The Topic of Research: Predictive Analytics of Brain Stroke Vulnerability via Lifestyle and Health Factors Analysis

Detailed Problem Statement: A stroke is a medical condition in which poor blood flow to the brain causes cell death. There are two main types of stroke: ischemic, due to lack of blood flow, and hemorrhagic, due to bleeding. Both cause parts of the brain to stop functioning correctly. Brain strokes represent a critical and often life-altering medical condition resulting from the sudden disruption of blood flow to the brain. Understanding the multifaceted determinants of brain stroke occurrence is crucial for prevention, early detection, and improved healthcare management. The project topic here is the comprehensive "Predictive Analytics of Brain Stroke Vulnerability via Lifestyle and Health Factors Analysis".

This research delves into various parameters to explore their potential roles in the development of brain strokes. The main risk factor for stroke is high blood pressure. But, the other parameters include gender, age, hypertension, heart disease, marital status (ever married), work type, residence type, average glucose level, body mass index (BMI), and smoking status. All these factors are examined meticulously to discern their individual and collective impact on brain stroke susceptibility.

By conducting a comprehensive investigation into these parameters, this research aims to uncover patterns, relationships, and correlations that can provide valuable insights into stroke risk assessment. The findings of this study hold significant implications for public health strategies, medical interventions, and healthcare policies, ultimately contributing to the reduction of brain stroke incidence and the enhancement of patient care.

SMART Questions

1. What are the age-specific incidence and mortality rates of brain stroke?
2. Which year marked a boom in brain stroke cases and what major factors contributed to the same?
3. What is the case fatality rate of stroke by gender, location, and work type?
4. Are there any biological or social factors that explain the gender differences in stroke risk?
5. What is the strength of the association between hypertension, heart disease, and brain stroke?
6. What are the modifiable and non-modifiable risk factors for stroke in healthy people?
7. What job types and residence types are associated with an increased risk of stroke?

Data Source: Kaggle

Data has roughly 5000 observations and 11 features.

Features:

1) gender: "Male", "Female" or "Other"

2) age: age of the patient

3) hypertension: 0 if the patient doesn't have hypertension, 1 if the patient has hypertension

4) heart_disease: 0 if the patient doesn't have any heart diseases, 1 if the patient has a heart disease

5) ever_married: "No" or "Yes"

6) work_type: "children", "Govt_jov", "Never_worked", "Private" or "Self-employed"

7) Residence_type: "Rural" or "Urban"

8) avg_glucose_level: average glucose level in blood

9) bmi: body mass index

10) smoking_status: "formerly smoked", "never smoked", "smokes" or "Unknown"*

11) stroke: 1 if the patient had a stroke or 0 if not

GitHub link: https://github.com/KanishkGoel1999/FA23-DATS6101-Project-Group-6