International Journal of Advances in Engineering and Management (IJAEM)
Volume 4, Issue 9 Sep. 2022, pp: 1248-1256 www.ijaem.net ISSN: 2395-5252

Lifestyle Disease Prediction

Dr.D.J.Samatha Naidu[1], K.Mahesh[2]
Principal, Annamacharya PG college of computer studies, Rajampet.
MCA Student, APGCCS, Rajampet.

Date of Submission: 17-09-2022 Date of Acceptance: 28-09-2022

ABSTRACT
Diseases that are associated with the way aperson or group of people live are known aslifestyle diseases.Healthcare industry collects enormous disease-related datathat isunfortunately not mined to discover hidden informationthat could be used for effective decision making. This studyaims to understand support vector machine and use it topredict lifestyle diseases that an individual might be susceptibleto.

Moreover, we propose and simulate an economic machinelearning model as an alternative to deoxyribonucleic acidtesting that analyzes an individual's lifestyle to identifypossible threats that form thefoundation of diagnostic testsand disease prevention, which may arise due to unhealthy dietsand excessive energy intake, physical dormancy, etc. Thesimulated model will prove to be an intelligent low-costalternative to detect possible genetic disorders caused byunhealthy lifestyles

I. INTRODUCTION

A report prepared by the WorldHealth Organization andWorld Economic Forum says that India will incur anaccumulated loss of $236.6 billion by 2015 because ofmorbid lifestyles as well as imperfect diet [1]. Lifestyle anddiet are the two main factors that are considered to influencereceptiveness to various diseases. Diseases are mainly causedby a combination oftransformation, lifestyle selections, andsurroundings. In addition, identifying health risks in anindividual's family is one of the most crucial things anindividual can do to help his/her practitioner understand anddiagnose hereditarily linked syndromes like cancer, diabetes,and mental illness. Diseases that are associated with the waya person or group of people live areknown as lifestylediseases. They include atherosclerosis; heart disease andstroke; obesityand type II diabetes; and smoking andalcohol-related diseases.

This study aimsto understandsupport vector machine (SVM) and use it to predict lifestylediseases thatan individual might be susceptible to. The needfor public awareness is not stressed enough, but lifestylediseases areeasytoprevent.Simply modifying anindividual's lifestyle to reduce and eliminate risks can beinteresting. Deoxyribonucleic acid (DNA) and genetictesting are creating a newexpanse of personalized medicine.However, on an average, DNA testing may incur 10,000 to20,000 [2], which is expensive. Though there are manyreceding diseases and tests, theyare erratically testedbecause they are costly, and factual tests have not beendeveloped yet. Our lifestyles are imperative in increasing ordecreasing risks of various diseases. According to someconducted in the discipline of epigeneticsdetermines that an individual's lifestyle selections canmodify his/her well-being at genetic level. This study discusses about a model that can predictthe probabilities ofan individual obtaining a lifestyle disease. Lifestylediseasesdepend on factors like heaviness, workout, and food likingsand thus have a strong association with the abovementionedfactors. In our simulated model, an actor will input his/herlike fatness, sleeping habits and will discover thelikelihood of suffering from lifestyle diseases.The remainder of this manuscript is organized as follows.Section 2 a brief summary about related work inmachine learning (ML) domain. Section 3 focuses on MLand SVM (linear and multiclass) algorithm. Section 4explains the proposed system (block diagram and working)for lifestyle disease prediction. Section 5 presents simulationfor the system. Section 6 concludes thestudy with future scope.

OBJECTIVE
To develop machine learning algorithms in to detect possible genetic disorders caused by unhealthy lifestyles.

MOTIVATION
Propose and simulate an economic machine learning model as an alternative to

International Journal of Advances in Engineering and Management (IJAEM)
Volume 4, Issue 9 Sep. 2022, pp: 1248-1256 www.ijaem.net ISSN: 2395-5252

deoxyribonucleic acid testing that analyzes an individual's lifestyle to identify possible threats.

EXISTING WORK

In medical research the machine learning begins with a hypothesis and results are adjusted tofit the hypothesis. This differs from standard machine learning practice, which simply starts with datasets without an apparent hypothesis. According to the doctor intuition the clinicaldecision are often made.

LIMITATIONS

The quality of service provided to patients is affected due to unwanted bias, errors. Excessive medical cost

PROPOSED WORK

The proposed work represents recent method that improved algorithmsperformance and accuracy in distributed environment. In this project wehave done analysis using SVM, NB (Naive Bayesian) algorithms by applyingvalidation measures. The project aims to implement a self-learning protocol such that the past inputs of the disease outcomes determine the future possibilities of the life style disease to a particular user.

CONTRIBUTIONAL WORK

The proposed methodology encompasses of hybrid algorithm which contains inner and outer classification.The proposed algorithm is divided into three sections: a) Dataset Pre-processing b) Classification using Support Vector Machine c)NB Machine learning has ability to deal with uncertain and insufficient data.

II. RELATED WORK

With a sharp increment in AI advancement, there has been an exertion in applying machine learning and deep learning strategies to recommender frameworks. These daysrecommender frameworks are very regular in the travel industry, e-commerce, restaurant, and so forth. Unfortunately, there are a limited number of studies available in the field of drug proposal framework utilizing sentiment analysis on the grounds that the medication reviews are substantially more intricate to analyze as it incorporates clinical wordings like infection names, reactions, a synthetic names that used in the production of the drug [8]. The study [9] presents Galen OWL, a semantic-empowered online framework, to help specialists discover details on the medications. The paper depicts a framework that suggests drugs for a patient based on the patient's infection, sensitivities, and drug interactions. For empowering Galen OWL, clinical data and terminology first converted to ontological terms utilizing worldwide standards, such as ICD-10 and UNII, and then correctly combined with the clinical information. Leilei Sun [10] examined large scale treatment records to locate the best treatment prescription for patients.

a). SYSTEM ARCHITECTURE

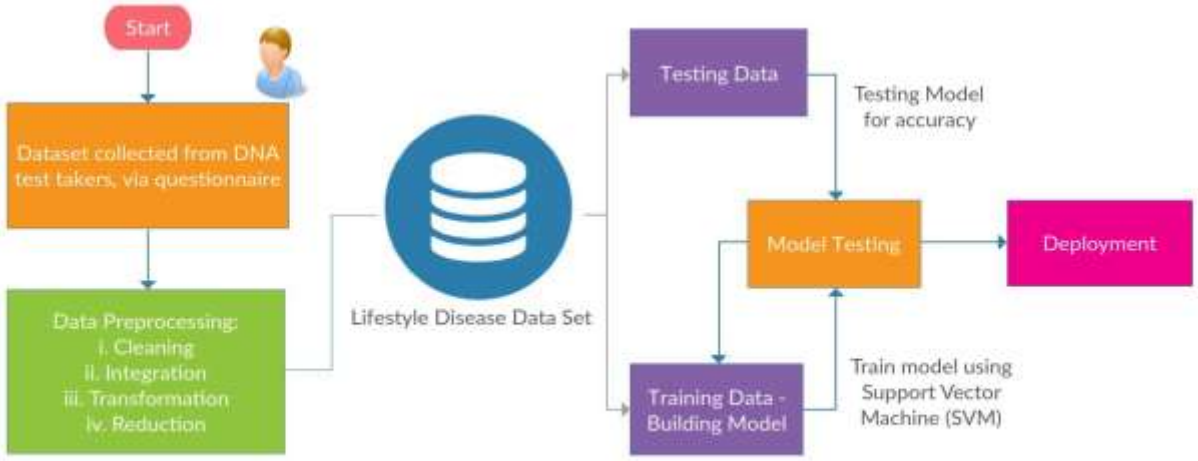


Fig.2.1. System Architecture

1. Data Collection: Data will be collected from hospitals with the consent of patients who have completed their DNA test. Hospitals will provide test results and other essential factors necessary to develop the proposed system. Dataset shall contain following patient attributes:

International Journal of Advances in Engineering and Management (IJAEM)
Volume 4, Issue 9 Sep. 2022, pp: 1248-1256 www.ijaem.net ISSN: 2395-5252

1. Unhealthy eating habits (1–5)
2. Lack of physical activity (1–5)
3. Obesity (yes/no)
4. Stress and anxiety (1–5)
5. Poor sleep (1–5)
6. Smoking (daily, sometimes, or never)
7. Alcoholism (daily, sometimes, or never)
8. If an individual is suffering from any other lifestyle disease (yes/no)
9. Family history of a lifestyle disease (yes/no)
10. Gender (male/female) (Grading: 1Æexcellent, 2Ægood, 3Æaverage, 4Æbad, and 5Ævery bad)
11. age

The aforementioned attributes have confirmed to be linked to majority of lifestyle diseases. As per [5], lifestyle disease diabetes can take place due to insalubrious eating habits, genetics, and absence of physical activity. Note that the attributes will be input variables for the simulated system.

The abovementioned attributes are daily records averaged over a week. For the simulated system to work efficiently, data was assembled from people who suffer a lifestyle disease and from those who fail to clear DNA test. Lifestyle diseases should be epitomized correspondingly so that the simulated system is unbiased toward a certain disease.

2. Data preprocessing:

Data preparation requires approximately 80% of time. Once data is gathered, it needs to be preprocessed, cleaned, constructed, and formatted in a style that SVM comprehends and is able to work with. DM tools should be used to analyze collected real-time data. There is a possibility that real-time data might hold mislaid values, they need to be replaced with a median. Herein, data has to be comprehensively reconnoitred and patterns or similarities in data need to be recognized.

Data preprocessing includes the following steps:

Data integration:

It is the process of combining significant data from different sources. Data will be obtained from the questionnaire that patients fill after their DNA test.

Data transformation:

It is the process of applying different algorithms on integrated data for significant outputs using data analysis.

Data reduction:

Herein, data filtering takes place and selection of only that data is considered that is needed for analysis. Only required fields will be taken.

Data cleaning:

It is the process of treatment of noisy data, inconsistency, and missing values in data. Spurious records are removed to make the dataset clean.

After data is preprocessed, it is added to lifestyle disease dataset, which can be used for training and testing purposes.

3.Training and Testing Data:

The proposed model needs to be trained and tested under various conditions by altering SVM parameters so that correctness can be obtained. In addition, we consider that the model's accuracy is maximum. From the collected data, 70:30 will be used to train and test the model, respectively. In case of necessity, there must be provisions to improvise on the algorithm being used. Furthermore, the model must adapt to new changes made in the dataset as dataset size will constantly increase. Data preprocessing would be needed to be performed to newly added data and include it to previously collected results. The model can then be retrained and checked for efficiency.

4. Working of the Model (Model Testing):

An individual who desires to know whether he/she is exposed to a lifestyle disease can make use of the model as a replacement for DNA test. A questionnaire will be provided on a web application asking an individual to rate his/her eating habits, physical activity, anxiety, sleep, etc. Once an individual submits his/her questionnaire, the data collected via the questionnaire will act as an input to the model working behind the web application on a cloud service like Amazon web service or Microsoft Azure. The model will quickly respond with predicted results, which will be shown to the individual.

The obtained results should specify whether a person is susceptible to a disease or not. Also, it should display graphs, charts showing an individual the probability of him/her suffering a disease. Results should also advise an individual medicines or exercises and motivate him/her to live a healthy lifestyle. Compared to DNA test, the model will prove to be faster, cheaper, and easier to predict an individual's chances of suffering from a lifestyle disease. Moreover, there is provision for an individual to change his/her input parameters and check for prediction.

5. Deployment:

Once the model is tested thoroughly, the web application will be deployed for users.

International Journal of Advances in Engineering and Management (IJAEM)
Volume 4, Issue 9 Sep. 2022, pp: 1248-1256 www.ijaem.net ISSN: 2395-5252

III. MODULES:

Data preprocessing includes the following steps:

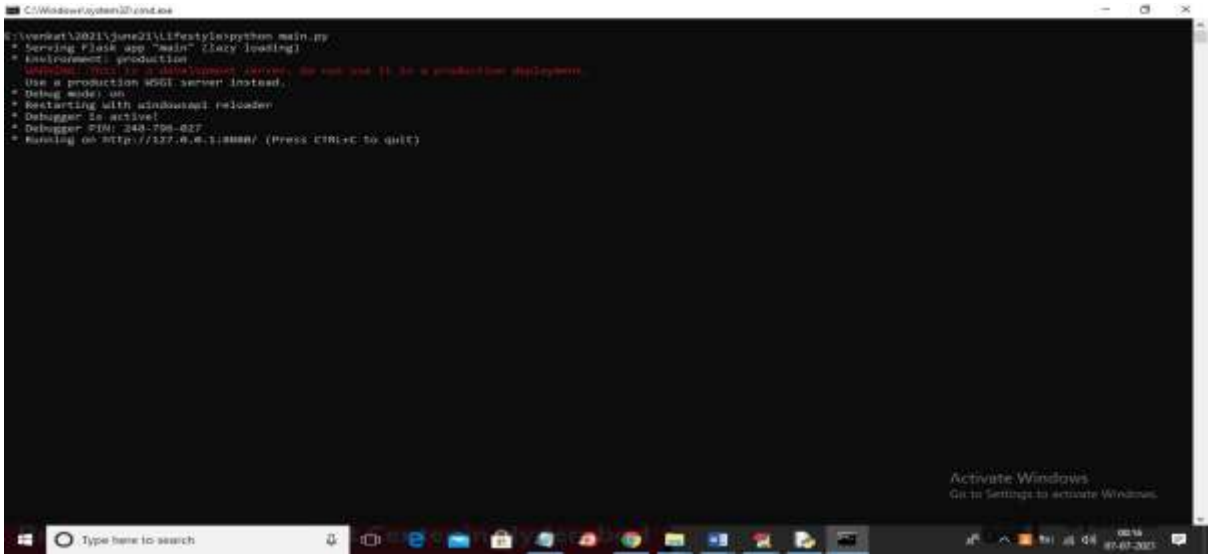
Step1 Taking User Data
Step2 Applying SVM
Step3 Applying life style filter to get minute points
Step3 Applying person daily works to detection
Step4 Applying Key points extraction using Harris method
Step5 This key points and original Data will be used to compute Euclidean Distance

Extract 30 points from Data rows and then normalize those points to get 0 and 1 binary values
Convert binary number to decimal number to get master key

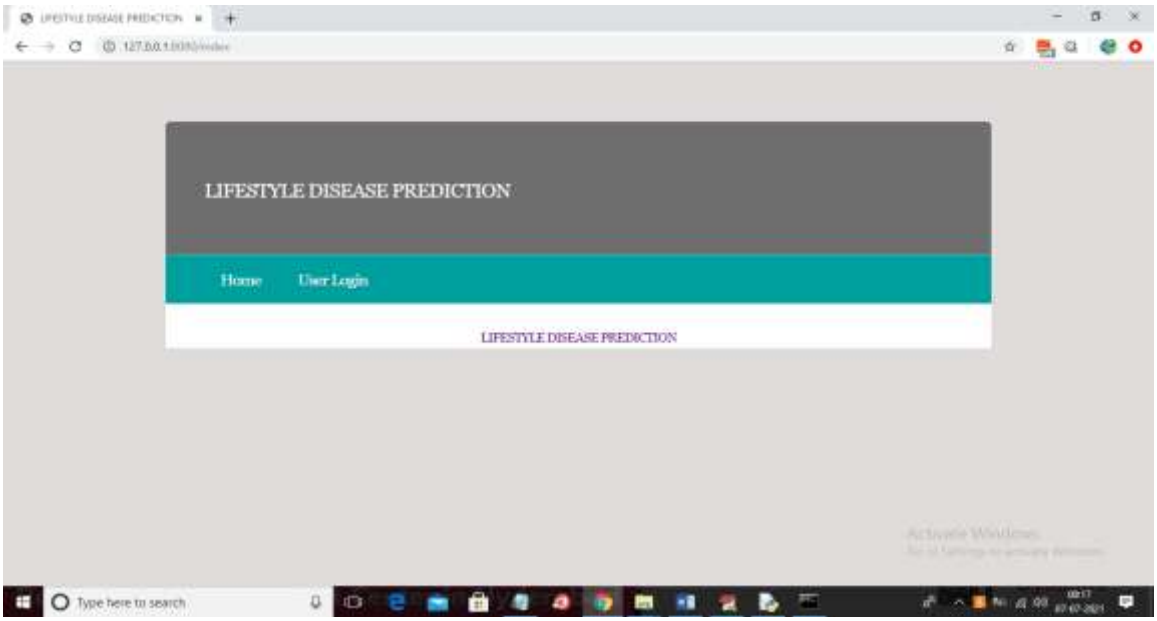
IV. RESULTS:

LIFESTYLE DISEASE PREDICTION

We have used same dataset given by you and we have used SVM algorithm to train life style dataset and to run project double click on 'run.bat' file to get below screen

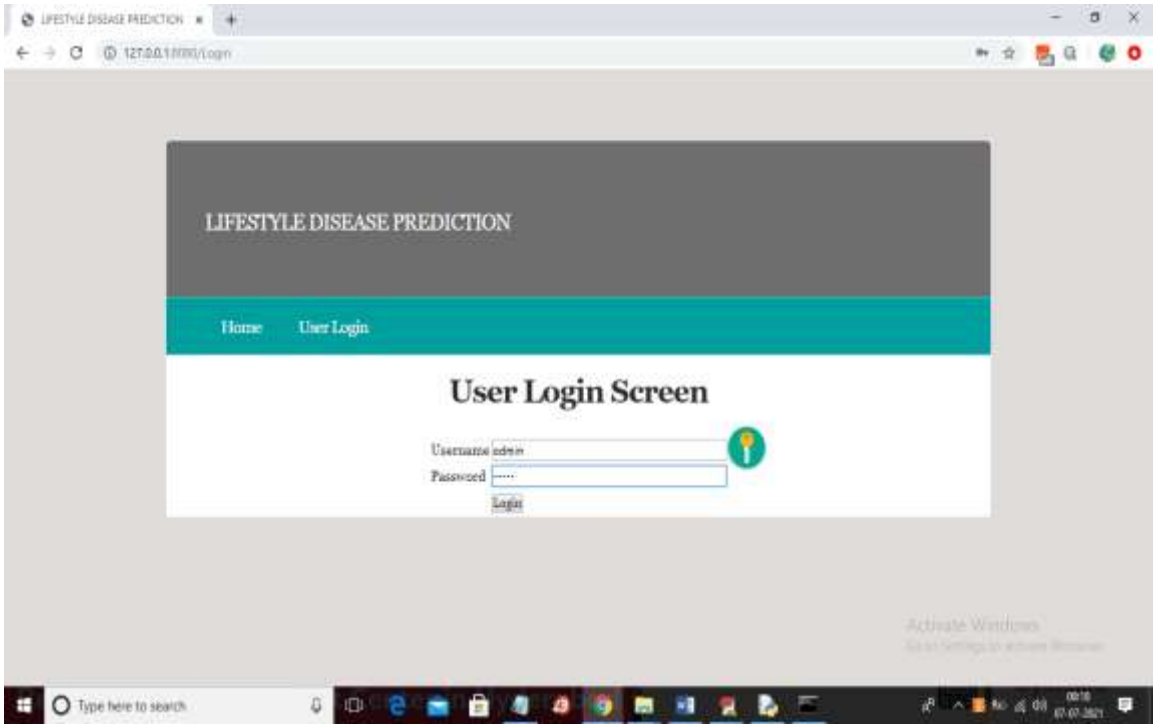


Screen 1: In above screen flask server started and now open browser and enter URL as 'http://127.0.0.1:8080/index' and press enter key to get below page

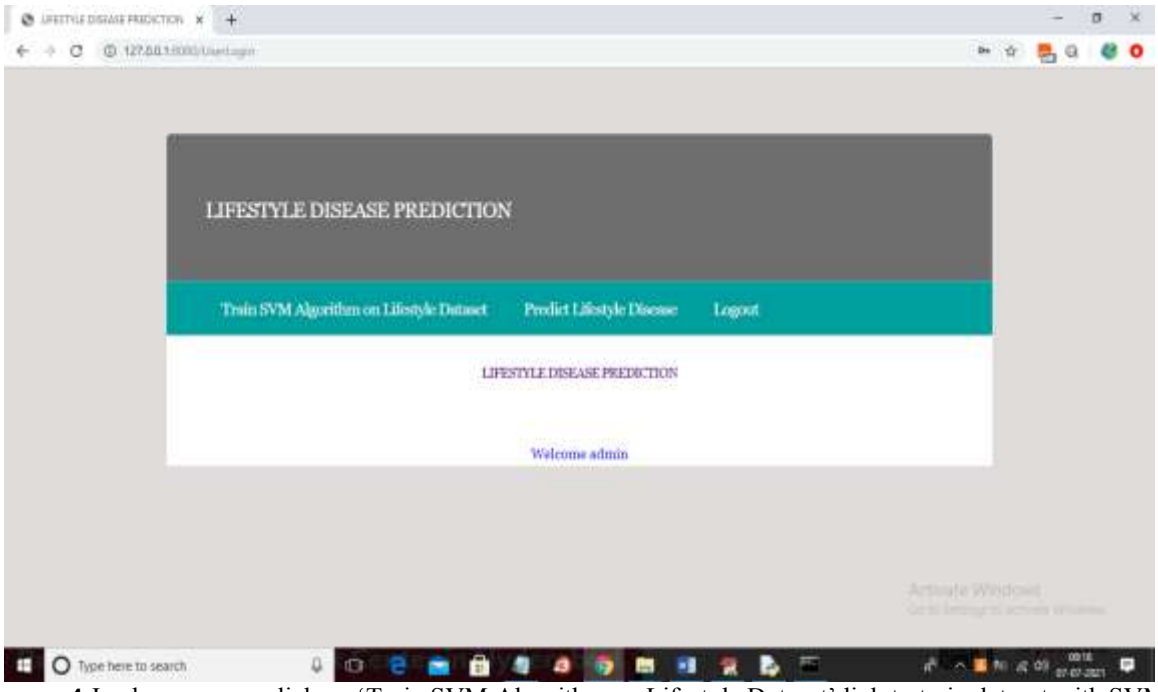


Screen 2: In above screen click on user login link and then enter username and password as 'admin' and 'admin'

International Journal of Advances in Engineering and Management (IJAEM)
Volume 4, Issue 9 Sep. 2022, pp: 1248-1256 www.ijaem.net ISSN: 2395-5252

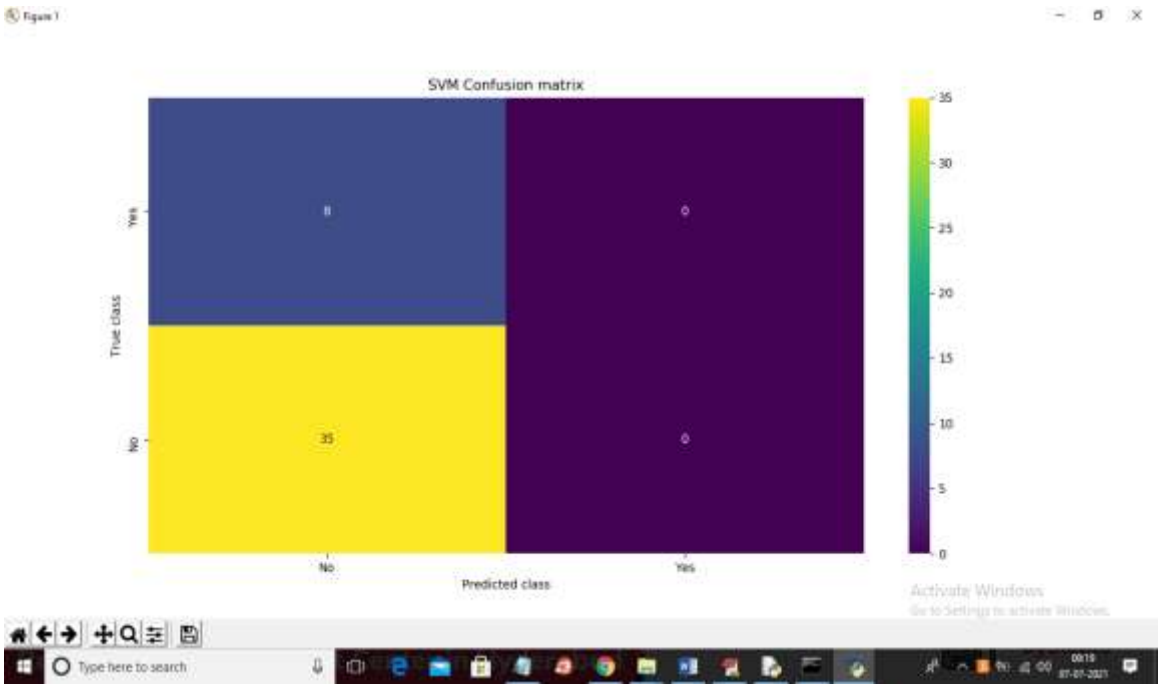


Screen 3:Now in above screen click on 'Login' button to get below screen

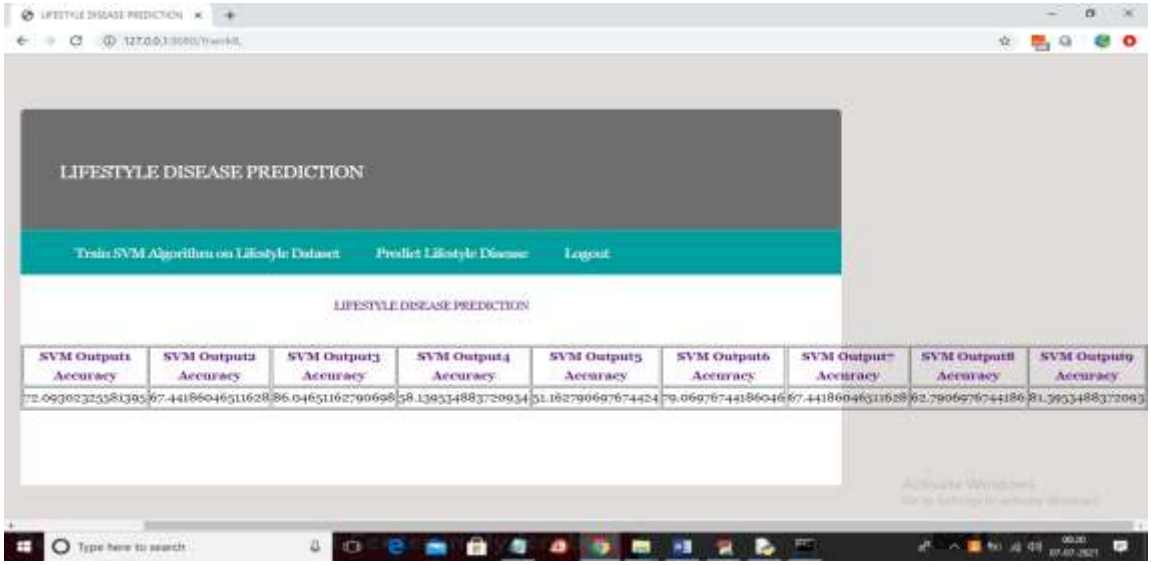


Screen 4: In above screen click on 'Train SVM Algorithm on Lifestyle Dataset' link to train dataset with SVM algorithm and then calculate accuracy and confusion matrix

International Journal of Advances in Engineering and Management (IJAEM)
Volume 4, Issue 9 Sep. 2022, pp: 1248-1256 www.ijaem.net ISSN: 2395-5252

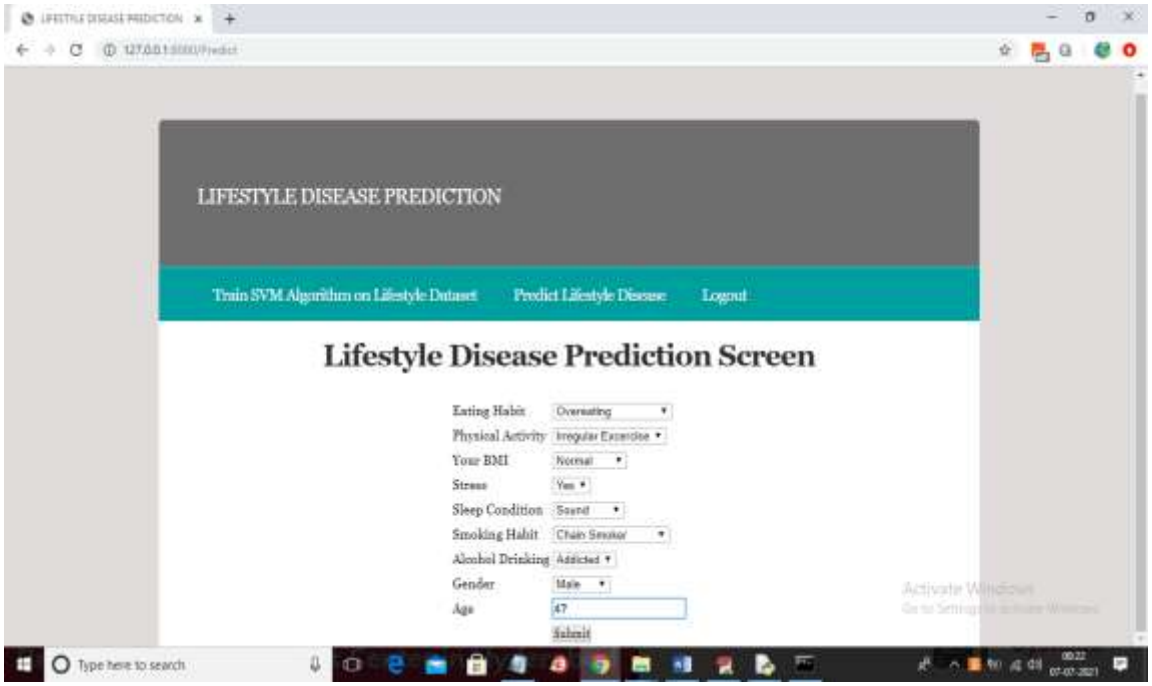


Screen 5: In above screen we can see confusion matrix generated from SVM algorithm after training dataset and now close above graph to get below screen

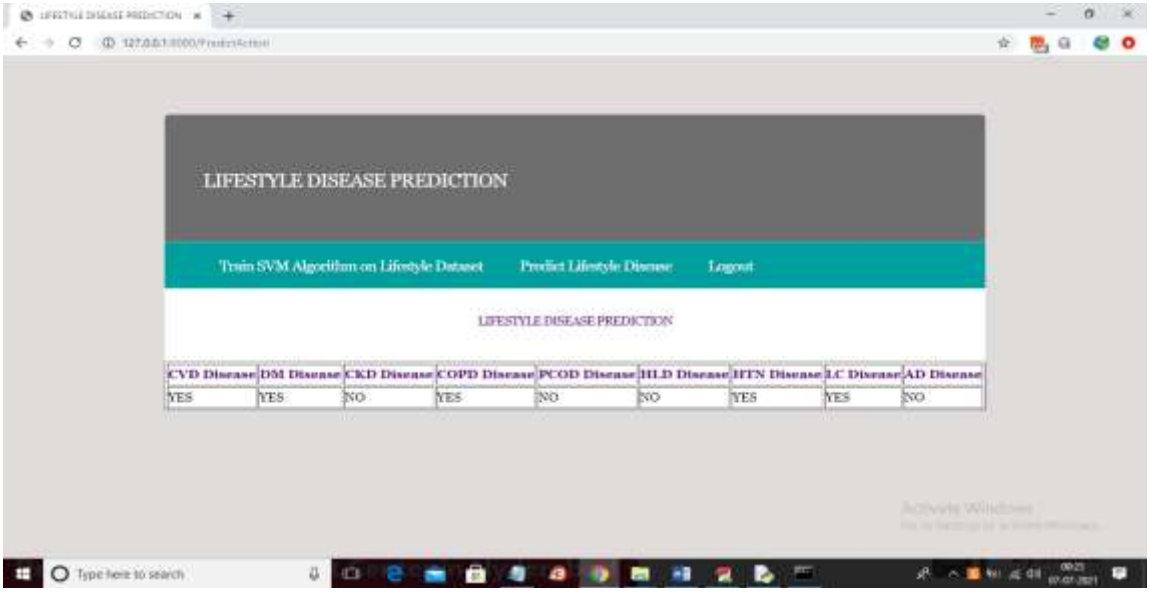


Screen 6: In above screen we can see SVM trained on 9 diseases available in dataset so we are getting accuracy for each disease prediction and the disease names are given in dataset like 'CVD','DM','CKD','COPD','PCOD','HLD','HTN','LC','AD'. In above screen for each disease we got accuracy and now SVM model is ready and now click on 'Predict Lifestyle Disease' link to get below screen

International Journal of Advances in Engineering and Management (IJAEM)
Volume 4, Issue 9 Sep. 2022, pp: 1248-1256 www.ijaem.net ISSN: 2395-5252

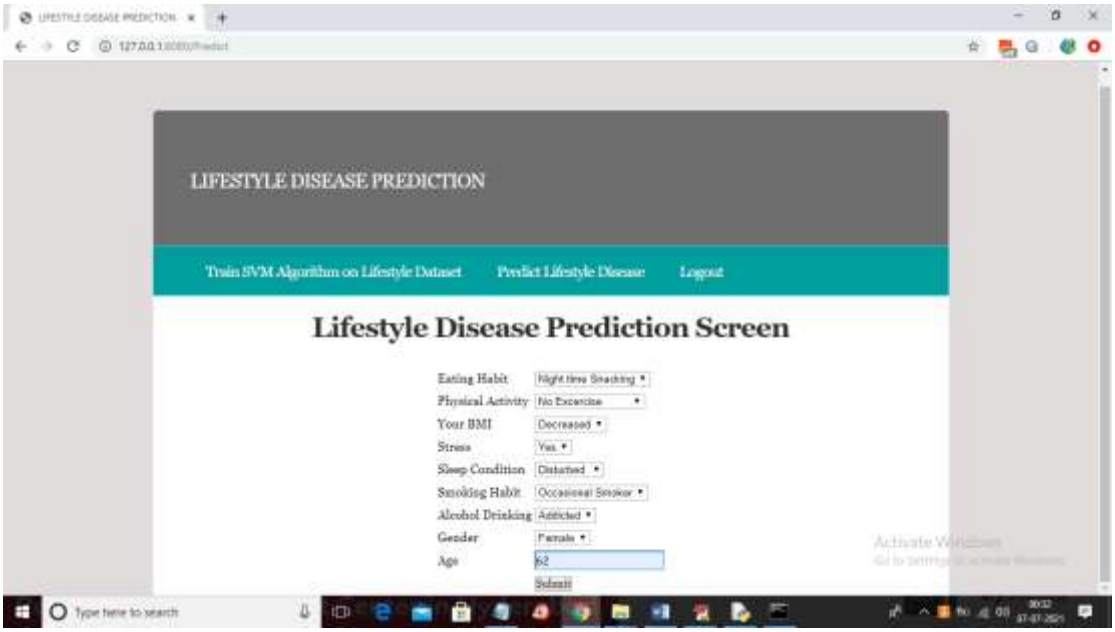


Screen 7: In above screen select desired values and then click on 'Submit' button to get below prediction result

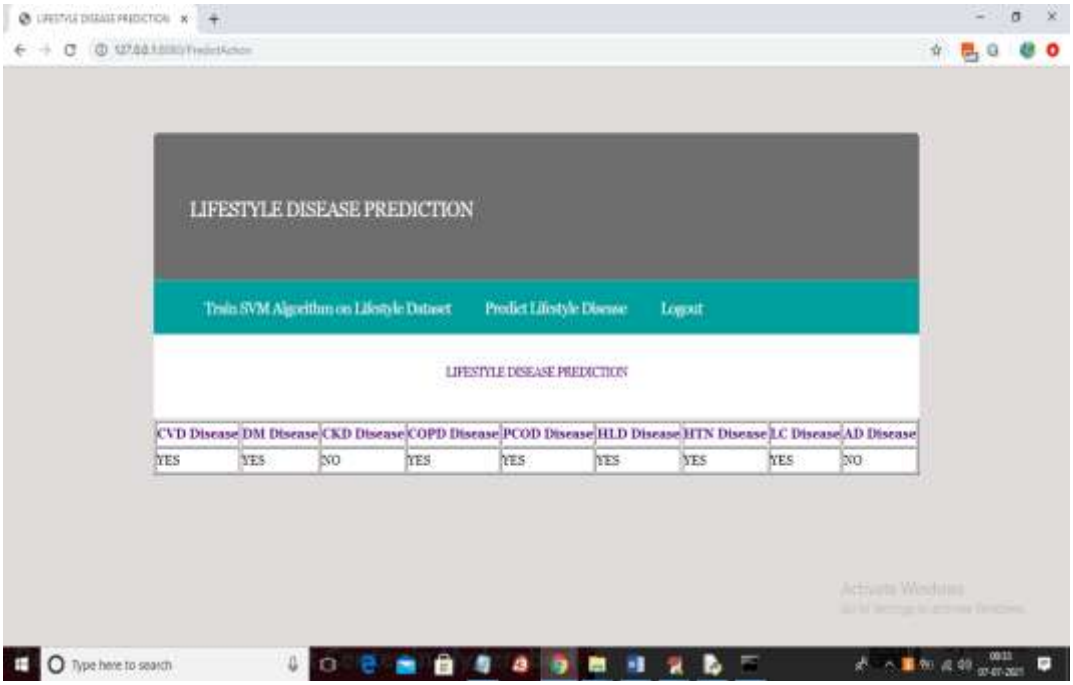


Screen 8: In above screen we can see the disease prediction for selected values and similarly you can select various values to get different results. You need to train only one and predict N number of times.

International Journal of Advances in Engineering and Management (IJAEM)
Volume 4, Issue 9 Sep. 2022, pp: 1248-1256 www.ijaem.net ISSN: 2395-5252



Screen 9: For above selection will get below result



Screen 10: In above screen we can see the disease prediction for selected values and similarly you can select various values to get different results. You need to train only one and predict N number of times.

V. CONCLUSION

ML being an essential CS application is used for predicting results given target input parameters and is being widely used for improving human lifestyle in several ways. Complex disorders—also known as polygenic—are caused by simultaneous effects of more than one gene often in a complex interaction with environment and lifestyle factors, which implies that if a parent has a particular disorder, it does not necessarily

mean that a child would develop the same. However, there could be a possibility of high risk of developing the disorder (i.e., genetic susceptibility), and for such a possibility where it cannot be a sure occurrence but risk prevails, the proposed model would provide a detailed report of alterations in an individual's lifestyle such as maintaining a healthy weight, and sugar levels may be able to reduce risk in case of genetic predisposition known that genetic makeup cannot be altered. Further additions to the model would include when an individual enters his/her details (i.e., input to the predictive model), the model would determine his/her identity based on several inputs, show an individual's current status of his/her health contrary to a desired ideal health using graphs, let know lifestyle changes, provide balanced diet and doctor consultations, recommend exercises, etc. The model would take into account climatic conditions and pollution levels and rank cities and suburbs with an ideal environment as to the precautionary measures that an individual could take making the model more content specific, accessible, and flexible in terms of customization. The fact that deep learning (DL) is overtaking ML algorithms in terms of accuracy would suggest the possibility of SVM being replaced by DL in the nearfuture.

REFERENCES

[1]. Sharma, M. and Majumdar, P.K., 2009. Occupational lifestyle diseases: An emergingissue. Indian Journal of Occupational andEnvironmental medicine, 13(3), pp. 109–112.

[2]. DNA Test Cost in India, Available [Online]https://www.dnaforensics.in/dna-test-cost-in-india/ [Accessed onJune 27, 2018].

[3]. Suzuki, A., Lindor, K., St Saver, J., Lymp, J., Mendes, F., Muto, A.,Okada, T. andAngulo, P., 2005. Effect of changes on body weightand lifestyle in nonalcoholic fatty liver disease. Journal ofHe***patology, 43(6), pp. 1060–1066.***

[4]. Pattekari, S.A. and Parveen, A., 2012. Prediction system for heartdisease using Naïve Bayes. International Journal of AdvancedComputer and Mathematical Sciences, 3(3), pp.290–294.

[5]. Anand, A. and Shakti, D., 2015. Prediction of diabetes based onpersonal lifestyle indicators. In Next generation computingtechnologies (NGCT), 2015 1st international conference on (pp.673–676). IEEE.

[6]. Kanchan, B.D. and Kishor, M.M., 2016. Study of machine learningalgorithms for special disease prediction using principal ofcomponent analysis. In Global Trends in Signal Processing,Information Computing and Communication (ICGTSPICC), 2016International Conference on (pp. 5–10). IEEE.

[7]. Kazeminejad, A., Golbabaei, S. and Soltanian-Zadeh, H., 2017.Graph theoretical metrics and machine learning for diagnosis ofParkinson's disease using rs-fMRI. In Artificial Intelligence andSignal Processing Conference (AISP), (pp. 134–139). IEEE.

[8]. Milgram, J., Cheriet, M. and Sabourin, R., 2006. "One against one"or "one against all": Which one is better for handwriting recognitionwith SVMs?. Tenth International Workshop on Frontiers inHandwriting Recognition, La Baule (France), Suvisoft, 2006.

[9]. Hossain, R., Mahmud, S.H., Hossin, M.A., Noori, S.R.H. and Jahan,H., 2018. PRMT: Predicting Risk Factor of Obesity among Middle-Aged People Using Data Mining Techniques. Procedia ComputerScience, 132, pp. 1068–1076.

[10]. Sayali Ambekar and Dr.Rashmi Phalnikar, 2018. Disease predictionby using machine learning, International Journal of ComputerEngineering and Applications, vol. 12, pp. 1–6.

[11]. Mishra, A.K., Keserwani, P.K., Samaddar, S.G., Lamichaney, H.B.and Mishra, A.K., 2018. A decision support system in healthcareprediction. In Advanced Computational and CommunicationParadigms (pp. 156–167). Springer, Singapore

[12]. Explaining the basics of machine learning, algorithms andapplications, Available [Online]https://www.hackerearth.com/blog/machine-learning/explaining-basics-machine-learning-algorithms-applications/ [Accessed on June27, 2018].

[13]. https://upload.wikimedia.org/wikipedia/commons/thumb/b/b5/Svm_separating_hyperplanes_%28SVG%29.svg/220pxSvm_separating_hyperplanes_%28SVG%29.svg.png