# **Disease Prediction System using Machine Learning**

# **A Project Report**

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***in partial fulfillment for the award of the degree of***

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# **Introduction to the Domain Area/Project**

Machine Learning is a branch of Artificial Intelligence (AI), where the main objective is

to give the computer the ability to learn from a provided set of data. The structure of the data is understood, after which the data is fit into models. These models can be successfully utilized by people for any given application where machine learning is required.

Despite being a field within computer science, it radically differs from the traditional computational approaches. In traditional computing, algorithms are sets of explicitly programmed instructions used by computers for calculations or problem-solving, whereas

Machine Learning algorithms allow for computers to train on data inputs and use statistical analysis in order to output values that fall within a specific range.

This approach in Machine Learning facilitates computers in building models from sample data, in order to automate decision-making processes based on data inputs.

Our project will be harnessing the potential of machine learning, in which a model will be trained in identifying various diseases included in our scope, where the output will be boolean values.

# **Problem Statement**

During the COVID-19 Pandemic, several hospitals faced a severe shortage of highly- skilled doctors. Despite the hard times, many doctors fulfilled their duty by being the first line of defense against the widespread pandemic.

Most of these doctors often required an expert system to help them aid in diagnosing a patient’s condition. However, it is necessary to realise that these expert systems may be much more useful if they could personalise the diagnosis for each and every patient with the help of an available doctor.

# **Motivation and Purpose of the project**

There has been an immense load on hospitals and doctors during the COVID-19 Pandemic, and helping the world to our best ability in these tough times is our goal.

Our aim is to reduce the pressure on doctors and hospitals by creating an expert machine that detects several major diseases.

With a well-defined scope and target to detect the common diseases, we aim to build a helpful prediction machine that will be of great help to medical professionals.

# **Project Scope and Objectives**

* Our model will have a Disease Detection System that will be based on Machine Learning.
* Our output will show if the patient has that particular disease and will give relative information related to the disease
* The Diseases that we are planning on targeting are:
  + Pneumonia
  + COVID - 19
  + Chronic Kidney Disease
  + Heart Attack

# **Plan of Action to Complete the Project**

1. Literature Survey
2. Identify and download Datasets
3. Identify the ML Algorithms
4. GUI Design
5. Integrate GUI and ML models
6. Testing the final implementation

# **References**

[1] G. Çınarer and B. G. Emiroğlu, "Classification of Brain Tumors by Machine Learning Algorithms," *2019 3rd International Symposium on Multidisciplinary Studies and Innovative Technologies (ISMSIT)*, 2019, pp. 1-4, doi: 10.1109/ISMSIT.2019.8932878.

[2] G. Hemanth, M. Janardhan and L. Sujihelen, "Design and Implementing Brain Tumor Detection Using Machine Learning Approach," *2019 3rd International Conference on Trends in Electronics and Informatics (ICOEI)*, 2019, pp. 1289-1294, doi: 10.1109/ICOEI.2019.8862553.

[3] M. S. Fasihi and W. B. Mikhael, "MRI brain tumor classification Employing transform Domain projections," *2020 IEEE 63rd International Midwest Symposium on Circuits and Systems (MWSCAS)*, 2020, pp. 1020-1023, doi: 10.1109/MWSCAS48704.2020.9184678.

[4] M. Kavitha, G. Gnaneswar, R. Dinesh, Y. R. Sai and R. S. Suraj, "Heart Disease Prediction using Hybrid Machine Learning Model," *2021 6th International Conference on Inventive Computation Technologies (ICICT)*, 2021, pp. 1329-1333, doi: 10.1109/ICICT50816.2021.9358597.

[5] F. Alotaibi, “Implementation of Machine Learning Model to Predict Heart Failure Disease”, *International Journal of Advanced Computer Science and Applications (IJACSA), 10(6)*, 2019, doi: 10.14569/IJACSA.2019.0100637.

[6] J. Qin, L. Chen, Y. Liu, C. Liu, C. Feng and B. Chen, "A Machine Learning Methodology for Diagnosing Chronic Kidney Disease," in *IEEE Access*, vol. 8, pp. 20991-21002, 2020, doi: 10.1109/ACCESS.2019.2963053.

[7] F. M. Javed Mehedi Shamrat, P. Ghosh, M. H. Sadek, M. A. Kazi and S. Shultana, "Implementation of Machine Learning Algorithms to Detect the Prognosis Rate of Kidney Disease," *2020 IEEE International Conference for Innovation in Technology (INOCON)*, 2020, pp. 1-7, doi: 10.1109/INOCON50539.2020.9298026.

[8] R. Gupta, N. Koli, N. Mahor and N. Tejashri, "Performance Analysis of Machine Learning Classifier for Predicting Chronic Kidney Disease," *2020 International Conference for Emerging Technology (INCET)*, 2020, pp. 1-4, doi: 10.1109/INCET49848.2020.9154147.

[9] T. Ozturk, M. Talo, E. Yildirim, U. Baloglu, O. Yildirim, U. Acharya, “Automated detection of COVID-19 cases using deep neural networks with X-ray images.”, *Computers in biology and medicine* *vol. 121* *(2020)*, 2020, doi: 10.1016/j.compbiomed.2020.103792.

[10] A. Sharma, M. Negi, A. Goyal, R. Jain and P. Nagrath, “Detection of Pneumonia using ML & DL in Python.”, *IOP Conference Series: Materials Science and Engineering* 1022, 2021, doi: 10.1088/1757-899X/1022/1/012066.

# **Chapter 1 Introduction**

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## **An Overview of Expert Systems in Medicine**

Expert systems in medicine are defined as systems with the ability to capture and store expert knowledge, facts, and reasoning techniques to assist doctors in diagnosing a patient’s condition.

These systems attempt to mimic a doctor’s expertise by applying several computational methods to help in decision support and problem solving, by coming up with reasoned conclusions for a patient’s illness or condition.

Our project will incorporate the core elements of an expert system by supporting medical experts with their claims, precursing their diagnosis of a chronic disease in their patients using trained machine learning model

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