IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Vol. 10, Issue 9, September 2021

DOI: 10.17148/IJARCCE.2021.10902

Using Machine Learning Techniques Studies on Water Quality Index and Phytoplankton Diversity of Tiptur Lake, Tiptur, Tumkur-District, Karnataka, India

Dr. Chethan Chandra S Basavaraddi[1], Prof. Sapna S Basavaraddi[1], Dr. S. B. Basavaraddi[2], Prof. Prakasha[2], Prof. G C Mallikarjunaswamy[2], Dr. Raviprakash M L[3], Dr. Anand Babu J[4], Dr. Balaji Prabhu B V[5], Prof. Usha C[5]

[1]Department of Computer Science and Engineering, Kalpataru Institute of Technology, Tiptur- 572201,

[1]Department of Computer Science, Kalpataru First Grade Science College, Tiptur-572201,

[2]Department of Physics, Kalpataru First Grade Science College, Tiptur-572201,

[2]Department of Botany, Kalpataru First Grade Science College, Tiptur-572201,

[2]Department of Zoology, Kalpataru First Grade Science College, Tiptur-572201,

[3]Department of Computer Science and Engineering, Kalpataru Institute of Technology, Tiptur- 572201,

[4] Department of Information Science and Engineering, Malnad College of Engineering, Hassan,

[5] Department of Information Science and Engineering, Malnad College of Engineering, Hassan,

[5]Department of Education, Kalpataru College of Education, Tiptur-572201.

Abstract: Artificial Intelligence is that the computational complexity of general intelligence may be exponentially hard which happens with Machine Learning. The field itself, and the evolution of natural Water is basic pre-condition for life. Water of good drinking quality is of basic importance to human physiology and the existence of human being is very much depends on its availability. The assessment of Tiptur lake water quality for suitability for drinking and domestic purpose was carried out during November 2020 to August 2021 and evaluate the water quality status through its physicochemical parameters such as AT, WT, P^H, TDS, EC, TA, TH Ca^{++} , Mg^{++} , Cl^-,DOM , SALINIITY, DO ,BOD, Na^+, K^+, PO_4, SO_4 and Fe. The results were compared with BIS Standard [1991]and WHO [1993] drinking water standards. The results revealed that most of the parameters were in normal range and indicated suitability for drinking purposes, and Artificial Intelligence applied for processing the samples with attributes and parameters with the test set. A total of 37genera of phytoplankton were recorded, of which chlorophycean and diatoms were found to be dominant among four classes. Four protozoa were recorded.

Key words: Tiptur-Lake, water quality, Human physiology, physicochemical parameters, suitability, BIS and WHO, Phytoplankton oligotrophic, Artificial Intelligence.

INTRODUCTION:

Water is indispensable and one of the precious natural resources of our planet. Water is the precious gift graced by the nature to the human race.[Water pollution ,V K Berry] Water is one of the major constituents of life supporting system .water is essential for existence of life on earth .water ,indeed a wonderful medium ,which has unique properties of dissolving and carrying in suspension of huge varieties of materials .It is strongly believe that first life originated in the ocean ,Hence sea is called mother of life.2/3 of the earth surface is covered by water but is not suitable for the sustenance and perpetuation of land plants and animals. surface water is about 2% of the global water resources is most suitable for the very existence of all land plants and animals and out of this only 1% of freshwater is in river ,streams, lakes, ponds

IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Vol. 10, Issue 9, September 2021

DOI: 10.17148/IJARCCE.2021.10902

tanks and reservoirs is available to all forms of living beings [P K Goel 2006] Quality and quantity of water at a place plays a vital role in health ,wealth and prosperity of the region .

The modern civilization, rapid industrialization, modern agriculture and increased population have led to rapid degradation of our water bodies. The study of water quality assessment is very essential and crucial to know its suitability for drinking and domestic purposes.

Lack of awareness, unscientific methods of waste disposal, improper water management and negligence damaged not only the aquatic systems but also its biological composition. According to W H O [1984] 30% to 40% of human diseases occurred due to impurities of water. Any physicochemical characteristics of water not only alters its quality but also disturbs aquatic environment and affects aquatic life [pawar and panderkar 2011].The aquatic forms play an important role in the biosynthesis of organic matter[primary production] in aquatic ecosystem, which directly or indirectly serve all the living organisms of a water body as food .The planktonic study is a very useful tool for the assessment of water quality of a water body and also contributes to understanding of the basic nature and general economy of the tank .

Study Area: Tiptur talukis about 75 KM from Tumkur [Dist] Karnataka .It is in southern peninsular India having east latitude of 13^0 23' degree and north longitude 76^0 29'degree at an altitude of 850 .3 m above sea level .It covers an of 758.5 sq Km .The Tiptur lake is located 0.2 Km from Tiptur, spread over 25 acres .The tank hold 150 million gallon of water , not only the prime source of drinking water for Tipturians but to replenish the dreaded ground water in around the feeding area. Tiptur lake is one of the important , major water supply resources to Tiptur town and Surrounding areas for the human domestic and even for drinking purposes.

The present aim of the research work is to carryout hydro chemical analysis of water quality of Tiptur lake so as to examine whether it is suitable for drinking and other domestic purposes or not.

MATERIALS AND METHODS BY AI SAMPLING :

Water samples were collected from Tiptur lake on monthly basis from November 2020 to August 2021 .samples were collected in two liter capacity polythene containers which were acid treated and dried previously . The parameters like AT, WT, P^H ,TDS ,EC were measured at the spot and samples were brought to the laboratory where other parameters were determined by following the standard methods of APHA [1995] and Trivedy and Goel [1986] .TDS and EC were measured using digital conductivity meter. Salinity and turbidity were analyzed using micro –controlled water analyzer Kit 371 and the data are processed with the algorithm to check the reliability and efficience.

RESULTS AND DISCUSSION:

The results obtained from analysis of Tiptur lake water are given in table 1 and 2 showing minimum, maximum and average of hydro chemical analysis of water parameters during the study period. The results were compared with W H O 1963, BIS 1991 drinking water standards.

IJARCCE

ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Vol. 10, Issue 9, September 2021

DOI: 10.17148/IJARCCE.2021.10902

An average values of hydro chemical parameters from Nov 2020 to August 2021Table -1 .

SL NO	MONTH/PARAMETER	14-Nov	14-Dec	15-Jan	15-Feb	15-Mar	15-Apr	15-May	15-Jun	15-Jul	15-Aug	15-Sep	15-Oct	AVERAGE	STD
1	AT	23.4	19.89	29.49	28.8	22.57	26.28	26.5	23.6	23.55	24	24.75	23.4	24.68583	
2	WT	24.34	24.8	26.4	26.39	26.73	26.8	26.9	27.3	25.5	25.8	25.6	24.5	25.92167	
3	PH	9	9.06	9.5	9.41	9.36	8.02	7.6	8.44	7.6	7.82	7.9	8.6	8.525833	
4	EC	70.625	81.31	91.125	92	119	144.2	141.69	151	176	172	170	70	123.2458	
5	TDS	34.8	40.31	45.25	45.56	59.75	68.81	71.38	76	91	91	84.9	34.3	61.92167	
6	TUR	0.615	0.72	0.378	0.751	3	4.28	4.28	3.1	3.35	3.17	2.95	0.653	2.270583	
7	SALINITY	0.049	0.06	0.0615	0.0675	0.08	0.09	0.1	0.128	0.112	0.295	0.24	0.164	0.120583	
8	ALKALINITY	61.25	63.44	78.93	62.75	63.13	79.06	91.88	73.12	90	95.5	88.8	66.81	76.2225	
9	TH	35.87	37.69	42.125	47.375	47.38	49.38	57.13	52.37	58.37	58.375	57.58	35.98	48.30208	
10	Ca	3.77	3.83	4.88	5.053	8.09	7.33	6.74	7.43	8	7.95	7.85	3.9	6.23525	
11	Mg	2.208	2	3.081	2.64	2.16	3.56	3.01	2.258	2.37	2.425	2.51	1.4268	2.470733	
12	CL	15.71	15.53	18.02	18.215	20.29	19.88	21.37	24	28.7	28.51	28.268	15.963	21.20467	
13	FREE CO2	6.91	7.49	12.57	13.075	7.76	7.74	14.3	12.37	12.05	10.65	11.15	7.19	10.27125	
14	DOM	1.88	2.02	2.53	1.92	2.88	3.13	3.38	4.28	3.6	5.15	3.51	2.07	3.029167	
15	DO	6.1	7.1	8.425	8.7	8.2	8.38	7.64	8.4	7.78	7.5	8.23	6.71	7.76375	
16	BOD	1.175	1.35	1.375	3.85	2.55	1.44	3.09	1.55	1.45	1.1	0.981	1.71	1.80175	
17	SO4	4.95	5.9	6.005	6.581	5.4	5.73	5.42	11.89	11.84	11.25	5.7	6.131	7.233083	
18	PO4	0.033	0.057	0.051	0.083	0.17	0.23	0.05	0.055	0.09	0.141	0.076	0.041	0.08975	
19	Na+	1.43	1.91	1.825	1.91	2	1.63	1.08	0.091	1.67	1.18	1.28	1.21	1.434667	
20	Fe++	0.41	0.16	0.375	0.392	0.13	0.06	0.4	0.122	0.068	0.1	0.1361	0.045	0.199842	
21	K+	1.23	1.54	1.363	1.91	2.1	1.04	0.21	0.51	0.371	1.703	0.265	0.701	1.078583	

All values are expressed in mg/L except P^H ,temperature [^{0}C] ,turbidity [N T U] and conductivity [µ mhos/cm]

Table -2

	AT	WT	PH	EC	TDS	TURBIDITY	SALINITY	ALKALINITY	T H	Ca	Mg	Cl	FreeCo2	DOM	DO	BOD	So4	Po4	Fe	Na	k
MIN	19.8	24.3	7.6	70	34.3	0.37	0.04	61.2	35.85	3.77	1.4	15.53	6.91	1.88	6.1	0.98	4.95	0.03	0.045	0.091	0.21
MAX	29.49	27.3	9.41	176	91	4.28	0.29	95.5	58.3	8.09	3.56	28.7	15.27	4.28	8.42	3.85	11.89	0.23	0.39	2	2.1
AVE	24.6	25.9	8.5	123.2	61.9	2.27	0.12	76.12	76.22	6.2	2.4	21.2	10.2	3	7.7	1.8	7.2	0.089	0.199	1.43	1.07
SD																					

Water temperature: Water temperature of the samples were varied from a minimum of 24.3^{0}C to a maximum of 27.3^{0}C with an average of 24.6^{0}C . Minimum temperature was observed in the month of December [winter] and maximum was observed in the month of January .

P^H: Biochemical and chemical reactions occurring in water are determined by p^H. In the studied period sample P^H was from 7.6 to 9.4 with an average of 8.5 indicating slight basic nature of the samples. Anyhow P^H was within the permissible limit of BIS [1991][P^H 6.5 -8.5]

Electrical conductivity :**[E C]**

Electrical conductivity is the important parameter of water and it depends on the nature and concentration of ionized salts .Electrical conductivity is used to measure the ability of water to carry an electric current. More the conductivity of water ,lesser in its resistance to electric flow ,there by indicating higher concentration of dissolved salts higher tropic status of the system [Kumar and siddique 1997] . Absolutely pure water is a poor conductor of electricity . water shows higher conductivity when dissolved salts are present .The conductivity is proportional to the amount of the salts dissolved in water.

During investigation, conductivity values were ranged from 70 µs /cm to176µs/cm and it is within the desirable limit 1500µs /cm of BIS [1991].

Total dissolved solids : In water ,total dissolved solids are composed mainly of carbonates ,bicarbonates ,chlorides ,phosphates and nitrates of calcium ,magnesium ,sodium ,potassium and organic matter ,salts and other particles .High values of T D Sand sulfates in drinking water may affect those persons who are suffering from kidney and heart diseases.[Gupta et al., 2004]

Analysis of solids is important in the control of biological and physicochemical treatment processes [APHA 1995]

The drinking water containing more than 500 mg /l of TDS is not considered desirable and it can cause excessive scaling in water pipes, water heaters and house hold appliances.[Ashwin G Godghats et al may 2013] .During investigation ,TDS

IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Vol. 10, Issue 9, September 2021

DOI: 10.17148/IJARCCE.2021.10902

values of the samples were found in the range of 34.8 mg/l to 91Mg/l with an average of 61.91mg/l and falling with in the desirable limit [500mg/l] of BIS

Dissolved oxygen

D O is one of the important factors influencing the quality of water, therefore it is considered as one of the parameters to assess the quality of water. Dissolved oxygen is a remarkable indicator of pollution [S B. Basavaraddi etal.,2012] The concentration of the D O regulates the distribution of flora and fauna of the water body and it also reflects the physical and biological processes prevailing in the water. Oxygen saturated water has pleasant taste while the water lacking oxygen has an insipid taste. The un polluted water is normally saturate with D O ,while presence of oxygen demanding pollutants causes rapid depletion of D O. The D O value ranged from 6.1mg/l to maximum of 8.42 mg/l . In present study higher value of D O was observed in the month of February due to higher photosynthetic activities . In the present study the DO value is above the standard value of both W H O and B IS ie 5 mg /l .

Biological oxygen demand: BOD is a parameter to assess the organic load in a water body. The amount of oxygen required by the aerobic decomposers for the biological breakdown of organic materials in water .It determines the strength of sewage effluents and other polluted water [Mahinda 1981] .High BOD indicates higher consumption of oxygen and a higher pollution in water . BOD values ranged from minimum of .98 mg/l to 3.85 mg/l .In the present study the values of BOD were within the permissible limits of B I S standardsie 2 mg/l .

Salinity: The measure of the salt content of water is called salinity .It is an important factor in determining many aspects of chemistry of water and of biological process with in it. Salinity of water samples were ranges from .o4 ppt to .29ppt /l .

Total hardness:

Total hardness of water is the sum of concentration of alkaline earth metal cations such as $ca^{++}$and $mg^{++.}$ It is the total soluble magnesium and calcium salts presents in water expressed as its $CaCo_3$ equivalent .The total hardness up to 200mg/l is desirable as per the standards set by BIS for drinking water. The hard ness beyond this limit cause encrustation of water supply structure and adversely affects the domestic use [Raghavendran 1992]

The hardness values of the samples were ranged from 35.85 mg/l to 58.3 mg/l with an average value of 76.22 mg/l and it was with n the desirable limit [200mg/l] of BIS

As the hardness values of the water samples were in the range of 35.8 mg/l to76.22 mg/l and it could be under ‘soft” class as per Handa’s [1965] classification [S. B. Basavaraddi *et al.*,2014].

Calcium: content of water in the present study was found in the range of 3.77 mg/l to 8.09 mg/l with an average value of 6.2 mg/l .The value is well below the desirable limit [75mg/l] of BIS 1991 guideline .similarly, Magnesium content varied from 1.4 mg/l to 3.56mg/l with an average value of 2.4mg/l .

$Ca^{++}$and mg^{++} are both essential minerals for living organisms, both the minerals occur in all kinds of natural water with Mg^{++} concentration generally lower than the calcium [Jamrakarchirikashova April 2014]. Magnesium is usually occurs in lesser concentration than calcium due to the fact that the dissolution of magnesium rich minerals is slow process and that calcium is more abundant in earth ‘s crust .

Total alkalinity :

The alkalinity of the water samples was ranged from 61.2 mg/l to 95.5 mg/l with an average value of 76.12 mg/l and were in the desirable limit level [200mg/l]of BIS

IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Vol. 10, Issue 9, September 2021

DOI: 10.17148/IJARCCE.2021.10902

Chloride:

Chloride is often associated with sodium since Nacl is a common constituent of water .chloride is an important parameter in assessing water quality .it controls the salinity of water and osmotic stress on biotic communities .chlorides increases the level of eutrophication [Goel et al., 1980]

Chloride concentration higher than 200mg/l is considered as risky for human consumption and causes unpleasant taste of water. Chloride ion concentration of water sample is known to depend upon the characteristics of sediments and the pollution load of the water body [shivanna and Nagendrappa 2012].water quality can be assessed by its chloride content .low chloride content indicates pure water. High chloride content indicates polluted water.

In the present study the chloride content was found in the range of 15.53 mg /l to 28.7mg/l with an average value of 21.2mg/l .The values are well below the WHO guidelines for drinking water.[maximum permissible level 250 mg/l]

Free CO_2: It is an important aspect in aquatic environment .The CO_2 is highly soluble in water. CO_2 is a byproduct of respiration and it also provides a carbon source for photosynthesis .Free CO_2 helps in buffering the aquatic environment against rapid fluctuation in acidity or a CO_2-alkalinity and also regulates biological process of aquatic communities [PrasannaKumari et al ., 2003] . Free CO_2 values ranged from 6.9 mg/l to 15.27mg/l with an average value of10.8 mg/l

Dissolved organic matter :

D O M comprises of soluble organic materials derived from the partial decomposition of organic materials including soil ,organic matter ,plant residues and soluble particles released by living organisms including bacteria ,algae, and other plants .D O M provides carbon rich nutrients to microbes helps in nutrient cycle .DOM is measure of organic pollution .water bodies containing low D O M utilize less dissolved oxygen for decomposition .DOM values ranged from 1.88 mg/l to 4.28mg/l with an average value of 3 mg/l

Sulphate:

The sulphate ion is one of the major anions occurring in natural waters. Sulfate in water imparts offensive odour, objectionable taste and laxative effects. The values of sulfate were found between 4.95 mg/ to11.89 mg/l .The maximum value was recorded in the month of January and minimum value was recorded in the month of November .It is with in the permissible limit of 200mg/l .

Phosphates:

phosphate is considered as the most critical single element for biological productivity .Increased level of phosphate is taken up by phytoplankton ,which lead to algal blooms .phosphate content ranged from 0.03 mg/l [November] to .23 mg/l [April]with an average of .089 mg/l is very much less in the water body .

Iron:

Iron is the fourth abundant element by weight in the earth's crust and it is present in the ferric state in surface waters. The values of Iron were found between .o45 mg/l to .39 mg/l with an average value of .199 mg/l and it is with in the permissible limit of.3mg/l [BIS [1998]] .For drinking purpose ,Iron content should be less than 0.25 mg/l

Potassium : Potassium is one of the major cations in water and soil .In this study ,the concentration of potassium ions varied from as low as 0.21mg/l to ashigh as2.1 mg/l with an average of 1.07/l mg and it is with in the permissible limit. Boyd [1978] considered a concentration of 1.3 mg/l to be critical level of potassium in fresh water ponds .High clay and organic matter content of productive fish ponds soil [singh and Ram ,1974] , associated with alkaline P^H values usually tend to maintain moderate to good amount of potassium [K] in pond water . [chattopadhyay ,1995] However ,with increasing use of N and P fertilizers , potassium is gradually becoming the limiting nutrient [chattopadhyay ,1998] . Lower concentration of potassiumcation leads to hypokalaemia(lowered plasma [K^+]) and when level is raised leads to hyperkalaemia (increased plasma[k^+]) and hyperkaluria (increased urinary excretion of K^+)

IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Vol. 10, Issue 9, September 2021

DOI: 10.17148/IJARCCE.2021.10902

Sodium : Sodium concentrations were found in between 0.091 mg /l to 2 mg /l with an average value of 1.43 mg/l and it is with in the permissible limit. The concentration of sodium present in the water body is more than potassium .sodium is the major cation of the extracellular fluid when its level is decreased ,Hyponatraemia is developed and hypernatraemiais developed when its level is raised.

Phytoplankton :The term plankton refers to those microscopic aquatic forms having little or no resistance to currents and living free –floating and suspended in natural waters. Phytoplankton occur as unicellular ,colonial or filamentous forms .

Aquatic algae usually occur in ponds ,pools, ditches, streams, Tanks or in slow running rivers and are called fresh water forms .The free floating and free swimming microscopic algal forms together with other similar organisms constitute the planktons of the water bodies.

One of the remarkable aspects of the tank environment is the large number of phytoplankton species that are present at any given time .Such species diversity appears as a paradox [Hutchinson,1967].

Phytoplankton play an important role in the biosynthesis of organic matter [primary production] in aquatic ecosystems, which directly or indirectly serve all the living organisms of a water body as food .The planktonic study is a very useful tool for the assessment of water quality in any type of water body and also contributes to understanding of the basic nature and general economy of the tank .

The species composition and the density of the phytoplankton determine the productivity status of a water body. Phytoplankton are the principal producers in a water body .Based on the density of phytoplankton ,the water bodies are classified into non productive or oligotrophic and highly productive or eutrophic .oligotrophic water bodies support only a few species ,whereas eutrophic water bodies support large number of species .

Diversity can be measured by recording the number of species, by describing their relative abundance or by using a measure, which combines the two components. Diversity measures are more useful in tank ecosystem ,which harbor a large variety of algal species in general ,and species diversity within genera. The present study is based on the data collected over a period of one year on the distribution of algal biodiversity in the Tiptur lake.

METHODS AND MATERIALS

Phytoplankton were collected from the tank and 25 ml of 4% formaldehyde was added [Welch,1948]and sedimentation was done in glass column .The sediments were finally reduced to 20 ml by centrifugation and were preserved in glass vial .From each vial, sample was mounted on microscopic slide and a cover slip was carefully put over it and observed under microscope at both low and high power .These observations at random and were repeated four times for each of the samples. The average counts of algae were determined as organisms /unit/per liter [o/u/I].

Plate 1. Diversity of Phytoplankton of Tiptur Lake .

A total of 33 phytoplankton and 5 protozoans were identified. Among phytoplankton, members of Chlorophyceae and Bacillariophyceae appear to be dominant as compared to other classes.

Lepocinclisovum, Lepocinclisacuta, Euglena acus, Euglena gracilis and Verticella sp were noted among Protozoans.

Table -3 List of phytoplankton.

Phytoplankton

Class: Cyanophyceae :

Gloeotrichia sp , Spirulinanordatedtie , Merismopediatenuissima , Oscillatoria sp , Microcystiscrassa ,

Class: chlorophyceae :Oocystisgigas , Spirogyra crassa , Bulbochaetaeangulosa , Ulothri , Zygnema sp , Pediastrum simplex , Pediastrum , Closteriumlumula , CosmariumlundeliiCosmariummargaritatum , Tetraedroncaudatum , Tetraedronmutium , Desmidiumswartzii ,Desmidiumquadratum , Stegeoclonium sp , Scenedesmusquadricauda , Closteridium ,Schroederia sp.

class: Bacillariophyceae : Naviculasphaerophora , Nitzschia sp , Gomphonemagracile , Cymbellacymbeliformis , Pinnulariagibba , Synedra ulna , Synedraacus , Surirellasplendida , Stauroneisphoenicentrum.Fragilaria sp .

IJARCCE

ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Vol. 10, Issue 9, September 2021

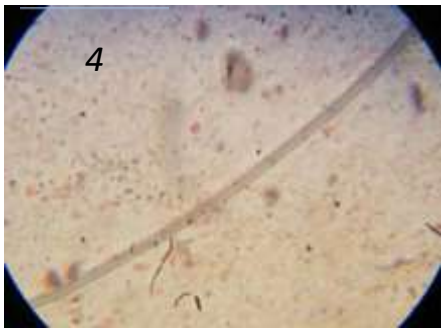
DOI: 10.17148/IJARCCE.2021.10902

1. Gloeotrichia sp

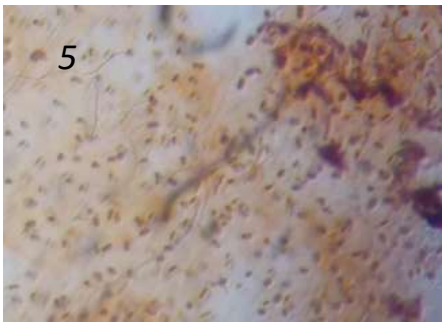
2.Spirulina nordatetii

3. Merismopediatenuissima

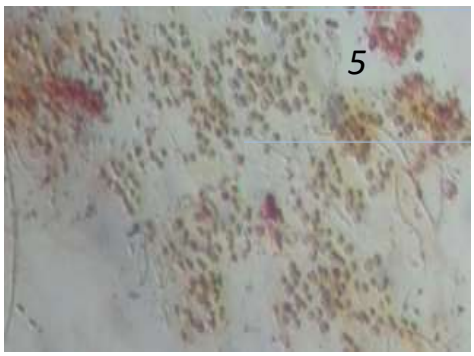
4.Oscillatoria

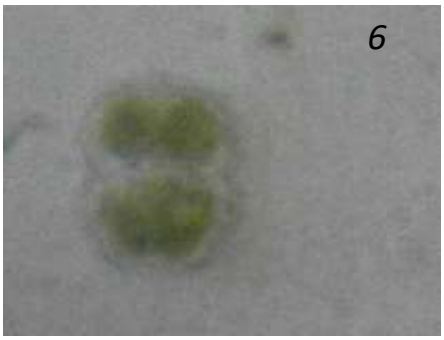


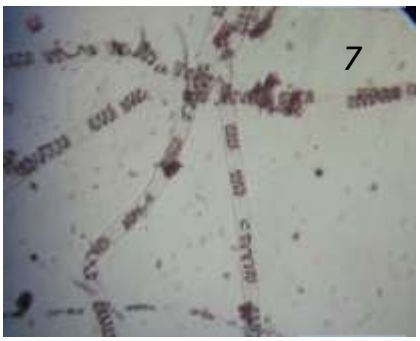
5.Microcystis crass



6. Oocystisgigas

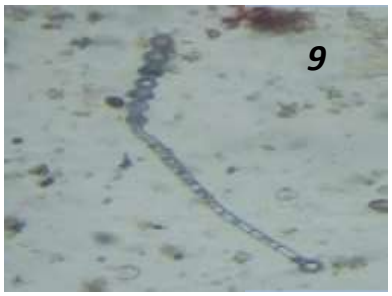




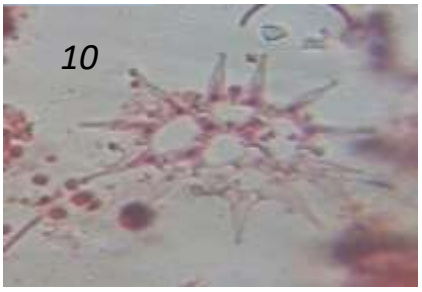


7.Spirogyra

8. Ulothrix sp



9. Zygnema sp



10. Pediastrum simplex

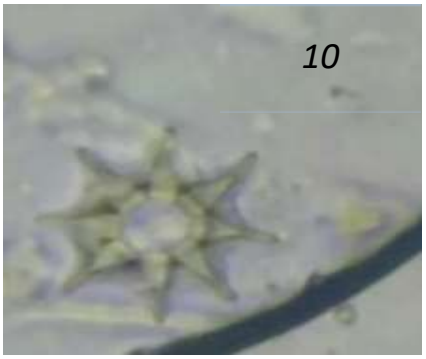
IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

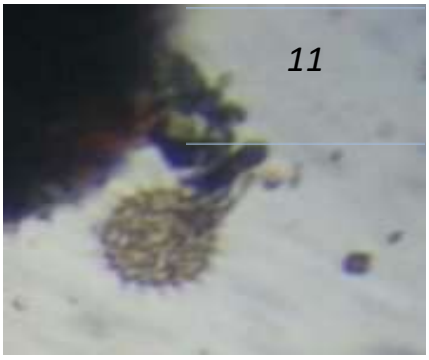
International Journal of Advanced Research in Computer and Communication Engineering

Vol. 10, Issue 9, September 2021

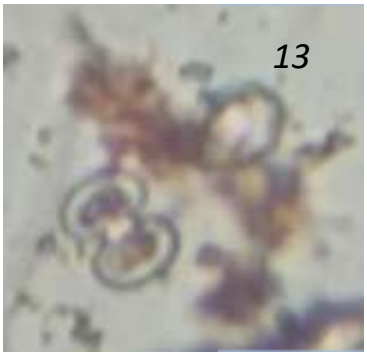
DOI: 10.17148/IJARCCE.2021.10902

15.Tetraedron mutium 16.Tetraedroncaudatum 17.Desmediumswartzii 18.Desmidiumquadratum

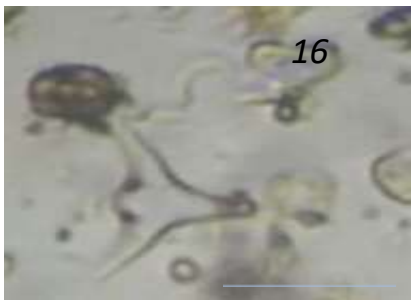


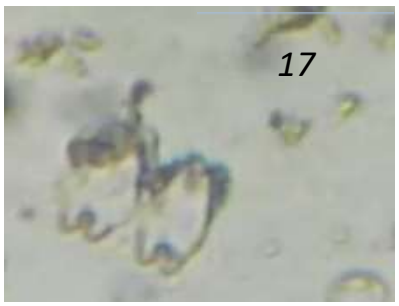


11. Pediastrum duplex

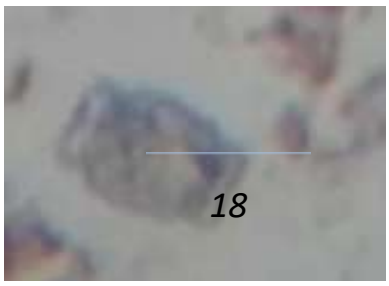


12. Closteriumlunula **13.Cosmariumlumula** **14. Cosmariummargaritatum**





15**.Tetraedron mutium** **16.Tetraedroncaudatum** **17.Desmediumswartzii**



18.Desmidiumquadratum

IJARCCE

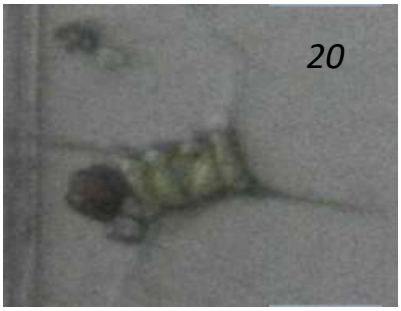
ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

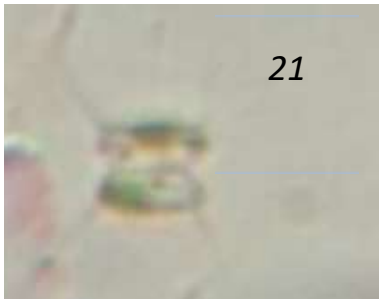
Vol. 10, Issue 9, September 2021

DOI: 10.17148/IJARCCE.2021.10902

19.Stegeoclonium

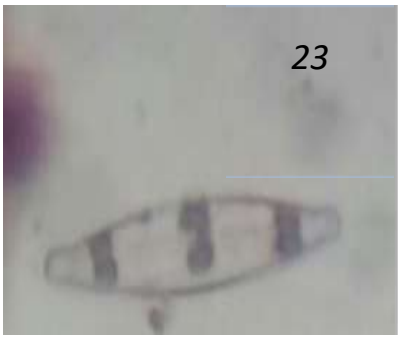


20.Scenedesmusquadricauda

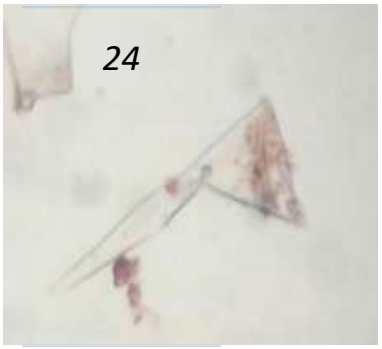


21.Schroederia

22. Naviculasphaerophora

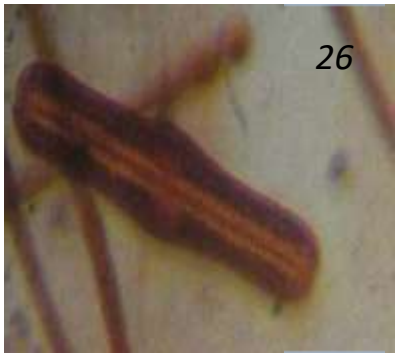


23 .Nitzschia

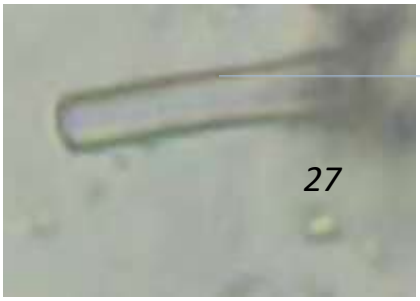


24. Gomphonemagracile

25 Cymbellacymbeliformis



26. Pinnulariagibba



27 .Synedra ulna

IJARCCE

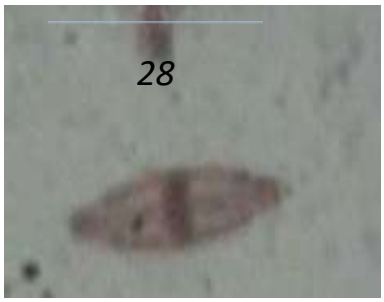
ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

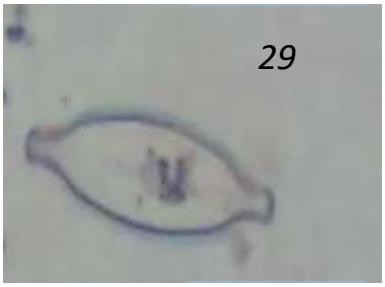
Vol. 10, Issue 9, September 2021

DOI: 10.17148/IJARCCE.2021.10902

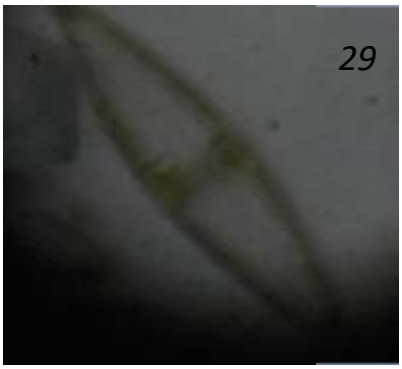
28.Surirellasplendida



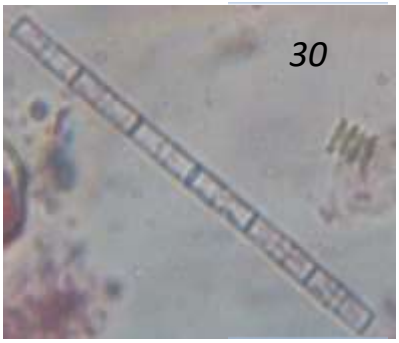
28.Surirellasplendida



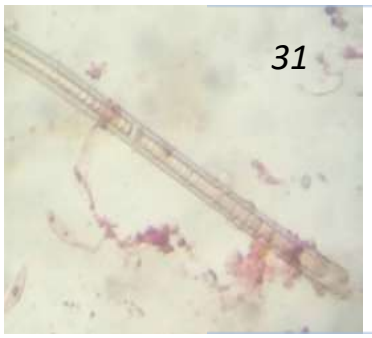
29 .Stauroneisphoenicentrum



29 .Stauroneisphoenicentrum



30. Melosiraislandica



31.Synedra acus

32 .Nitzchiasublinearis

33.Fragilaria sp.

34. Auxosporeformation inpinnularia.

IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

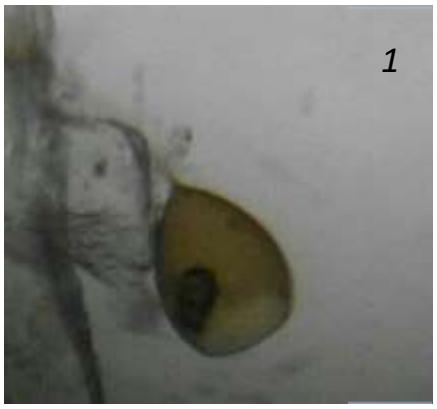
International Journal of Advanced Research in Computer and Communication Engineering

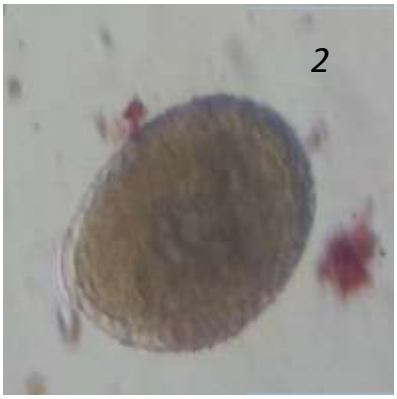
Vol. 10, Issue 9, September 2021

DOI: 10.17148/IJARCCE.2021.10902

Zooplanktons in Tiptur Lake.

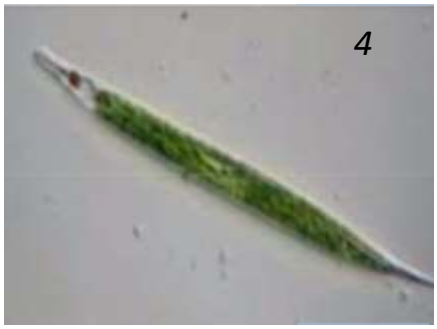
Protozoa: 1.Lepocinclisovum 2.Lepocinclisacuta 3. Euglena gracilis 4.Euglena acus 5.Verticella sp.

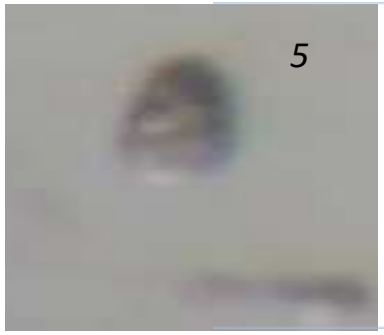




1] Verticella sp

2] Lepocinclisacuta





3] Lepocinclis ovum

4] Euglena acus

5] Euglena sp .

The presence of bioindicators of pollution [phytoplankton and protozoans]indicates the occurrence of organic pollution .

CONCLUSION :

Thus the Artificial Intelligence works better for analyzing the water quality index and phytoplankton presence in the water with the study area taken into consideration for our analysis that is Tiptur lake.

1.The present investigation of water quality analysis reveals that Tiptur Lake water is safe for drinking and domestic purposes as per standards set by BIS.

2. Analysis of tank water slight alkaline in nature, need of some treatment for minimizing the said parameter .

3. During study Period, it is learnt that grazing of animals inside the tank during summer season and other anthropogenic activities add some organic waste in to the tank , cause for pollution .

4. In the present study phytoplankton diversity was observed [bioindicators].

5. Along with some common Zooplanktons were also observed indicating pollution of water. Hence tank water requires treatment before use by municipal authorities.

Vol. 10, Issue 9, September 2021

DOI: 10.17148/IJARCCE.2021.10902

ACKNOWLEDGEMENT:

The author is greatful to Kalpataru Vidya Samsthe, Principal, Kalpataru Institute of Technology, Malnad College of Engineering and NEFTU for their continues support and encouragement to complete this work.

REFERENCES:

1. APHA 1998,standardmethods for examination of water and waste water ,20th ed. American public Health Association, Washington .DC.
2. S . B. Basavaraddi ,HeenaKousar and E T Puttaiah ' Hydrochemical analysis and classification of ground water in Tiptur Town and its surrounding areas " Tumkur dist. .Nature environment and pollution technology ,ISSN 6972-6268,Vol 13,NO-2 pp315-320,204.
3. A M Shivanna and Nagendrappa ,Analysis of water quality of Albur tank in Tiptur taluk of Karnataka through physicochemical characteristics .
4. Tamrakarchirikashova,-'Evaluation of physicochemical characteristics of drinking water supply in Kathmandu, Nepal, Research journal of chemical sciences ,vol 4[4],33-36,april [2014.]
5. R K Trivedi and P K Goel , chemical and biological methods of water pollution studies environmental publication ,Karad ,1986.
6. Ashwin G Gdghays , International research journal of environmental science ,vol 2 [5] may [2013]
7. An evaluation of physicochemical parameters to assess bore well water quality from Madhyal and Vadgaon of Kagal Tahsil ,M S, India.
8. B I S 1993.Drinking water standards Bureau of indian Standards , New Delhi .
9. pawar B A and Panarkar A K 2011: studies on water quality of Kelawad lake in relation to pisciculture, maharashtra .UP.J Zoo.,1[1] 35-41.
10. R.C Dubey, D .K Maheswari .Water and Waste water microbiology .2nd edition ,I S B N -81, S .chand publication .
11. H. A. Sayeswara ,Maheshanandgouder and R.Manjunatha .water quality evaluation and phytoplankton diversity of Hosahalli pond ,shivamogga,Karnataka . Int,J , sci : 9[2] 2011, 805- 815 ,ISSN 0972-768x .
12. Shankar p. Hosamani .phytoplankton diversity in lakes of Mysore dist .The Ecoscan/4[1]:53-57,2010.
13. Shankar p. Hosamani .Fresh water algae as indicators of water quality .universal journal of Environmental Research and Technology .Eissn 22490256 ,2013 volume 3,issue 4:473-482.
14. Aniruddha Nag ,Hema Gupta [Joshi] –physicochemical analysis of some water ponds in and around santiniketan ,West Bengal ,India .international journal of environmental sciences volume 4, No 5 ,2014 .ISSN 0976-4402.
15. Amrutkar R. D , Thube A. E,Kulkani S. C , Determination of Sodium and Potassium content present in water sample collected from Girna and Godavari River by Flamephotometry .JPSBR:Volume 3,issue 3:May 2013 [105-107] .
16. *Mr.Chethan Chandra s basavaraddi*, "Performance Evaluation Of Mesh And Position Based Hybrid Routing In MANETs", *Irnet International Conference On Computer Science and Engineering(ICCSE)-February 3rd , 2012- Nagpur, ISBN-978-93-81693-17-9.*
17. *Mr.Chethan Chandra s basavaraddi,* "Current Project Work on Routing Protocols For MANET: A Literature Survey", *Irnet International Conference On Computer Scienceand Informatics(ICCSI)-March 9th , 2012-Hyderabad, ISBN-978-93-81693-25-4.*
18. *Mr.Chethan Chandra S Basavaraddi*," A New Routing Algorithm in MANETS: LocationAided Hybrid Routing", *Chethan Chandra S Basavaraddi et al* ,Int.J.Computer Technology & Applications,Vol 3 (2), 760-765 760 ISSN:2229-6093.
19. *Chethan Chandra S Basavaraddi,* "Performance Analysis of Mesh and Position Based Hybrid Routing In MANETS: A Comprehensive Study", *Chethan Chandra S Basavaraddi et al ,Int.J.Computer Technology & Applications,Vol 3 (2), 804-812 804 ISSN:2229-6093.*
20. *Mr. Chethan Chandra S Basavaraddi,* "A Comparative Analysis Of Two Position Based Hybrid Routing Algorithms Over MANETs", */International Journal Of Computational Engineering Research / ISSN: 2250–3005 IJCER | Mar-Apr 2012 | Vol. 2 | IssueNo.2 |540-546* Page 540.
21. *Mr. Chethan Chandra S Basavaraddi*, "Current Project Work On Routing Protocols for MANET: A Literature Survey", *International Journal of Scientific and Engineering Research (IJSER) - Volume 3, Issue 5, May 2012 (ISSN 2229-5518).*
22. *Mr. Chethan Chandra S Basavaraddi,* "Performance Evaluation Of Mesh And Position Based Hybrid Routing In MANETs*", International Journal of Scientific and Engineering Research (IJSER) - Volume 3, Issue 5, May 2012 (ISSN 2229-5518).*
23. *Mr. Chethan Chandra S Basavaraddi,." A* Comparative Performance Analysis Of Two Position Based Hybrid Routing Algorithms Under Mobility Speed Over Manets", "*International Conference On Recent Trends In Computer Science And Engg. (Icrtcse 2012) held at May 3rd & 4th 2012. Apollo Engineering College Sriperumbudur, Kanchipuram – 602105. Tamil Nadu, South India.*
24. *Mr. Chethan Chandra S Basavaraddi," A* Stable Route Selection in PBHRA for MANETs", "*Nationalconference Advances in Electronics & communicationTechnology(NCAECT 2012) May 18th, 2012. Dept of Studies and Research inElectronics Kuvempu University, Shankaraghatta-577451 Shimoga Dist, Karnataka.*
25. *Mr. Chethan Chandra S Basavaraddi," A* PBHRA IN MANETs", "*National conference on Emerging Mobile Technologies And Policies (NCEMTP-2012) 28th May 2012 to 30th May 2012. Organized by Department of Telecommunication Engineering, M.S.*

DOI: 10.17148/IJARCCE.2021.10902

RAMAIAH INSTITUTE OF TECNOLOGY, Bangalore-560054.

26. *Mr. Chethan Chandra S Basavaraddi,* "A Comparative Analysis Of Two Position Based Hybrid Routing Algorithms Under Mobility Speed Over MANETs", *International Journal of Research and Innovation in Computer Engineering , ISSN 2249-6580, Vol 2, Issue 3, June 2012, (285-291).*

27. *Mr. Chethan Chandra S Basavaraddi, "*MANETs Application on Environment*", UGC sponsored National conference on Perspectives of Physics in ReducingEnvironmental Pollution, Kalpataru First Grade Science College, Feb 2014, Tiptur-572002.*

28. *Mr. Chethan Chandra S Basavaraddi,* "How hard is English – Kannada Machine Translation", *International seminar on Computational linguistics on Indian Languages*
,held by CDAC,IIIT-Trivandrum & Kerala university, Thrivandrum, feb-2014.

29. *Mr. Chethan Chandra S Basavaraddi,* "A Typical Machine Translation System for English to Kannada", *International Journal of Scientific & Engineering Research, Volume 5, Issue 4, April-2014, ISSN 2229-5518.*

30. *Mr. Chethan Chandra S Basavaraddi,* "Current Project Work on English to Kannada Machine Translation System: a Literature Survey on NLP",*Int.J.Computer Technology & Applications,Vol 5 (3),1254-1275,2014.*

31. *Mr. Chethan Chandra S Basavaraddi,* "Simultaneous Prediction of Stock Market Investments by Analyzing Sentiments: A Supervised Joint Aspect Model",
NC*ETSE2018.*

32. Chethan Chandra S Basavaraddi, "Privacy policy controlling for OSN users" ISSN (Online): 2347-2820, Volume -4, Issue-8, 2016, International Journal of Electrical, Electronics and Computer Systems (IJEECS).

33. Chethan Chandra S Basavaraddi, "Single Hop Cryptographic Server Based Data Sharing in Cloud" ISSN (Online): 2347-2820, Volume -4, Issue-8, 2016, International Journal of Electrical, Electronics and Computer Systems (IJEECS).

34. *Chethan Chandra S Basavaraddi,* "Face Recognition Using Hybrid Neuro Fuzzy Network for Occluded Images", *International Journal of Science and Research (IJSR), ISSN: 2319-7064, ResearchGate Impact Factor (2018): 0.28 | SJIF (2019): 7.583.*

35. *Chethan Chandra S Basavaraddi,* "Face Recognition from Feed Forward Neural Network for Occluded Images Using Hybrid Neuro Fuzzy Network", *International conference on Recent Advancements in Wireless Communications, Signal and Image Processin (ICWCSIP 2020),* Organized by Chenni Institute of Technology, from 29th-30th June, 2020.

36. *Chethan Chandra S Basavaraddi,* "FACE RECOGNITION FROM FEED FORWARD NEURAL NETWORK USING OCCLUDED IMAGES FOR AUTOMATING THE SURVEILLANCE USING HYBRID NEURO FUZZY NETWORK", International Journal of Engineering Applied Sciences and Technology, 2020 Vol. 5, Issue 2, ISSN No. 2455-2143, Pages 508-519 Published Online June 2020 in IJEAST (http://www.ijeast.com).

37. *Chethan Chandra S Basavaraddi,* "Multiple Object Tracking Using Hybrid Neuro Fuzzy Network Applied to Face Recognition from Feed Forward Neural Network", International Journal of Advanced Research in Computer and Communication Engineering Vol. 9, Issue 7, July 2020, DOI 10.17148/IJARCCE.2020.9707, ISSN (Online) 2278-1021 ISSN (Print) 2319-5940.

38. *Chethan Chandra S Basavaraddi,* "Deep Affinity to Multiple Object Tracking Using Hybrid Neuro Fuzzy Network Applied to Face Recognition", Journal of Seybold Report, VOLUME 15 ISSUE 8 2020 ,ISSN NO: 1533-9211.

39. *Chethan Chandra S Basavaraddi,* "Deep Learning Based Multiple Object Tracking for Facial Images Using Hybrid Neuro Fuzzy Network", International Journal of Scientific & Engineering Research Volume 11, Issue 8, August-2020 1096 ISSN 2229-5518.

40. *Chethan Chandra S Basavaraddi,* "Machine learning based recommendation system on movie reviews using KNN classifiers", ICACSE 2020 Journal of Physics: Conference Series 1964 (2021) 042081 IOP Publishing doi:10.1088/1742-6596/1964/4/042081.

41. *Chethan Chandra S Basavaraddi,* "Implementation of Client-Side Deduplication of Encrypted Data with Public Auditing in Cloud Storage", http://www.ijniet.org/issues/volume-17-issue-2-july-2021, ISSN: 2319-6319. UGC Approved Journal - 47645 Impact factor - 4.012.

42. *Chethan Chandra S Basavaraddi,* "Applying Artificial Intelligence to Studies on Water Quality and Phytoplankton Diversity of Eachnur Tank, Tiptur, Tumkur District, Karnataka, India", International Journal of New Innovations in Engineering and Technology, Volume 17 Issue 3 August 2021, ISSN: 2319-6319.

AUTHOR PROFILE:

Dr. Chethan Chandra S Basavaraddi[1]
Assistant Professor, Department of Computer Science & Engineering, Researcher- Mangalore University, University of South America -Dr. Radhakrishnan Research & Development Center India, North East . Frontier Technical University- AP.
Work: Kalpataru Institute of Technology,
Tiptur-572201.

Education: University BDT College of Engineering, Bangalore College of Engineering and Technology, Mangalore University, North East Frontier Technical University.

