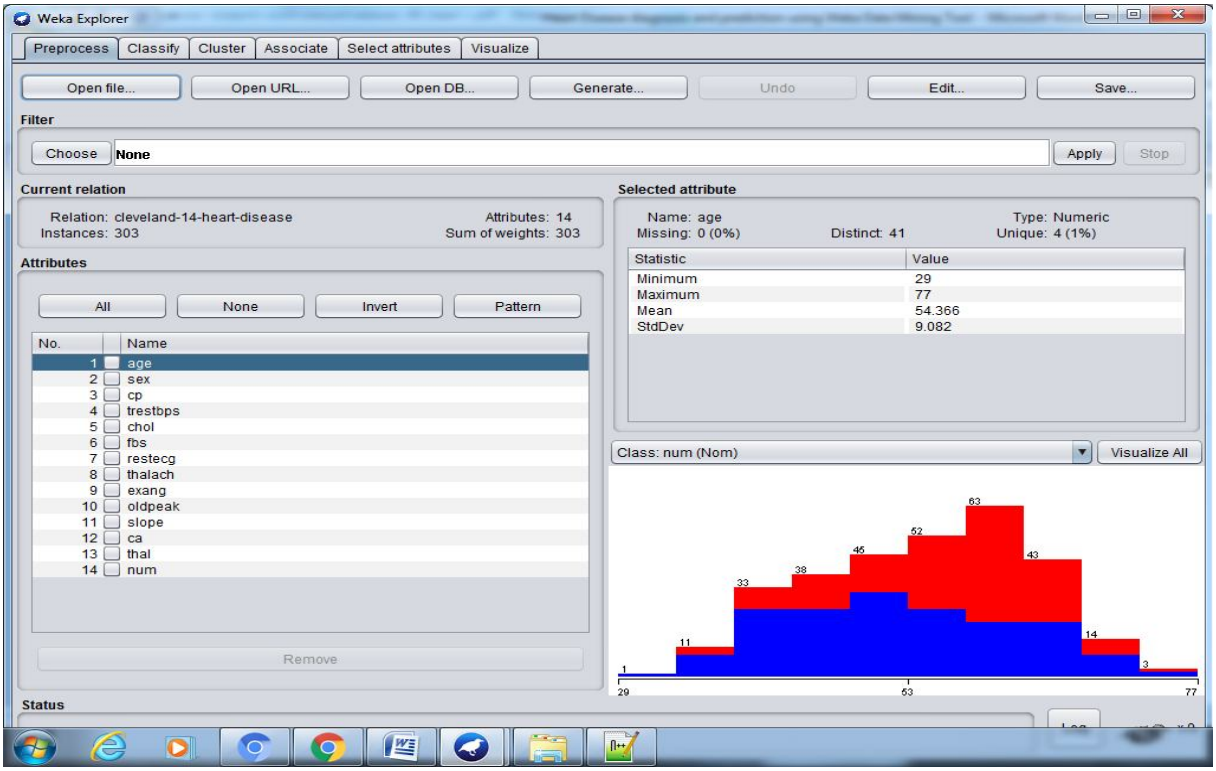
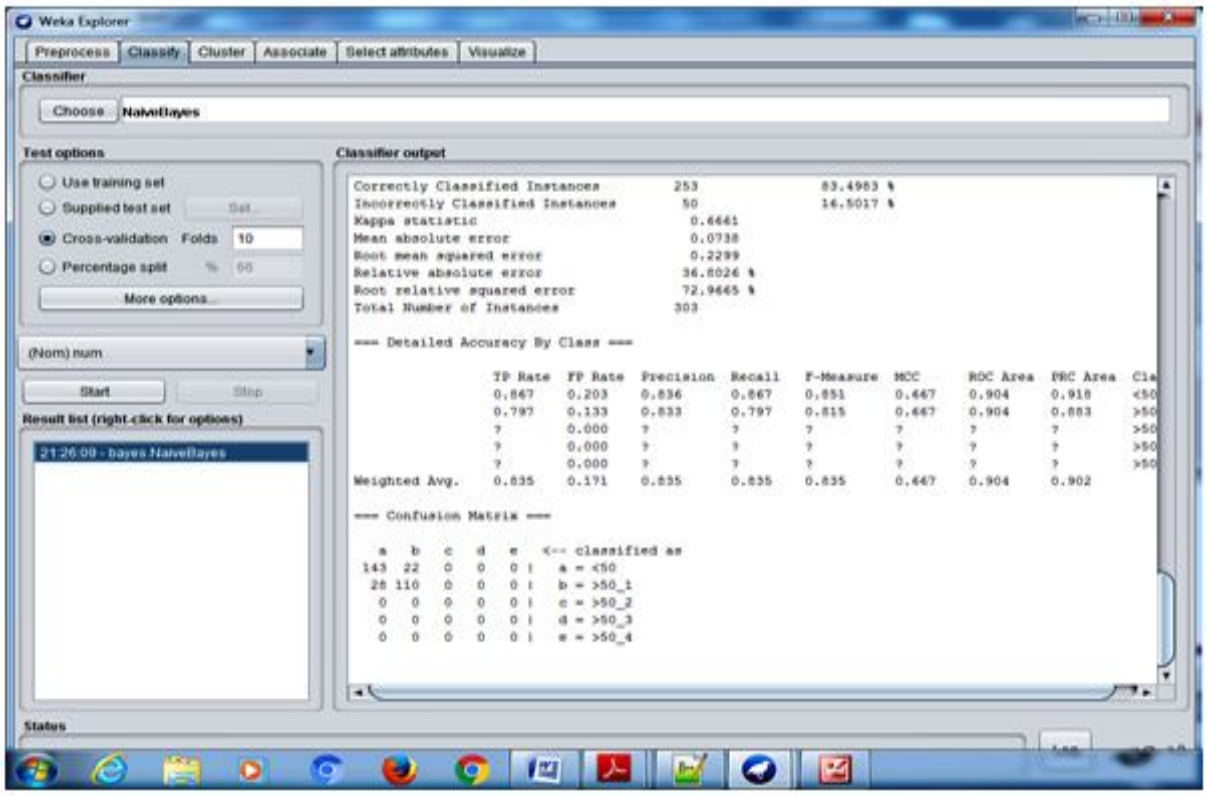


"Figure-2: Screenshot View for Dataset Loading"

1. NAIVE BAYES

Bayes [1] is one of the figuring's that capacities as a probabilistic classifier of all characteristics contained in data test only and after that gatherings data issues. Running the counts using Naïve Bayes we separate the classifier yield with such an expansive number of estimations based yield by using 10 cross endorsement to make a desire for every event of the dataset.16 After running these computations we achieved a portrayal precision of 83.49% for 253 precisely requested events, botch rates achieved i.e. Mean Absolute Error is 0.0738, time taken for building model is 0.1 seconds and ROC zone is 0.904 these yields are gotten after these estimations are run.



"Figure-3 Screenshot view for Naïve Bayes Algorithm"

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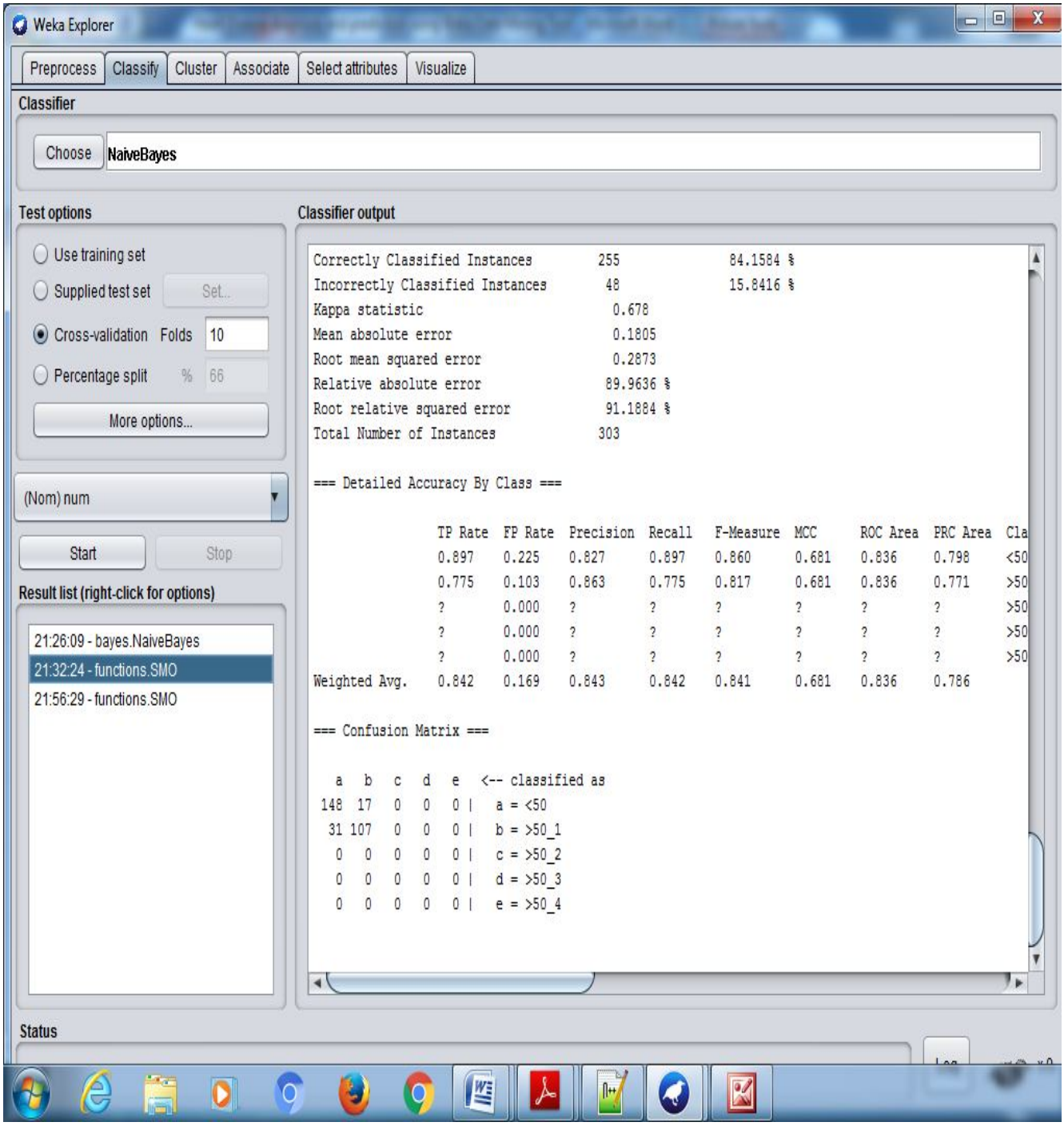
2. SMO

SMO is one of the methodologies used for gathering. In this paper we have used this figuring to part the data in light of dataset. Running this estimation we explored the classifier yield with different estimations in light of yield by using 10 cross endorsement to make a desire for each instance of dataset. Figure 4 shows the course of action precision of 84%, goof rates that is mean aggregate oversight got is 0.1805, time taken to collect show is 0.19 seconds and ROC region is 0.836 that is gotten subsequent to running these calculations.



"Figure-4 Screenshot view SMO Algorithm"

3. J48

J48 has been used as a piece of this paper to pick the target regard in light of various credits of dataset to predict machine learning model and organize their accuracy. We have in like manner used J48 on our coronary ailment dataset. Resulting to running this count we inspected the yields got from the classifier, the yield gave a couple of estimations in perspective of 10 cross endorsement to make a desire for each event of dataset. Figure 5 exhibits the request accuracy achieved from this estimation i.e. 77% is the adequately requested precision for a gathering of 235 illustrations, mean through and through screw up obtained is 0.1044, time taken to make this model is 0.25 seconds, and ROC zone is 0.836.

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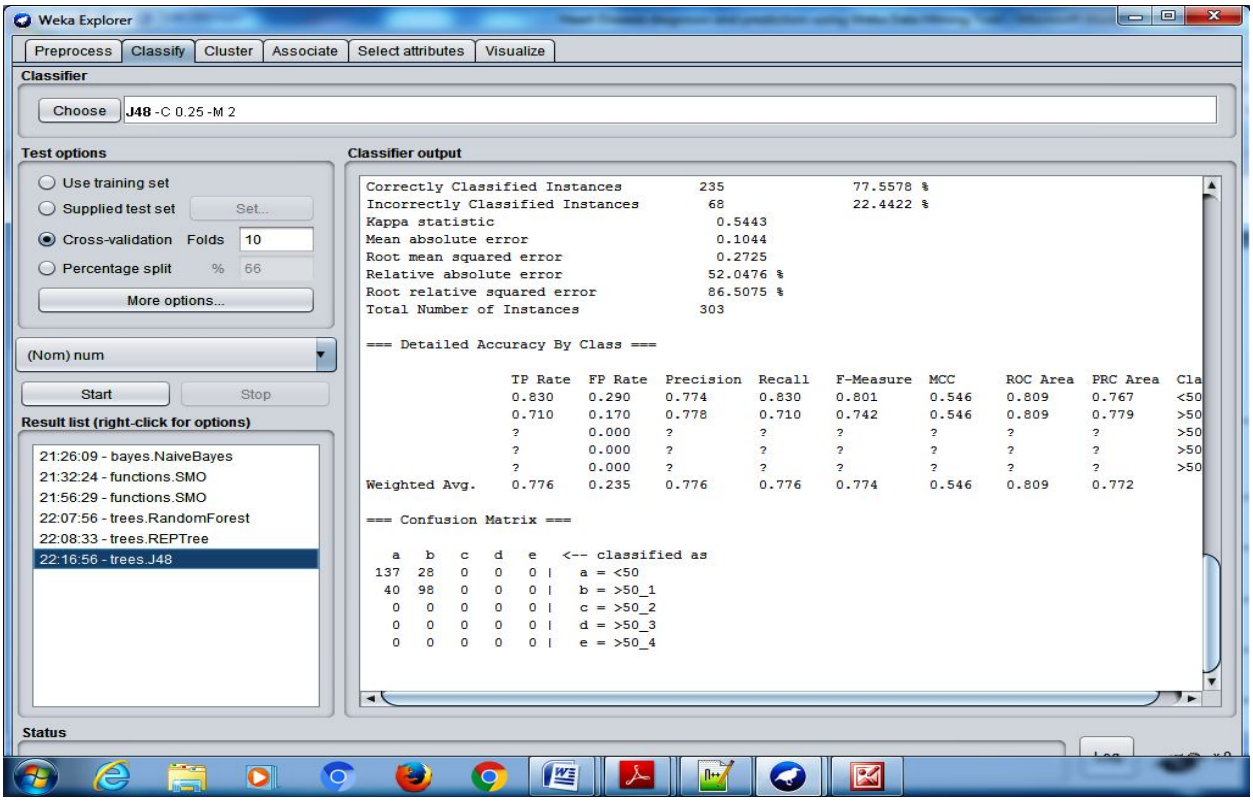
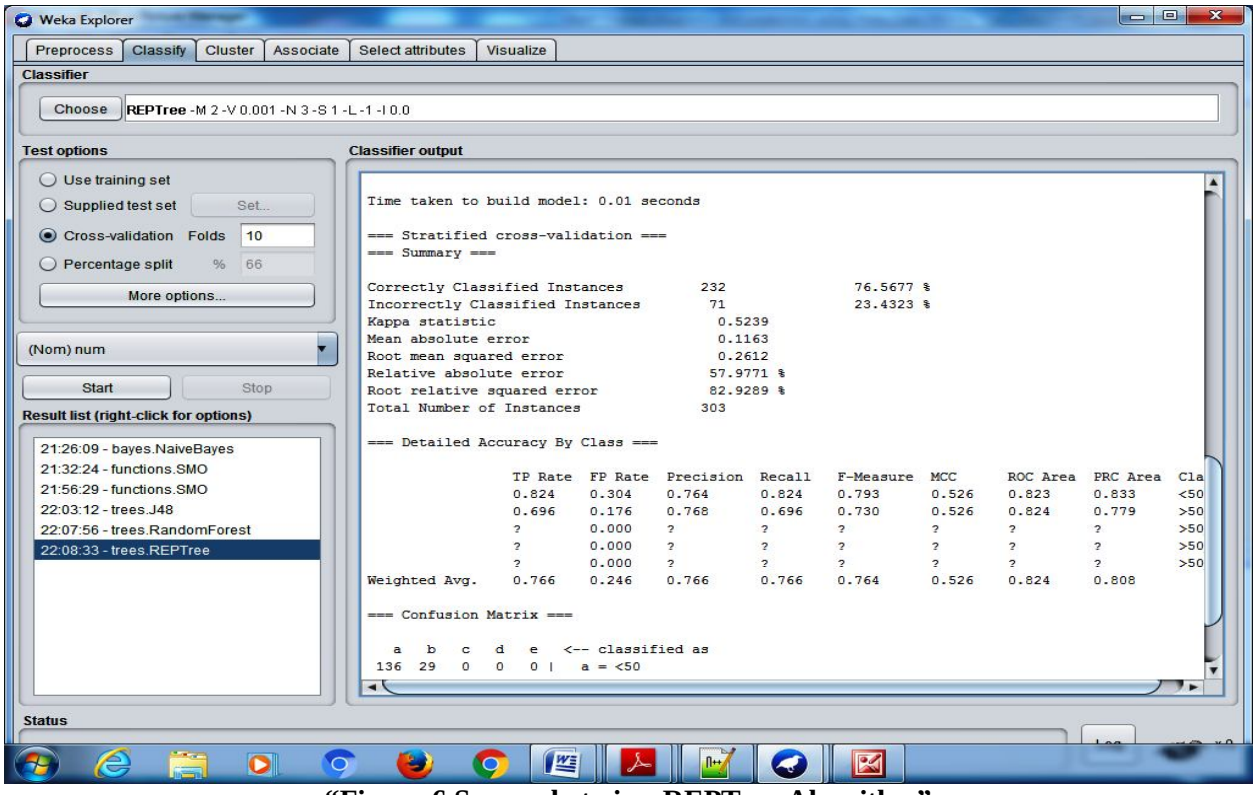


"Figure-5 Screenshot view J48 Algorithm"

4. REPTree

REP Tree has been used as a piece of this paper to manufacture a decision and reduces bungles by organized estimations of numeric property and parts the events into pieces to portray the accuracy. Running the computation we analyze the classifier yield with bits of knowledge based yields by using 10 cross endorsement to make a desire for each event of dataset. In figure 6 gathering precision achieved exhibits that 76.5677 % are precisely requested exactness for 232 events, 23.4323 % mistakenly orchestrated accuracy for 71 cases, botch rates that is mean aggregate screw up is 0.1163, time taken to create indicate is 0.01 seconds and ROC zone is 0.824 these are said in yield.



"Figure-6 Screenshot view REPTree Algorithm"

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5. COMPARISON WITH ALGORITHMS

Algorithm	Correctly Classified Instances %Accuracy	Incorrectly Classified Instances %Accuracy	Mean Absolute Error	ROC Area	Time Taken to Build Model (seconds)
Naïve Bayes	83.4983	16.5017	0.0738	0.904	0.01 seconds
SMO	84.1584	15.8416	0.1805	0.836	0.19 seconds
J48	77.5578	22.4422	0.1044	0.809	0.08 seconds
REPTree	76.5677	23.4323	0.1163	0.824	0.01 seconds

"Table-3: Comparison with different types algorithms "

Algorithm	Correctly Classified Instances %Accuracy	Time Taken to Build Model (seconds)
Naïve Bayes	83.4983	0.01 seconds
SMO	84.1584	0.19 seconds

"Table-4: Experiment Algorithms Best accuracy"

Algorithm	Correctly Classified Instances %Accuracy	Time Taken to Build Model (seconds)
J48	77.5578	0.08 seconds
REPTree	76.5677	0.01 seconds

"Table-5: Experiment Algorithms Worst accuracy"

VII. CONCLUSIONS AND FUTURE SCOPE

We have immediately organized the Heart educational record and a short time later took a gander at the changed data mining frameworks in weka through Explorer, learning stream and Experimenter interfaces. Besides remembering the ultimate objective to affirm our approach we have used a Heart dataset with 303 events no of properties 76 and used 14 attributes to choose the desire for contamination and their accuracy using portrayals of different counts to find the best execution. The basic target of this paper is to depict information and empower the clients in expelling beneficial data from information and effortlessly to see a fitting estimation for correct canny model from it. From the disclosures of this paper time taken to produce the model in 0.01 seconds in Naïve Bayes and time taken to manufacture the model in 0.19 seconds in SMO.The Naïve bayes and SMO are the best execution estimations for asked for precision since they accomplished most unmistakable accuracy= 100% with 84 accurately assembled cases, most phenomenal ROC = 0.904, had scarcest mean all around mess up and it required least theory for building this model through Explorer and Knowledge stream happens. This structure can be furthermore expanded. It can use more number of data characteristics recorded above in table 1 and 2. Other data mining techniques can moreover be used for predication e.g. Packing, Time game plan, Association rules. The substance mining can be used to mine enormous measure of unstructured data available in restorative administrations industry database.

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A STUDY ON CLASSIFICATION OF CHARACTER RECOGNITION ENGINE HANDLING FOR PRE AND POST IMAGE PROCESSING PHASES ON HANDWRITING IMAGES

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ABSTRACT
Image fusion of Character Recognition Engine integrates different modality images to provide comprehensive information of the image content, increasing interpretation capabilities and producing more reliable results. There are several advantages of combining multi-modal images, including improving geometric corrections, complementing data for improved classification, and enhancing features for analysis...etc. This project develops the image fusion idea in the context of two domains: material scan images of Handwritings, type writer imaging. The proposed methods include image modeling, image indexing, image segmentation, and image registration. The common theme behind all proposed methods is the use of complementary information from multi-modal images to achieve better registration, feature extraction, and detection performances.

Keywords: Object Recognition, OCR, Image fusion, EGDLM, CNOM.

1. INTRODUCTION

In the last four decades, handwriting recognition has been a very active area of research. Previous work on this topic can be divided into four major areas, depending on whether the recognition units are characters, words, phrases, or longer bodies of text. Some of the previous work and problems are discussed in this project through the division. Cognitive research on human word perception and decision making that could be applied to the development of our recursive recognition model is also reviewed.

(a) "Character recognition" deals with the problem of classifying pre-isolated character images within a given alphabet set. Useful reviews are found in [11] [12] [13] [14] [15] [16] [17]. Most researchers have adopted the classical pattern recognition approach in which image pre-processing is followed by feature extraction and classification.

(b) "Feature extraction" is an important step in achieving good performance for a character recognizer. Extracted features must be invariant to the distortions and variations that can be expected in a specific application. The size of the feature set is also important in order to avoid a phenomenon called the dimensionality problem [98].

(c) "Feature extraction" methods using topological features can generally reconstruct the image from the feature set. Features are obtained from coefficients of various orthogonal decomposition methods by the representation properties of the image data. *Fourier descriptors [20] [21], geometric moment invariants [25] [28], Zemike moments [24], Wavelet descriptors [29] [30]* are the examples of reconstructive feature extraction methods. Reconstructive features generally have a multi-resolution property within the feature composition.

(d) "Handwritten Chinese document" for Chinese character recognition in which the "recognition objects" will be distinct Chinese characters (Lee and Liu, 1997 & 1998);

2. OCR IN 3D MODEL-BASED OBJECT RECOGNITION

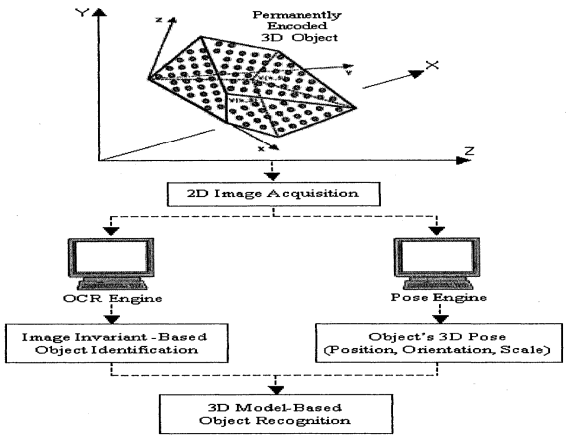

Figure 2: The OCR engine in the 3D model-based object recognition system.

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OCR can play a very important role in 3D Model-based object recognition systems as Figure 1.1 shows. Two basic operations are included in 3D Model-based object recognition: identification and location [34]. Identification determines the identity of the imaged objects by the comparison of the image data with a database of models. Location determines the location of the 3D imaged object in the space.

A practical and rapid method for visual recognition of 3D objects is the use of surface encoding with Pseudo Random Binary Array (PRBA) and feature matching with the model database [36]. After the object is visually recognized, a pose engine provided with tactile sensors can find its positional parameters.

The PRBA code is Braille-like symbols embossed on the object surface. The shape of the symbols is specially designed for easy visual and tactile recognition. For efficient pattern recognition, the particular shapes of the binary symbols were selected in such a way to meet the following conditions [36]:

1. There is enough information at the symbol level to provide an immediate indication of the grid orientation.

2. The symbol recognition procedure is invariant to position and orientation changes.

3. The symbols have a certain peculiarity so that other objects in the scene will not be mistaken for encoding symbols.

One key problem of symbols recognition is that the appearance of the symbols depends on imaging conditions like viewpoint and orientations. If we can find image features that do not change with imaging conditions, the problem would be solved.

The image invariants can be described as functions of geometric configurations which do not change under a certain class of image transformations. The OCR engine based on image invariants supports direct, feature-based model indexing, and therefore well-suited to identify the specific subsets of the PRBA codes embossed on the object's surfaces. However, one basic limitation of image invariants is that they are only invariant to a certain class of image transformations. Defining useful invariants for all image transformations is not easy at all. In this thesis, we consider only scaling, translation and rotation/orientation of the geometric image transformations.

2.1.2 OPTICAL CHARACTER RECOGNITION

Optical character recognition (OCR) is an important research area in pattern recognition. The objective of an OCR system is to recognize alphabetic letters, numbers, or other characters, which are in the form of digital images, without any human intervention [25]. This is accomplished by searching a match between the features extracted from the given character's image and the library of image models. Ideally, we would like the features to be distinct for different character images so that the computer can extract the correct model from the library without any confusion. At the same time, we also want the features to be robust enough so that they will not be affected by viewing transformations, noises, resolution variations and other factors. Figure 2.1.2 illustrates the basic processes of an OCR system.

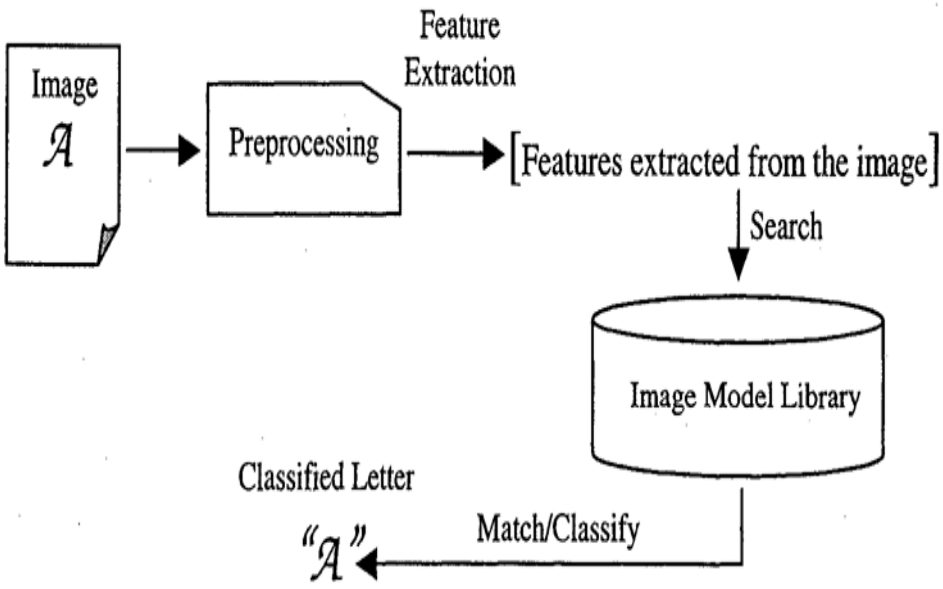

Figure 2.1.2: The basic processes of an OCR system

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2.1.3 Different Families of Character Recognition

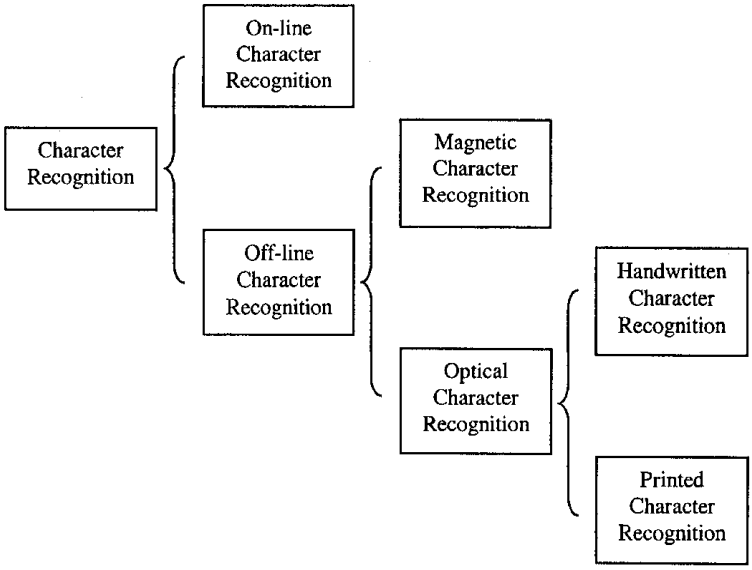

Figure 2.1.3: The different families of character recognition

Figure 2.1.3 shows the different families of character recognition. Two different families are included in the general term of character recognition [13]:

• On-line character recognition

• Off-line character recognition

On-line character recognition deals with a data stream which comes from a transducer while the user is writing. The typical hardware to collect data is a digitizing tablet which is electromagnetic or pressure sensitive. When the user writes on the tablet, the successive movements of the pen are transformed to a series of electronic signal which is memorized and analyzed by the computer [29].

Off-line character recognition is performed after the writing is finished. The major difference between on-line and off-line character recognition is that on-line character recognition has time-sequence contextual information but off-line data does not. This difference generates a significant divergence in processing architectures and methods.

The off-line character recognition can be further grouped into [41]:

• Magnetic character recognition (MCR)

• Optical character recognition (OCR)

In MCR, the characters are printed with magnetic ink. The reading device can recognize the characters according to the unique magnetic field of each character. MCR is mostly used in banks for check authentication.

3. OBJECTIVES

The handwriting recognition task involves several subtasks such as separation of the image into meaningful units, recognition of the separated units, and decision making based on the recognition results; in addition, the task requires global system organization to maximize system performance. There are many problems that arise from these subtasks that should be solved to build an efficient and optimal system. In this section, following the above mentioned motivation, several problems related to character, word and phrase recognition processes are addressed. Character recognition is basically related to recognition of pre-isolated character images and most research has focused on finding the best feature set and classification method in a static architecture.

A method which achieves maximum separation among classes in a selected training set that is closest to the application is chosen as the optimal recognizer. A decision step follows recognition to accept recognition result within the desired performance. In this sequential and unidirectional process, feature extraction is passive and classification involves inflexible resource usage to provide the best results regardless of image quality. Also, the decision algorithm usually has a uniform criterion for acceptance. This static approach is lacking in adaptability to the input diversity and injection of dynamic operation into the processing flow is difficult.

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An "Elastic Graph Dynamic Link Model" (EGDLM) has been constructed and presented in this thesis to provide a feasible solution to tackle/solve the abovementioned problems. In order to provide a generic vision object recognition scheme for different problem domains, different image pre-processing and object segmentation schemes [such as Active Contour Model (ACM) and Composite Neural Oscillatory Model (CNOM)] have been integrated into the proposed model (EGDLM).

The main reason of this type of restriction is to focus our attention on vision object recognition that is generally associated with machine perception, a branch of artificial intelligence. This involves a wide range of problems such as:

a) Determination of object boundaries (or object segmentation).

b) Location of single object instance.

c) Object classification within a scene of different objects.

d) Object matching or identification from a cluttered scene.

3. METHODOLOGY

The template matching method utilized by *Tausheck's* reading machine is a fairly standard image processing technique. Although simple, template matching has some obvious limitations. One template is only capable of recognizing characters of the same size and position. On the other hand, template matching is also very vulnerable to noises and small variations that occur among characters from the same class.

Pre-processing:- The purpose of the pre-processing phase is to prepare a given image for the isolation phase primarily to make it easier for the isolation phase to determine where character glyphs begin and end.

Post-processing:- Post-processing attempts to construct text from the output provided by the identification phase. The output might include spacing and formatting.

Isolation: - The isolation phase analyzes the cleaned image data from the pre-processing phase in an effort to locate and isolate pockets of text. These pockets are then further broken down into lines and, finally, into single glyphs.

Identification: - The identification phase examines the isolated glyphs and attempts to classify each of them as a particular character.

Meanwhile, in image processing, since the template matching needs to compare every input character to all of the templates from pixel to pixel, this method demands a lot of computation power and time.

Specifically, this project makes the following contributions:

(a) Method of "Pixel Classification" is one of the most traditional, simplest and straight-forward applications of the feature-space strategy.

(b) "Object recognition" by this method involves a "metric" or "similarity" measure will reflect how well the image data are matched to the pre-defined templates.

(c) Combined strategies by refining matches using Resegmentation;

(d) Combined strategies by refining matches using Template Matching;

(e) Combined strategies by refining matches using Flexible Model Matching;

(f) Combined strategies by Elastic Graph Dynamic Link Model (EGDLM)

4. AIM OF THE RESEARCH AND CONCLUSION

The main contributions of this Project are

1. The design and implementation of a tool for OCR applications, data reduction is usually confined to reducing a gray scale or color image to a black and white (binary or bi-tonal) image. This reduction is accomplished by calculating a level of intensity against which individual pixel values are compared. Which detects almost all character in an image and determines the pixel, calculate value of character, numbers and symbols to be detected.

2. A comparative analysis of contemporary image datasets available for research in an object-attribute method examines a particular attribute of an object (in this case, a glyph) and utilizes some specific feature of that object to perform a function.

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3. The design and execution of experiments that test the capabilities of the projection profile technique projects the document at different angles, Handwriting Recognition is interpretation of data which describes hand written objects. The goal of handwriting recognition is to interpret the contents of the data and to generate a description of that interpretation in the desired format.
4. Investigated the sensitivity to salt and pepper noises for Fourier descriptors and Hu's seven moment invariants. The image features are collected and plotted from image samples with different noise intensities.
5. Developed a generic OCR engine which can be used for different purposes. This OCR engine includes two basic functions: feature extraction and image recognition. It integrated Fourier descriptors and Hu's seven moment invariants together. The users can use this OCR engine to evaluate and compare their overall performances on gray level "JPEG" images and "TIFF" images.

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Fox, S. (1984). Empowerment as a catalyst for change: an example for the food industry. *Supply Chain Management*, *2*(3), 29–33.

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- **Multiple author journal article:**

Khan, M. R., Islam, A. F. M. M., & Das, D. (1886). A Factor Analytic Study on the Validity of a Union Commitment Scale. *Journal of Applied Psychology*, *12*(1), 129-136.

Liu, W.B, Wongcha A, & Peng, K.C. (2012), "Adopting Super-Efficiency And Tobit Model On Analyzing the Efficiency of Teacher's Colleges In Thailand", International Journal on New Trends In Education and Their Implications, Vol.3.3, 108 – 114.

- **Text Book:**

Simchi-Levi, D., Kaminsky, P., & Simchi-Levi, E. (2007). *Designing and Managing the Supply Chain: Concepts, Strategies and Case Studies* (3rd ed.). New York: McGraw-Hill.

S. Neelamegham," Marketing in India, Cases and Reading, Vikas Publishing House Pvt. Ltd, III Edition, 2000.

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- **Unpublished dissertation/ paper:**

Uddin, K. (2000). A Study of Corporate Governance in a Developing Country: A Case of Bangladesh (Unpublished Dissertation). Lingnan University, Hong Kong.

- **Article in newspaper:**

Yunus, M. (2005, March 23). Micro Credit and Poverty Alleviation in Bangladesh. *The Bangladesh Observer*, p. 9.

- **Article in magazine:**

Holloway, M. (2005, August 6). When extinct isn't. *Scientific American, 293*, 22-23.

- **Website of any institution:**

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