**Unsupervised Learning**

**Project Definition:**

The objective of the project is to collect information as much as possible gain knowledge. The dataset helps us to that. By analyzing this dataset through different data mining unsupervised algorithms we tried to find a way to classify absenteeism dataset based on the duration of absenteeism using WEKA. For this purpose UCI dataset – Absenteeism at work data set is used.

**Literature Survey:**

Absenteeism dataset is used in to analyses the reason for absence from work. The productivity in industry and organizations can decrease because of employee absence. Employee might be irregular to work due to multiple reasons including, sickness, depression, unhappiness in work etc. this purpose uses an Artificial Neural Network to predict absentees. The future work of suggests that a model can be used to find out whether an employee would be absent for a week or a month. This paper classifies the employee record to find if he would be absent for hours, day, week or month.t

**Methods:**

# The dataset has been preprocessed via weka 3.8.3 and missing values got replaced by most common value. Different clustering algorithms like K means, EM, Hierarchical were applied to cluster dataset. Hierarchical clustering was chosen finally as it suited the best to fulfil our goal. A tree was generated on which a cut point was applied and data was divided into 12clusters.

**Attribute Information:**

1. Individual identification (ID)

2. Reason for absence (ICD).

Absences attested by the International Code of Diseases (ICD) stratified into 21 categories (I to XXI) as follows:

I certain infectious and parasitic diseases

II Neoplasms

III Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism

IV Endocrine, nutritional and metabolic diseases

V Mental and behavioral disorders

VI Diseases of the nervous system

VII Diseases of the eye and adnexa

VIII Diseases of the ear and mastoid process

IX Diseases of the circulatory system

X Diseases of the respiratory system

XI Diseases of the digestive system

XII Diseases of the skin and subcutaneous tissue

XIII Diseases of the musculoskeletal system and connective tissue

XIV Diseases of the genitourinary system

XV Pregnancy, childbirth and the puerperium

XVI Certain conditions originating in the perinatal period

XVII Congenital malformations, deformations and chromosomal abnormalities

XVIII Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified

XIX Injury, poisoning and certain other consequences of external causes

XX External causes of morbidity and mortality

XXI Factors influencing health status and contact with health services.

And 7 categories without (CID) patient follow-up (22), medical consultation (23), blood donation (24), laboratory examination (25), unjustified absence (26), physiotherapy (27), dental consultation (28).

3. Month of absence

4. Day of the week (Monday (2), Tuesday (3), Wednesday (4), Thursday (5), Friday (6))

5. Seasons (summer (1), autumn (2), winter (3), spring (4))

6. Transportation expense

7. Distance from Residence to Work (kilometers)

8. Service time

9. Age

10. Work load Average/day

11. Hit target

12. Disciplinary failure (yes=1; no=0)

13. Education (high school (1), graduate (2), postgraduate (3), master and doctor (4))

14. Son (number of children)

15. Social drinker (yes=1; no=0)

16. Social smoker (yes=1; no=0)

17. Pet (number of pet)

18. Weight

19. Height

20. Body mass index

21. Absenteeism time in hours (target)

**Hierarchical Clustering:**

=== Run information ===

Scheme: weka.clusterers.HierarchicalClusterer -N 12 -L MEAN -P -A "weka.core.EuclideanDistance -R first-last"

Relation: Absenteeism\_at\_work\_A

Instances: 740

Attributes: 21

ID

Reason\_for\_absence

Month\_of\_absence

Day\_of\_the\_week

Seasons

Transportation\_expense

Distance\_from\_Residence\_to\_Work

Service time

Age

Work\_load\_Average/day\_

Hit target

Disciplinary failure

Education

Son

Social\_drinker

Social\_smoker

Pet

Weight

Height

Body\_mass\_index

Absenteeism\_time\_in\_hours

Test mode: evaluate on training data

=== Clustering model (full training set) ===

Cluster 0

(((((((((((4.0:0.2364,8.0:0.2364):0.52233,8.0:0.75873):0.14557,8.0:0.9043):0.13994,8.0:1.04423):0.15649,((2.0:0.92244,((1.0:0.3617,4.0:0.3617):0.44667,1.0:0.80837):0.11407):0.16421,8.0:1.08665):0.11407):0.05405,(8.0:1,8.0:1):0.25477):0.10183,104.0:1.3566):0.06112,((((32.0:1.0198,8.0:1.0198):0.01113,8.0:1.03093):0.14358,24.0:1.17451):0.10436,8.0:1.27887):0.13886):0.09348,(((8.0:1.00723,8.0:1.00723):0.02509,24.0:1.03232):0.16619,(8.0:1,8.0:1):0.19851):0.31269):0.12568,(((3.0:0.99513,((8.0:0.33588,3.0:0.33588):0.46622,8.0:0.8021):0.19303):0.15872,8.0:1.15385):0.33612,(8.0:1.21034,((16.0:0.75862,(8.0:0.13333,24.0:0.13333):0.62529):0.24172,8.0:1.00034):0.21):0.27963):0.14692):0.14943,((((8.0:1.006,8.0:1.006):0.14455,(8.0:1.02139,4.0:1.02139):0.12916):0.12097,(8.0:1.02963,8.0:1.02963):0.24188):0.17213,(8.0:1.19158,(((2.0:0,2.0:0):0.74413,8.0:0.74413):0.30265,8.0:1.04678):0.1448):0.25206):0.34268)

Cluster 1

((((0.0:1.16313,(0.0:1.0159,0.0:1.0159):0.14723):0.13788,((0.0:1.00723,0.0:1.00723):0.01868,0.0:1.02591):0.2751):0.30463,((0.0:1.10601,(((0.0:0.66988,0.0:0.66988):0.26001,0.0:0.9299):0.05502,0.0:0.98492):0.1211):0.23024,0.0:1.33625):0.26939):0.20024,((((0.0:1.03431,0.0:1.03431):0.31437,((0.0:0.87131,(0.0:0.27678,0.0:0.27678):0.59453):0.24558,0.0:1.11689):0.23179):0.12971,0.0:1.47839):0.12223,(0.0:1.1619,0.0:1.1619):0.43872):0.20527)

Cluster 2

(((((((((2.0:0.01667,4.0:0.01667):0.65567,1.0:0.67234):0.3419,8.0:1.01424):0.21832,((1.0:0.77855,8.0:0.77855):0.24459,(8.0:0.93905,((2.0:0.42508,4.0:0.42508):0.41241,4.0:0.8375):0.10155):0.08409):0.20942):0.09513,(((((2.0:0,2.0:0):0.22511,2.0:0.22511):0.32178,3.0:0.54689):0.27892,1.0:0.82581):0.24233,1.0:1.06814):0.25955):0.10477,3.0:1.43247):0.26694,(((((3.0:0.2231,24.0:0.2231):0.67504,(8.0:0.5457,((4.0:0.03333,8.0:0.03333):0.05004,4.0:0.08337):0.46233):0.35245):0.23489,0.0:1.13304):0.22472,(8.0:1.00113,(1.0:1,1.0:1):0.00113):0.35662):0.19375,(((((8.0:0.78497,((4.0:0.18918,((3.0:0.00833,4.0:0.00833):0.10833,24.0:0.11667):0.07251):0.32897,2.0:0.51815):0.26683):0.17734,(3.0:0.57208,(2.0:0.11667,16.0:0.11667):0.45541):0.39023):0.1704,40.0:1.13271):0.12374,16.0:1.25645):0.14243,2.0:1.39888):0.15262):0.14791):0.09479,(((((((4.0:0.00833,3.0:0.00833):0.66594,3.0:0.67428):0.32619,8.0:1.00047):0.18763,(((3.0:0.1275,8.0:0.1275):0.5832,(3.0:0.12049,3.0:0.12049):0.5902):0.28411,((1.0:0.24691,1.0:0.24691):0.51319,8.0:0.7601):0.23471):0.19329):0.19064,8.0:1.37873):0.14431,((8.0:1.31392,((((8.0:0.68806,((2.0:0.00833,1.0:0.00833):0.12939,1.0:0.13772):0.55034):0.30004,((1.0:0.19586,3.0:0.19586):0.61013,(3.0:0.35588,1.0:0.35588):0.45011):0.18211):0.08146,((1.0:0.59219,((1.0:0,1.0:0):0.13489,1.0:0.13489):0.4573):0.29285,1.0:0.88504):0.18451):0.11707,16.0:1.18662):0.1273):0.12539,(8.0:1,8.0:1):0.43931):0.08373):0.11492,((1.0:1.00003,2.0:1.00003):0.27616,3.0:1.27619):0.36177):0.15624):0.12394,(((((((((8.0:0.84055,(((((2.0:0.00833,3.0:0.00833):0.05257,(2.0:0,2.0:0):0.06091):0.10408,(2.0:0.00833,3.0:0.00833):0.15665):0.24508,4.0:0.41007):0.25561,(2.0:0.27773,2.0:0.27773):0.38795):0.17487):0.17283,8.0:1.01338):0.13232,8.0:1.1457):0.1022,4.0:1.2479):0.09633,8.0:1.34423):0.12134,8.0:1.46556):0.1448,((((8.0:1.10906,(((2.0:0.71139,(1.0:0.51198,(3.0:0.36343,(((((3.0:0,3.0:0):0,3.0:0):0.05471,((2.0:0,2.0:0):0.00556,3.0:0.00556):0.04916):0.0594,3.0:0.11411):0.06361,2.0:0.17772):0.1857):0.14855):0.19942):0.16222,2.0:0.87361):0.12091,24.0:0.99452):0.11454):0.11214,2.0:1.22119):0.10136,2.0:1.32256):0.11259,3.0:1.43515):0.17522):0.07948,((((8.0:1.16017,(((8.0:0.82723,((8.0:0.56922,(((3.0:0.15356,((2.0:0,2.0:0):0.00556,3.0:0.00556):0.14801):0.09163,((3.0:0,3.0:0):0,3.0:0):0.2452):0.19458,8.0:0.43978):0.12944):0.11162,3.0:0.68083):0.14639):0.10867,4.0:0.9359):0.12102,8.0:1.05692):0.10325):0.11666,8.0:1.27684):0.12551,8.0:1.40235):0.16319,(((24.0:0.50502,(8.0:0.27773,8.0:0.27773):0.22729):0.40504,32.0:0.91006):0.29816,8.0:1.20822):0.35732):0.12431):0.08829,(((((((8.0:1.16115,(8.0:1.08327,(((((((8.0:0.42591,(((((((3.0:0,3.0:0):0,3.0:0):0,3.0:0):0.05196,((2.0:0,(2.0:0,2.0:0):0):0.00417,3.0:0.00417):0.0478):0.06267,3.0:0.11464):0.06958,((2.0:0,2.0:0):0,2.0:0):0.18421):0.13097,3.0:0.31518):0.11073):0.09557,1.0:0.52148):0.1175,3.0:0.63898):0.10022,8.0:0.73921):0.10704,0.0:0.84624):0.08966,8.0:0.9359):0.08028,16.0:1.01618):0.06709):0.07788):0.07837,16.0:1.23951):0.0706,3.0:1.31011):0.06705,(8.0:1.05017,8.0:1.05017):0.327):0.06558,3.0:1.44274):0.0848,0.0:1.52754):0.14073,(0.0:1.31695,0.0:1.31695):0.35132):0.10986):0.14)

Cluster 3

(((((4.0:1.03557,2.0:1.03557):0.3708,16.0:1.40637):0.17365,((1.0:1.00003,2.0:1.00003):0.29078,8.0:1.29082):0.2892):0.21932,(((4.0:1.36883,(4.0:1.16884,(((4.0:0.54165,((1.0:0.10618,(4.0:0.01667,2.0:0.01667):0.08951):0.1184,2.0:0.22457):0.31708):0.23778,4.0:0.77944):0.2077,3.0:0.98713):0.1817):0.19999):0.19718,(((((1.0:0.64899,((2.0:0,2.0:0):0.18704,2.0:0.18704):0.46195):0.17369,1.0:0.82267):0.18573,3.0:1.0084):0.114,8.0:1.1224):0.21013,0.0:1.33252):0.23348):0.099,((((((32.0:0.4191,40.0:0.4191):0.42369,8.0:0.84279):0.24273,40.0:1.08552):0.1995,((4.0:0.85772,(((2.0:0.16414,2.0:0.16414):0.12057,1.0:0.28471):0.37304,1.0:0.65776):0.19996):0.19754,4.0:1.05526):0.22976):0.10458,(((((5.0:0.21695,(5.0:0.01667,3.0:0.01667):0.20029):0.40089,1.0:0.61784):0.16823,1.0:0.78607):0.18676,4.0:0.97283):0.20757,8.0:1.1804):0.2092):0.10167,(2.0:1.08118,2.0:1.08118):0.41009):0.17373):0.13433):0.07492,((((((8.0:0.97274,((3.0:0.67272,(2.0:0.46309,(((2.0:0,2.0:0):0.1044,(4.0:0.025,1.0:0.025):0.0794):0.12273,(1.0:0,1.0:0):0.22713):0.23596):0.20963):0.16079,1.0:0.83351):0.13923):0.14816,8.0:1.1209):0.1354,(24.0:0.95333,(2.0:0.30093,3.0:0.30093):0.6524):0.30298):0.10847,(16.0:1.00885,32.0:1.00885):0.35593):0.08645,0.0:1.45123):0.12643,((8.0:1.06119,8.0:1.06119):0.17075,(8.0:1,8.0:1):0.23194):0.34572):0.29659)

Cluster 4

((((((((8.0:0.26855,8.0:0.26855):0.52196,8.0:0.79052):0.25397,8.0:1.04449):0.24158,(1.0:1.07771,(8.0:0.35921,8.0:0.35921):0.71851):0.20836):0.09504,((((8.0:0,8.0:0):0.73584,8.0:0.73584):0.23251,8.0:0.96835):0.26693,4.0:1.23528):0.14584):0.13698,(((40.0:1.02995,(7.0:1.00125,1.0:1.00125):0.0287):0.23613,8.0:1.26608):0.11489,(8.0:1.0388,2.0:1.0388):0.34217):0.13713):0.06464,((8.0:1.009,8.0:1.009):0.4237,(1.0:1.18952,(8.0:1.00125,2.0:1.00125):0.18827):0.24318):0.15004):0.14678,((2.0:1.32142,(8.0:1.01885,2.0:1.01885):0.30257):0.16021,(8.0:1.00087,3.0:1.00087):0.48076):0.2479)

Cluster 5

((((((((((4.0:0.33766,4.0:0.33766):0.45817,8.0:0.79583):0.25996,((((4.0:0.36084,4.0:0.36084):0.2545,4.0:0.61534):0.23225,8.0:0.84759):0.12806,3.0:0.97564):0.08015):0.07523,4.0:1.13102):0.0672,8.0:1.19822):0.06458,(8.0:1,8.0:1):0.2628):0.1591,3.0:1.4219):0.15906,((((((4.0:0.74473,(((((3.0:0.19319,4.0:0.19319):0.0791,3.0:0.27229):0.04931,(4.0:0.24927,(3.0:0.15558,3.0:0.15558):0.09368):0.07233):0.20629,8.0:0.52789):0.12786,8.0:0.65575):0.08898):0.13876,16.0:0.88349):0.10165,8.0:0.98514):0.11918,8.0:1.10432):0.1419,0.0:1.24622):0.17291,8.0:1.41913):0.16183):0.10824,((((((((2.0:0.2752,(3.0:0.14121,4.0:0.14121):0.13399):0.10534,4.0:0.38054):0.29976,40.0:0.6803):0.23652,8.0:0.91682):0.15574,16.0:1.07256):0.19228,(8.0:1.04618,(((4.0:0.29209,(((3.0:0.00833,4.0:0.00833):0.0651,3.0:0.07344):0.08332,4.0:0.15676):0.13533):0.29496,56.0:0.58705):0.23177,8.0:0.81881):0.22737):0.21866):0.1348,8.0:1.39963):0.14211,(8.0:1.10797,64.0:1.10797):0.43377):0.14745):0.1635,((((8.0:1.07122,(((8.0:0.19023,(8.0:0.04167,3.0:0.04167):0.14856):0.41069,8.0:0.60092):0.29168,8.0:0.8926):0.17862):0.13321,(8.0:1,8.0:1):0.20443):0.13809,80.0:1.34252):0.19016,(((4.0:1.00614,8.0:1.00614):0.05449,24.0:1.06063):0.12492,8.0:1.18555):0.34713):0.32002)

Cluster 6

((((((40.0:1.04188,16.0:1.04188):0.25366,(2.0:1.04067,2.0:1.04067):0.25486):0.07126,2.0:1.36679):0.1787,((((((8.0:0.05988,8.0:0.05988):0.64775,8.0:0.70763):0.16612,4.0:0.87375):0.17104,80.0:1.04479):0.15247,2.0:1.19726):0.13018,((16.0:1.05663,2.0:1.05663):0.0277,5.0:1.08433):0.24311):0.21805):0.10197,((32.0:1.26441,120.0:1.26441):0.2424,((((1.0:0.53355,4.0:0.53355):0.61144,(1.0:1.05061,((2.0:0.66946,(1.0:0.00833,2.0:0.00833):0.66112):0.23846,4.0:0.90792):0.1427):0.09438):0.15553,(48.0:1.05409,8.0:1.05409):0.24643):0.08246,(24.0:1.12271,(24.0:1.03411,2.0:1.03411):0.0886):0.26027):0.12383):0.14064):0.2809,(((2.0:1.15664,(((1.0:0.41374,1.0:0.41374):0.41825,1.0:0.83198):0.17961,(1.0:0.35209,1.0:0.35209):0.6595):0.14505):0.42181,(((((1.0:0.76839,(24.0:0.175,3.0:0.175):0.59339):0.16081,2.0:0.9292):0.26155,(3.0:1.00014,1.0:1.00014):0.19061):0.15463,(((1.0:0.79303,3.0:0.79303):0.21338,(2.0:0.70642,(1.0:0.09943,2.0:0.09943):0.60698):0.29999):0.15416,(3.0:1.0159,3.0:1.0159):0.14467):0.18481):0.12792,0.0:1.4733):0.10514):0.14121,(((24.0:1.06739,((((24.0:0.18937,8.0:0.18937):0.23564,80.0:0.42501):0.24278,8.0:0.66779):0.16118,120.0:0.82896):0.23843):0.26232,(8.0:1.02451,2.0:1.02451):0.3052):0.24341,(8.0:1.08671,8.0:1.08671):0.4864):0.14654):0.2087)

Cluster 7

(((((8.0:1.05578,8.0:1.05578):0.10182,(8.0:1.00118,8.0:1.00118):0.15641):0.25622,((3.0:1.06671,16.0:1.06671):0.09281,8.0:1.15952):0.2543):0.25731,((((4.0:1.01851,(((1.0:0.10844,4.0:0.10844):0.59847,4.0:0.70691):0.15497,8.0:0.86188):0.15664):0.17268,4.0:1.1912):0.23897,0.0:1.43017):0.17946,(((8.0:1.01371,1.0:1.01371):0.25086,(4.0:1.06021,3.0:1.06021):0.20437):0.22713,((8.0:1.08982,(2.0:0.35549,2.0:0.35549):0.73433):0.23839,8.0:1.32821):0.16349):0.11792):0.06151):0.26816,(((8.0:1.3398,((((8.0:1,8.0:1):0.01663,1.0:1.01663):0.13271,8.0:1.14935):0.11861,16.0:1.26795):0.07185):0.19526,(((4.0:1.00614,8.0:1.00614):0.2735,8.0:1.27964):0.06865,8.0:1.34829):0.18678):0.28912,((((((1.0:0.29889,16.0:0.29889):0.49606,1.0:0.79496):0.38233,((8.0:0.7849,(1.0:0.24455,2.0:0.24455):0.54035):0.2196,2.0:1.0045):0.17278):0.16879,8.0:1.34607):0.18395,(((8.0:0.86517,(64.0:0.49167,5.0:0.49167):0.3735):0.15554,5.0:1.02071):0.27576,(1.0:1.00778,16.0:1.00778):0.28869):0.23355):0.18678,((((((8.0:1.08786,(((2.0:0.55742,((((2.0:0,2.0:0):0,(2.0:0,2.0:0):0):0.14128,2.0:0.14128):0.11733,(2.0:0,2.0:0):0.25861):0.29881):0.20827,2.0:0.76569):0.16792,8.0:0.93361):0.15425):0.13564,2.0:1.22351):0.1005,3.0:1.32401):0.10609,((((3.0:0,3.0:0):0.72371,(2.0:0.28068,3.0:0.28068):0.44303):0.28269,2.0:1.0064):0.20053,2.0:1.20693):0.22316):0.14112,((((1.0:1.01605,((3.0:0.00833,2.0:0.00833):0.66112,2.0:0.66946):0.34659):0.1229,(2.0:0.78198,(2.0:0.30149,2.0:0.30149):0.48049):0.35697):0.15932,(((8.0:0.4787,2.0:0.4787):0.37251,3.0:0.85121):0.24591,(24.0:1.00222,16.0:1.00222):0.0949):0.20115):0.19455,((((1.0:0.73091,2.0:0.73091):0.17291,(1.0:0.28068,2.0:0.28068):0.62314):0.14325,3.0:1.04707):0.22098,8.0:1.26804):0.22477):0.0784):0.06185,(((3.0:0.27773,3.0:0.27773):0.49415,2.0:0.77188):0.38686,8.0:1.15874):0.47432):0.08375):0.10738):0.1151)

Cluster 8

((((((8.0:1.32933,((((2.0:0.28952,3.0:0.28952):0.49219,2.0:0.78171):0.26674,2.0:1.04844):0.16806,(((((3.0:0.24536,3.0:0.24536):0.08646,2.0:0.33182):0.34535,2.0:0.67718):0.18763,2.0:0.86481):0.14362,4.0:1.00842):0.20808):0.11283):0.07834,(8.0:1,8.0:1):0.40767):0.13567,(((((((((1.0:0.23727,(1.0:0.18989,5.0:0.18989):0.04738):0.03286,2.0:0.27013):0.30206,2.0:0.57219):0.17093,1.0:0.74312):0.17741,1.0:0.92053):0.20518,8.0:1.12571):0.13135,(((2.0:0.6386,((1.0:0.22922,2.0:0.22922):0.02565,3.0:0.25487):0.38373):0.20767,1.0:0.84627):0.20449,1.0:1.05076):0.20631):0.08905,8.0:1.34612):0.07907,(8.0:1.17383,(8.0:0.77377,(2.0:0.2822,8.0:0.2822):0.49157):0.40006):0.25136):0.11815):0.08524,((2.0:1.1224,(((2.0:0,2.0:0):0.68396,1.0:0.68396):0.16734,8.0:0.8513):0.2711):0.24273,4.0:1.36513):0.26344):0.09949,((((((8.0:0.66949,1.0:0.66949):0.28815,8.0:0.95764):0.05667,16.0:1.01431):0.22078,(3.0:1.00118,3.0:1.00118):0.2339):0.08668,((8.0:1,8.0:1):0.13807,8.0:1.13807):0.18369):0.17985,((((2.0:0.13838,2.0:0.13838):0.57761,1.0:0.71599):0.36937,8.0:1.08536):0.29493,0.0:1.38029):0.12132):0.22645):0.13128,((((0.0:1.03567,0.0:1.03567):0.47343,(((1.0:1.00319,(((((3.0:0.08608,(4.0:0.01667,2.0:0.01667):0.06941):0.11,3.0:0.19607):0.33122,2.0:0.52729):0.19707,3.0:0.72436):0.10812,3.0:0.83248):0.1707):0.15908,8.0:1.16227):0.15997,0.0:1.32224):0.18687):0.10361,((((((((((((2.0:0.18662,((2.0:0.01667,4.0:0.01667):0.0986,2.0:0.11526):0.07136):0.09174,(2.0:0.12307,2.0:0.12307):0.15529):0.21565,3.0:0.49401):0.204,(2.0:0.31699,3.0:0.31699):0.38102):0.13782,1.0:0.83583):0.12651,1.0:0.96234):0.12133,8.0:1.08367):0.11209,112.0:1.19576):0.11423,3.0:1.30998):0.08544,((((2.0:0.12336,3.0:0.12336):0.58696,3.0:0.71031):0.16019,3.0:0.8705):0.29255,4.0:1.16305):0.23237):0.0693,0.0:1.46472):0.0894,(((((((((3.0:0.59549,(((2.0:0.00833,3.0:0.00833):0.24039,(((1.0:0,1.0:0):0.01111,3.0:0.01111):0.18065,(3.0:0,3.0:0):0.19176):0.05696):0.19719,2.0:0.44591):0.14958):0.13784,1.0:0.73333):0.13268,3.0:0.86601):0.10801,4.0:0.97402):0.12047,3.0:1.09449):0.09427,((2.0:0.49182,1.0:0.49182):0.364,8.0:0.85582):0.33293):0.07466,24.0:1.26342):0.06768,8.0:1.33109):0.0835,(8.0:1.01659,8.0:1.01659):0.39799):0.13954):0.05859):0.09628,((0.0:0.34053,0.0:0.34053):1.01161,0.0:1.35214):0.35685):0.15036)

Cluster 9

((((((((2.0:0.36093,1.0:0.36093):0.44916,2.0:0.81009):0.14797,2.0:0.95806):0.13626,1.0:1.09432):0.12402,8.0:1.21834):0.23163,(((1.0:1.01827,8.0:1.01827):0.01557,2.0:1.03384):0.2069,2.0:1.24074):0.20923):0.14758,((3.0:1,3.0:1):0.49433,(4.0:1.35177,((2.0:1.03788,3.0:1.03788):0.1833,((2.0:1,2.0:1):0.13809,3.0:1.13809):0.08309):0.13059):0.14255):0.10323):0.18951,(((8.0:1,8.0:1):0.14661,1.0:1.14661):0.13557,8.0:1.28219):0.50488)

Cluster 10

(((((((((4.0:0.00833,3.0:0.00833):0.67712,2.0:0.68545):0.2427,3.0:0.92815):0.3245,8.0:1.25265):0.23495,(8.0:1.358,((((2.0:0.77,(((8.0:0.10454,(4.0:0.00833,5.0:0.00833):0.09621):0.11962,3.0:0.22416):0.3201,4.0:0.54426):0.22574):0.1913,3.0:0.9613):0.1399,(1.0:0.75764,(2.0:0.24539,1.0:0.24539):0.51225):0.34356):0.13741,16.0:1.23861):0.1194):0.12959):0.08559,((8.0:1.04724,(((4.0:0.41059,8.0:0.41059):0.41529,8.0:0.82588):0.16755,2.0:0.99342):0.05381):0.25597,8.0:1.30321):0.26998):0.06988,(((2.0:1.00493,3.0:1.00493):0.12882,(8.0:0.9897,((2.0:0.35673,8.0:0.35673):0.44933,3.0:0.80606):0.18364):0.14404):0.21551,8.0:1.34926):0.29381):0.10035,((((((((((((2.0:0.08052,(3.0:0,3.0:0):0.08052):0.07463,2.0:0.15515):0.34385,8.0:0.49901):0.19855,8.0:0.69756):0.11399,8.0:0.81155):0.14299,3.0:0.95454):0.09692,((64.0:0.06667,56.0:0.06667):0.69844,8.0:0.76511):0.28634):0.06471,2.0:1.11616):0.07996,(8.0:1.00087,3.0:1.00087):0.19525):0.09444,8.0:1.29056):0.09532,1.0:1.38588):0.12895,0.0:1.51484):0.22859):0.13213,((((((2.0:1.13537,((1.0:0.38909,32.0:0.38909):0.65295,(((((1.0:0.00556,(2.0:0,2.0:0):0.00556):0.49723,2.0:0.50278):0.23167,(2.0:0,2.0:0):0.73445):0.12103,(((2.0:0,2.0:0):0.01111,0.0:0.01111):0.59225,(2.0:0,2.0:0):0.60336):0.25212):0.08658,8.0:0.94206):0.09998):0.09333):0.09764,1.0:1.23301):0.08227,8.0:1.31529):0.07661,8.0:1.3919):0.11402,2.0:1.50592):0.26295,(((3.0:1.00003,2.0:1.00003):0.3454,112.0:1.34543):0.29356,(8.0:1.36789,120.0:1.36789):0.27111):0.12988):0.10668)

Cluster 11

((((8.0:1,8.0:1):0.29964,2.0:1.29964):0.33959,((((8.0:1.1626,8.0:1.1626):0.17121,((8.0:1.15052,((2.0:1,2.0:1):0,2.0:1):0.15052):0.09224,(3.0:1.04449,2.0:1.04449):0.19827):0.09104):0.12588,(1.0:1.0017,8.0:1.0017):0.45799):0.11613,((40.0:1.26519,(2.0:1.00003,3.0:1.00003):0.26516):0.19294,((2.0:1.19023,(1.0:1.0017,8.0:1.0017):0.18853):0.12309,8.0:1.31332):0.14482):0.11768):0.06341):0.28673,(((8.0:1.17147,(8.0:0.60165,8.0:0.60165):0.56982):0.23006,8.0:1.40153):0.27851,((0.0:0.89577,0.0:0.89577):0.4515,0.0:1.34727):0.33278):0.24591)

Time taken to build model (full training data) : 1.8 seconds

=== Model and evaluation on training set ===

Clustered Instances

0 44 ( 6%)

1 21 ( 3%)

2 154 ( 21%)

3 63 ( 9%)

4 28 ( 4%)

5 58 ( 8%)

6 58 ( 8%)

7 87 ( 12%)

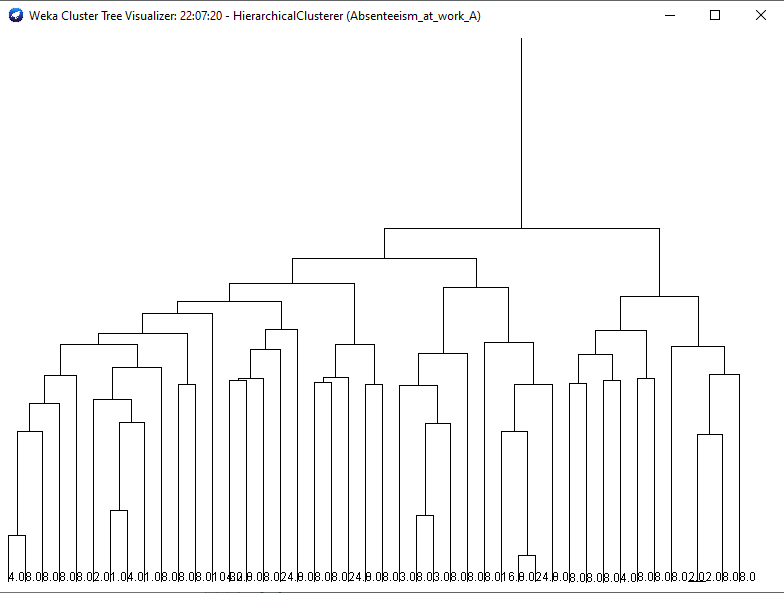
8 107 ( 14%)

9 22 ( 3%)

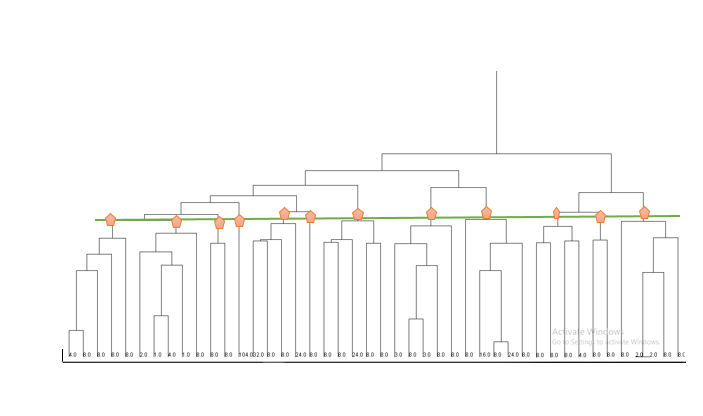
10 71 ( 10%)

11 27 ( 4%)

**Hierarchical clustering Tree:**



**Hierarchical cluster tree with graphical cutting point:**

****

**Cluster Analysis:**

|  |  |  |  |
| --- | --- | --- | --- |
| Cluster no. | Reason for absence | Total no. of Reason | Cluster analysis |
| 01 | IV)Endocrine, nutritional and metabolic diseases ;  VII)Diseases of the ear and mastoid process (4times) | 5 | Under ICD |
| 02 | I) Certain infectious and parasitic diseases (2 times)  II) Neoplasms  IV )Endocrine, nutritional and metabolic diseases  VIII) Diseases of the ear and mastoid process | 5 | Under ICD |
| 03 | VIII) Diseases of the ear and mastoid process (2 times) | 2 | Under ICD |
| 04 | X) Diseases of the respiratory system | 1 | Under ICD |
| 05 | IV) Endocrine, nutritional and metabolic diseases  VIII) Diseases of the ear and mastoid process(3times)  24)blood donation | 5 | One is without ICD  But most are Under ICD |
| 06 | VIII) Diseases of the ear and mastoid process | 1 | Under ICD |
| 07 | VIII )Diseases of the ear and mastoid process (4 Times)  24)blood donation | 5 | One is without ICD  But most are Under ICD |
| 08 | III) Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism (2times)  VIII )Diseases of the ear and mastoid process (3Times) | 5 | Under ICD |
| 09 | VIII )Diseases of the ear and mastoid process (3 times)  XVI) Certain conditions originating in the perinatal period.  24)blood donation | 5 | One is without ICD but Majority  Is ICD |
| 10 | VIII )Diseases of the ear and mastoid process (3 times)  IV Endocrine, nutritional and metabolic diseases | 4 | Under ICD |
| 11 | VIII )Diseases of the ear and mastoid process (2 times) | 2 | Under ICD |
| 12 | II)I Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism (2 times)  VIII )Diseases of the ear and mastoid process (3 times) | 5 | Under ICD |

**Finding new bases:**

From the above cluster analysing can have create khowledge that ICD is the main reason of abseentism at work