



## STRESS MANAGEMENT SYSTEM USING ML, DATA SCIENCE AND AI APPROACH

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### Abstract

The As per existing process to measure human body stress use heart rate data such as bpm to determine the interval between each heartbeat. In existing process the human stress values are finalized through continuous monitoring with expensive gadgets like smart watches etc. The aim of this project is to evaluate the human stress characteristics prediction using Machine learning approach. Machine learning model with higher accuracy by considering all stress parameters. This study will be helpful for humans to understand the difference between the stress and real body issues. In this study, the approach will help to reduce human body stress. In this process will get the graphical relation between various variable factors and which is directly link to human stress characteristics. It will provide the nearly behavior of stressed human. This project will pre define the human stress characteristics prediction which will helpful to improvise the human health on regular life. We can provide the precise stress characteristics of human to system to detect highly accurate human body stress level.

**Keywords:** Data Reliability, Data module level, Mislead

### Introduction

When using the stress level feature, smartwatches use heart rate data such as bpm to determine thin travel between each heartbeat. The less variability between beats equals higher stress levels, whereas an increase in variability indicates less stress. In this scenario it is very difficult to predict early human body stress characteristics without gadgets (like smart watches etc.). We are totally dependent on smart gadgets reading. This practice is a standard. There is risk for time and cost. In new construction, "Stress management system using Machin learning, Data science an AI approach" is completely different approach with respect to existing. When we plan to design new system then first need decide to do the real time survey details or questionnaires.

Different factors influencing stress characteristics of human body and that factor affect the a lot. The human body performance is directly dependent on body stress characteristics. There are many factors affect the stress characteristics of human such as anxiety, anger, ego, etc. Our proposed system will enhance to humans to get the stress characteristics in correct form. Our system will support to humans to save time and cost to find out difference between stress and real body issues.

### Existing System

In the existing process when using the stress level feature, smartwatches use heart rate data such as bpm to determine the interval between each heartbeat. The less variability between beats equals higher stress levels, whereas an increase in variability indicates less stress. The stress level feature allows a user to determine their current level of stress based on their heart-rate variability. When using the feature, the watch uses heart rate data to determine the interval between each heartbeat. This study aims to explore the early important stress characteristics features and determine and accurate mechanism to find out. This method is costly method. This model is less accurate in terms of result.

Disadvantageous

Costly method.

Hardware dependent

No data analysis used earlier for prediction.



### **Problem Statement's**

- As per present process to identify desired human stress level and finalizing the stress values of human body is one of the important parameter.
- In existing process the when using the stress level feature, smartwatches use heart rate data such as bpm to determine the interval between each heartbeat.
- In this scenario stress, identification need more money and highly cost
- Some time, this process is time consuming.

### **Motivation's**

- To get the pre human body stress characteristics and identify the basic difference between the actual body issues and stress.
- It allows the save the stress identification time.
- The data need to update constantly for updating of stress characteristics with respect to upcoming modifications.
- We used here different regression method to get the precise stress characteristics.

### **Objective's**

- The purpose of this project to pre predict the stress characteristics of human body.
- Here we propose a system in which we get the precise human body stress characteristics for human by considering different affecting factors.
- This is is simpler configuration of software mechanism it would give the accurate value on one click.

### **Software Requirement and Specification**

- Introduction
- Performance Requirements

The projected structure will offer the highest performance even when the data inputis through. Model efficiency can not be measured onto the basis of time complexities. It should be based on the identification accuracy.

Key Benefits

Approachable.

Reasonable.

Permit worthy GUI.

Precisely predict human body stress.

- Software to be used

The prerequisite is for the design of both the proposed model to proceed.

- Python 3:

Python is a high-level programming language used for general-purpose programming. It offers frameworks that allow for simple programming both on larger and smaller scales.

- Assumptions and Dependencies

The presumption for such a system is to support the device processor as Windows / Linux. Implementation will also be performed throughout the programming language of Python and so this implementation of the framework will be independently of the platform. Python is a high-performance programming language.

- System Features
- a)Portability:-  
System should run on any operating system.
- b)Flexibility:-  
System should able to adopt changes.
- c)Usability:-  
System have good interface so any new user can use it.
- Non-Functional Requirement
- Performance Requirements
- System is able to detect human body stress.
- Software Quality Requirements
- The system is easy to use.
- The system is easy to learn.

**Functional Requirements**

Collection of data set.

Data Prepossessing.

Detecting human body stress characteristics

**Minimum Hardware Requirements**

The system shall use here to the following hardware requirements:

RAM: Minimum 8GB.

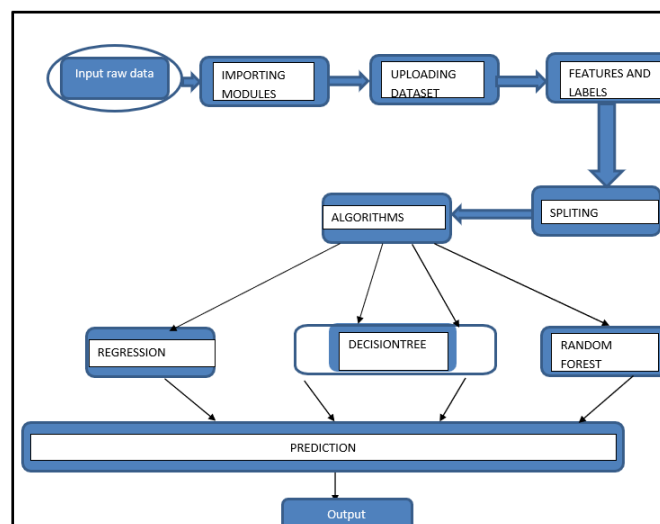
Hard Disk: Minimum 16 TB.

Processor: Intel Core i3.

**Minimum Software Requirements**

- Platform Windows 7 or higher.
- Language Python.
- Documentation Latex, Microsoft Office Word, Power-Point.
- Required Input
- Datasets form human body different characteristics.
- Required Output
- Prediction of human body stress

**Proposed Algorithm**



The procedures used in this study have different properties that will be used during the application.



The research is done with the IDE Spyder using Python as a programming language. However, in all algorithms, the data is split into four variables.

### Technical Specification

- Windows 7

Windows 7 is my Microsoft built platform which is used as a workwise and individually to the computer system. Windows 7 was authorized for production on July 22, 2009. Windows 7 was designed primarily as an incremental update to the operating system with the intention of resolving the concerns of its predecessors. In just six months, more than 100 million versions had already been sold worldwide. In July 2012, it rose to over 630 million licenses and according to Net Applications, a share market as of February 2014, which was the most commonly used version of Windows, was 47.49 percentages.

The new features in Windows 7 include developments in the identification of touch and handwriting, support for virtual hard drives, improved performance on multi-core processors, improved boot efficiency, Direct Access, and kernel enhancements. Windows 7 supports multiple heterogeneous graphics cards from various vendors.

- Python

Python is a strong-level programming language with complex technicalities that is construed entity-oriented. Coupled with dynamic typing and dynamic linking, its strong-level data structures make this very appealing for Rapid Application Creation but also for use as a debugging tool or glue language to link established components. The plain, easier-to-learn syntax of Python promotes readability and thus reduces software maintenance costs. Python supports modules and packages that promote software modularity and reuse of code. The Python interpreter and comprehensive standard library are available for all gaming platforms in origin and binary format free of charge and can be shared freely.

Benefits of Using Python: -

- It's open-source and free.
- It has over 1,500 data science modules from Python / R.
- It has software to use machine learning and AI to quickly collect data from sources.
- It creates an atmosphere that is simple to use to execute every design.
- It has sturdy support from the public —i.e. you should ask your questions

### System Architecture

System architecture consists of five steps in the current system: initialization, data collection, key generation signing, submission of data, storage and authentication of data, monitoring and cancellation. Applying algorithm, the raw data of the component level is encoded in this system. Software for effective storing data and assessment part is included in the Modification. There is one dataset used in this study; named is human body stress level datasets. The human body stress level dataset is taken from a survey. It consists of records ranging from Nov to Dec 2022. Each record contains useful features describing an individual characteristics, such as anxiety, ego, anger etc. The feature stress values is the variable to be predicted, and it will be taken out.

We gather application information from all the humans and all data are coded and processed and finally made chain applying software.

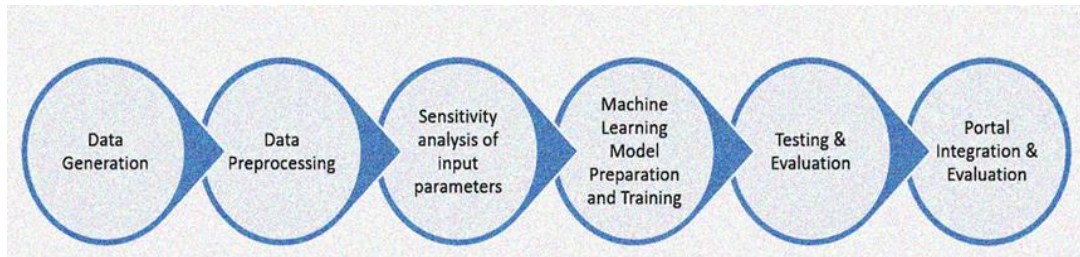


Figure 1: System Architecture

**Project Outline**

- **Healthcare survey to detect stress and anxiety issue in the people**

A survey will be conducted in group or at individual level to evaluate some health parameter. Majorly the focus will be on stress and anxiety issue management among all age group.

**Input structure:**

Input will be taken in form of survey via google form etc and will be extracted in form of CSV. We will focus on keeping the system robust to give a fair output for survey done at group or individual level

Our survey will try to cover the following section to create more relevant data model to provide a more realistic output.

1. Personal information ( e.g age , education, occupation, skill, hobbies etc)
2. Social activities (e.g engagement in social life, naturally being introvert/extrovert etc)
3. Medical history - currently on any medication or any past medical history
4. Section focussing on most common symptoms of stress and anxiety
5. Self care and mental wellbeing

The above sections will be part of the survey form which will be converted in form of a data model and an Informative output will be displays.

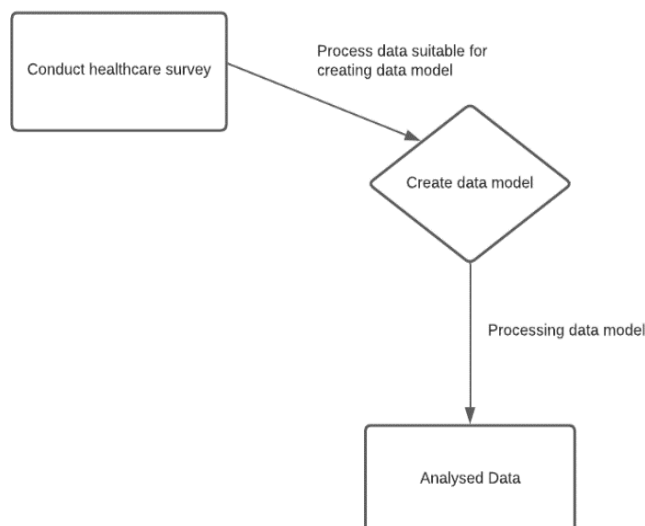


Fig : Higher level process diagram

**System Design**

Data Flow Diagram

Data Flow Diagram Level 0

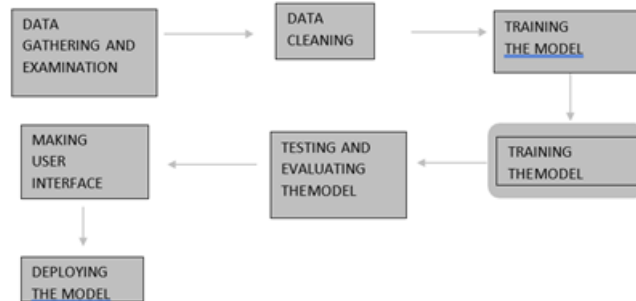


Figure 2: Block Diagram

Data Flow Diagram Level 1

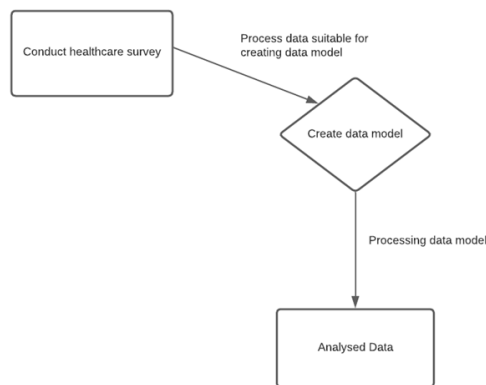


Figure 3: Data Flow Diagram Level 1

**UML Diagram**

Use Case Diagram

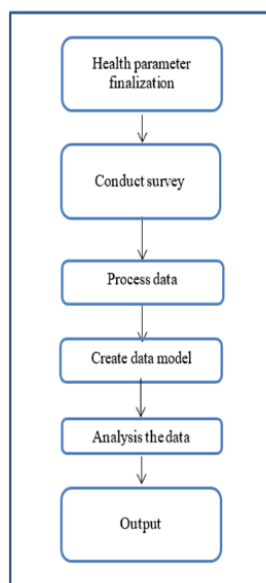


Figure 4: Use Case Diagram

### Sequence Diagram

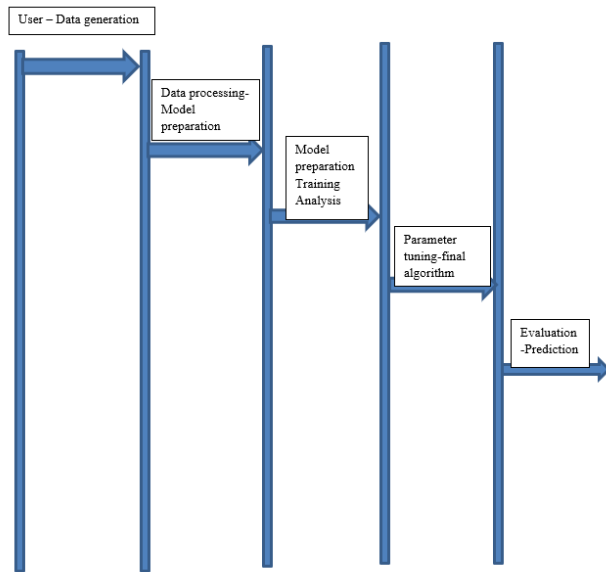


Figure 6: Sequence Diagram

### Activity Diagram

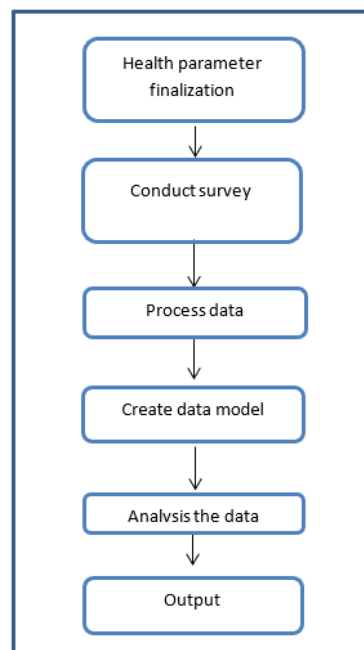


Figure 7: Activity Diagram

### Conclusion

No dataset available for predicting stress characteristics of Human in different working and environmental conditions. In existing process the stress characteristics measured are concluded through use heart rate data such as bpm to determine the interval between each heartbeat. We introduce group or at individual level to evaluate some health parameter. Majorly the focus will be on stress and anxiety issue management among all age group. Model with higher accuracy by considering all parameters. Which will be helpful to achieve desired output and handling target finalizing the human health conditions.

In addition, the features that are added to the local dataset have been generated from general survey data collection. This theory provides valuable material about techniques in AI, and it gives awareness



into some features that effect the stress characteristics of human. This theory does not expose any private or sensitive data.

In this report, the algorithms are develop and some are public & open source. In addition, the algorithms are competent and verified on the available datasets. Each of the datasets is separated into train and examination parts.

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### **References**

#### **Journal Papers:**

Design and implementation of a human stress detection system: A biomechanics approach, 2008 5th International Symposium on Mechatronics and Its Applications, DOI: 10.1109/ISMA.2008.4648856, Publisher: IEEE, Author Mohammad S. Sharawi, Murad Shibli, Mohammad I. Sharawi

The human side of big data: Understanding the skills of the data scientist in education and industry. 2018 IEEE Global Engineering Education Conference (EDUCON), DOI: 10.1109/EDUCON.2018.8363273, Author Patrick Mikalef, Michail N. Giannakos, Ilias O. Pappas, John Krogstie

Methods and Measures for Mental Stress Assessment in Surgery: A Systematic Review of 20 Years of Literature, IEEE Journal of Biomedical and Health Informatics ( Volume: 26, Issue: 9, September 2022) DOI: 10.1109/JBHI.2022.3182869 Mastaneh Torkamani-Azar, Ahreum Lee, Roman Bednarik Psychological Stress Detection Using Biosignals, Published in: IEEE Transactions on Affective Computing, DOI: 10.1109/TAFFC.2019.2927337, Giorgos Giannakakis, Dimitris Grigoriadis, Katerina Giannakaki

#### **Patents:**

Method for stress management and overall health status improvement and compositions used there in, Inventor: Jayant Deshpande, James M. STRINGHAM and Vijaya Juturu, 2016-03-02: Application filed by OMNIACTIVE HEALTH TECHNOLOGIES Ltd