

Proper Dataset Documentation

Title: “AI-Enabled Study of Funding Cuts in the UK: Exploring Regional Mental Health Disparities through Machine Learning”

Dataset has been provided by the supervisor

1 **Dataset source:** [Data.gov.uk]
(<https://www.data.gov.uk/search?filters%5Bpublisher%5D=Department+of+Health+and+Social+Care>) - Department of Health and Social Care]

2 Corresponding supervisor:

- Corresponding Authors (Supervisor): Md Sipon Miah and Mingbo Niu
- IVR Low-Carbon Research Institute, Chang'an University, Shaanxi, 710018, China
- Dept. of Information and Communication Technology, Islamic University, Kushtia, 7003, Bangladesh
- Dept. of Signal Theory and Communications, University Carlos III of Madrid (UC3M), Leganes, 28911, Madrid, Spain

3 Data Analysis conducted by the Md Abu Sufian

3.1 Data frame0-1

```
Index (['Year', 'Funding levels', 'staffing levels', 'Patient outcome',  
        'Emergency referall', 'Discharges', 'Associated emergency readmissions',  
        'Urgent crisis referalls', 'Access_to_care_waiting_time', 'Geographic',  
        'Geographic-1', 'Gender', 'Age', 'Indicator_value_patient_satisfaction',  
        'Indicator_value_Policy_changes', 'Region'],  
dtype='object')
```

4 Data Types:

Year	float64
Funding levels	float64
staffing levels	object
Patient outcome	object
Emergency referall	float64
Discharges	float64
Associated emergency readmissions	float64
Urgent crisis referalls	float64
Access_to_care_waiting_time	float64
Geographic	object
Geographic-1	object
Gender	object
Age	float64
Indicator_value_patient_satisfaction	object
Indicator_value_Policy_changes	int64
Region	object
dtype:	object

5 No missing values:

Missing values in the dataset after handling:

Year	0
Funding levels	0
staffing levels	0
Patient outcome	0
Emergency referall	0
Discharges	0
Associated emergency readmissions	0
Urgent crisis referalls	0
Access_to_care_waiting_time	0
Geographic	0
Geographic-1	0
Gender	0
Age	0
Indicator_value_patient_satisfaction	0
Indicator_value_Policy_changes	0
Region	0

dtype: int64

6 Synthetic Data frame:

```
Index (['num_professionals_pre_cuts', 'num_professionals_post_cuts',  
       'waiting_time_pre_cuts', 'waiting_time_post_cuts',  
       'service_accessibility_pre_cuts', 'service_accessibility_post_cuts',  
       'hospitalization_rate_pre_cuts', 'hospitalization_rate_post_cuts',  
       'readmission_rate_pre_cuts', 'readmission_rate_post_cuts',  
       'patient_satisfaction_pre_cuts', 'patient_satisfaction_post_cuts',  
       'service_utilization_pre_cuts'],  
      dtype='object')
```

7 Conbined data frame:

```
Index (['Year', 'Funding levels', 'staffing levels', 'Patient outcome',  
       'Emergency referall', 'Discharges', 'Associated emergency readmissions',  
       'Urgent crisis referalls', 'Access_to_care_waiting_time', 'Geographic',  
       'Geographic-1', 'Gender', 'Age', 'Indicator_value_patient_satisfaction',  
       'Indicator_value_Policy_changes', 'Region',  
       'num_professionals_pre_cuts', 'num_professionals_post_cuts',  
       'waiting_time_pre_cuts', 'waiting_time_post_cuts',  
       'service_accessibility_pre_cuts', 'service_accessibility_post_cuts',  
       'hospitalization_rate_pre_cuts', 'hospitalization_rate_post_cuts',  
       'readmission_rate_pre_cuts', 'readmission_rate_post_cuts',  
       'patient_satisfaction_pre_cuts', 'patient_satisfaction_post_cuts',  
       'service_utilization_pre_cuts'],  
      dtype='object')
```

8 Descriptive Analysis of Combined Data frame:

Variable	Count	Mean	Std Dev	Min	25th Pctl	50th Pctl	75th Pctl	Max
Year	454	1972.5	13.56	1923	1972.5	1972.5	1972.5	2022
Funding Levels	454	7.41	4.35	0	5	7.41	7.41	29
Staffing Levels	454	4494.49	18138.5	5	1573.75	4494.49	4494.49	384683
Patient Outcome	454	2087.84	9876.2	5	716.25	1665	2087.84	210277
Emergency Referral	454	35.82	215.64	0	0	5	35.82	4315
Discharges	454	21947.58	5978.86	7225	21947.58	21947.58	21947.58	72225
Associated Emergency Readmissions	454	836.31	228.28	240	836.31	836.31	836.31	3155
Urgent Crisis Referrals	454	443.88	2494.94	0	0	200	443.88	52528
Access to Care Waiting Time	454	32.94	19.49	0	30	32.94	32.94	165
Age	454	28.82	3.51	8	28.82	28.82	28.82	65
Waiting Time Post Cuts	454	30.16	5.25	3.9	30.16	30.16	30.16	61.05
Service Accessibility Pre Cuts	454	0.8	0.06	0.6	0.8	0.8	0.8	1
Service Accessibility Post Cuts	454	0.62	0.09	0.31	0.62	0.62	0.62	0.9
Hospitalization Rate Pre Cuts	454	0.29	0.06	0.11	0.29	0.29	0.29	0.5
Hospitalization Rate Post Cuts	454	0.38	0.05	0.21	0.38	0.38	0.38	0.6
Readmission Rate Pre Cuts	454	0.16	0.03	0.05	0.16	0.16	0.16	0.25
Readmission Rate Post Cuts	454	0.19	0.03	0.1	0.19	0.19	0.19	0.3
Patient Satisfaction Pre Cuts	454	8.48	0.4	7.03	8.48	8.48	8.48	9.96
Patient Satisfaction Post Cuts	454	7.12	0.58	5.07	7.12	7.12	7.12	8.99
Service Utilization Pre Cuts	454	1799.78	321.67	536	1799.78	1799.78	1799.78	2969