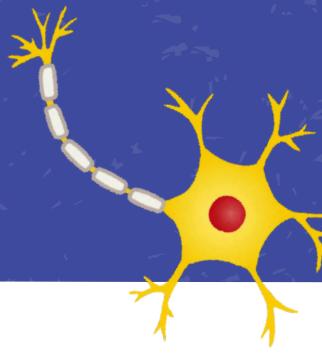


Alzheimer risk detection

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Alzheimer



Alzheimer's disease is a progressive neurodegenerative disorder that primarily affects memory, thinking, and behavior. It is the most common cause of dementia, accounting for 60-80% of cases.

Cause: It is associated with abnormal protein accumulations in the brain, such as beta-amyloid plaques and tau tangles, leading to the death of brain cells.

Symptoms: Early symptoms include memory loss and difficulty in problem-solving. As the disease progresses, it affects language, spatial awareness, and the ability to perform daily activities.

Problem statement



There is no cure for alzheimer, but treatments like medications and lifestyle modifications can help manage symptoms and improve quality of life.

The goal of this project is to create a reliable, interpretable, and accessible tool that can aid healthcare professionals in identifying high-risk individuals at an early stage, enabling proactive management strategies and resource allocation.

Dataset

2149 rows x 33 columns

PatientID	Age	Gender	Ethnicity	EducationL	BMI	Smoking	AlcoholCor	PhysicalAc	DietQuality	SleepQuali	FamilyHist	Cardiovasc	Diabetes	Depressor	HeadInjury	Hypertensi	SystolicBP	DiastolicBF	Cholester	Cholester	Cholester	Cholester	MMSE	Functional	MemoryCo	Behavioral	ADL	Confusion	Disorientat	Personality	DifficultyC	Forgetfulne	Diagnosis	DoctorInCl	
4751	73	0	0	2	22.92775	0	13.29722	6.327112	1.347214	9.025679	0	0	1	1	0	0	142	72	242.3668	56.1509	33.68256	162.1891	21.46353	6.518877	0	0	1.725883	0	0	0	1	0	0	XXXConfid	
4752	89	0	0	0	26.82768	0	4.542524	7.619885	0.518767	7.151293	0	0	0	0	0	0	115	64	231.1626	193.408	79.02848	294.6309	20.61327	7.118696	0	0	2.592424	0	0	0	0	1	0	0	XXXConfid
4753	73	0	3	1	17.79588	0	19.55508	7.844988	1.826335	9.673574	1	0	0	0	0	0	99	116	284.1819	153.3228	69.77229	83.63832	7.356249	5.895077	0	0	7.119548	0	0	1	0	0	0	0	XXXConfid
4754	74	1	0	1	33.80082	1	12.20927	8.428001	7.435604	8.392554	0	0	0	0	0	0	118	115	159.5822	65.36664	68.45749	277.5774	13.99113	8.965106	0	1	6.481226	0	0	0	0	0	0	0	XXXConfid
4755	89	0	0	0	20.71697	0	18.45436	6.310461	0.795498	5.597238	0	0	0	0	0	0	94	117	237.6022	92.8697	56.8743	291.1988	13.51761	6.045039	0	0	0.014691	0	0	0	1	1	0	0	XXXConfid
4756	86	1	1	1	30.62689	0	4.140144	0.211062	1.584922	7.621953	0	0	1	0	0	0	168	62	280.7125	198.3346	79.0805	263.9437	27.51753	5.510144	0	0	9.015686	1	0	0	0	0	0	0	XXXConfid
4757	68	0	3	2	38.38762	1	0.646047	9.257695	5.897388	5.477686	0	0	0	0	1	0	143	88	263.7341	52.47067	66.53337	216.4892	1.964413	6.062124	0	0	9.236328	0	0	0	0	1	0	0	XXXConfid
4758	75	0	0	1	18.77601	0	13.72383	4.649451	8.341903	4.21321	0	0	0	0	0	0	117	63	151.3831	69.62351	77.34682	210.5709	10.13957	3.401374	0	0	4.517248	1	0	0	0	0	1	1	XXXConfid
4759	72	1	1	0	27.83319	0	12.16785	1.53136	6.736882	5.748224	0	0	0	0	0	1	117	119	233.6058	144.0457	43.07589	151.1642	25.82073	7.396061	0	1	0.756232	0	0	0	1	0	0	0	XXXConfid
4760	87	0	0	0	35.4563	1	16.02869	6.440773	8.086019	7.551773	0	1	0	0	0	0	130	78	281.6301	130.4976	74.29125	144.176	28.38841	1.148904	0	1	4.554394	0	0	0	0	0	0	0	XXXConfid
4761	89	0	3	1	39.46303	0	9.811292	8.81995	0.43402	7.644097	0	0	0	0	0	0	131	86	224.5264	160.7658	68.32831	172.7852	19.69611	8.246968	0	0	2.0184	0	1	0	0	0	1	0	XXXConfid
4762	78	0	0	2	22.46338	1	19.30018	3.834639	8.27919	8.312326	0	0	1	0	0	1	165	97	254.5866	132.96	39.00928	344.4486	21.20562	5.568541	0	0	5.467267	0	1	0	1	1	0	0	XXXConfid
4763	84	1	0	1	26.77095	0	10.97802	3.978079	7.024417	8.253005	1	0	0	1	0	0	145	63	254.4354	148.2914	98.58555	81.52514	2.20034	0.515136	0	0	9.003759	1	0	0	0	0	0	0	XXXConfid
4764	78	1	0	1	28.87065	1	10.19471	0.631281	1.63281	7.333236	1	0	0	0	0	0	137	82	221.3053	194.6004	26.33392	357.5828	7.852082	4.510713	1	0	1.939596	0	1	0	0	0	1	XXXConfid	
4765	64	1	0	2	27.94286	0	2.17578	9.714566	5.317232	9.087141	0	1	1	0	0	0	94	98	247.5846	193.9085	94.81174	287.0479	10.7865	6.791686	0	0	5.505587	1	1	0	0	0	0	0	XXXConfid
4766	69	0	0	1	18.04592	0	8.116832	2.956495	7.570633	6.736797	0	0	0	0	0	1	124	72	204.6708	97.75565	99.28634	246.9108	22.71516	3.743028	0	0	1.911131	0	0	0	0	1	1	XXXConfid	
4767	63	1	1	2	22.8229	1	4.433961	7.182895	7.929486	4.654828	0	1	0	0	0	0	148	116	200.5001	181.0236	51.86714	119.6564	7.167602	9.365946	1	0	1.382086	0	0	0	0	0	0	0	XXXConfid
4768	65	1	0	1	16.33328	1	4.161795	1.30632	2.888936	5.436423	0	0	0	0	0	1	154	61	183.1123	101.2582	39.22967	374.8552	18.04929	4.019546	0	0	2.89294	0	0	0	0	0	0	0	XXXConfid
4769	72	0	0	2	37.93247	0	9.385603	7.12794	3.314983	6.790196	0	0	0	1	0	0	132	107	214.9084	132.1274	20.888	192.7608	15.44741	5.189536	0	0	7.498114	0	0	0	0	1	0	0	XXXConfid
4770	68	0	0	3	20.0414	0	18.42636	4.060714	3.361536	7.393126	0	0	0	0	0	0	144	98	195.2046	181.9779	50.59787	52.78695	11.04989	0.535639	0	0	1.63858	0	0	0	0	1	1	XXXConfid	
4771	82	1	0	0	36.2231	0	4.192896	6.381502	7.971127	9.521027	0	1	0	0	0	0	120	93	271.8414	84.47889	76.37039	361.242	8.98475	6.946428	0	0	1.688025	0	0	0	0	1	1	XXXConfid	
4772	65	0	1	2	37.54394	1	12.06396	9.126038	3.531207	9.574005	0	0	0	0	0	0	178	89	210.1505	94.12844	68.19563	364.1497	24.11316	2.747484	0	0	3.001114	0	0	0	1	0	0	0	XXXConfid
4773	82	1	0	3	37.58388	0	5.836421	7.67658	9.76759	5.97503																									

Dataset

1

Patient Information

2

Medical History

3

Clinical Measurements

4

Cognitive & Functional Assessments

5

Symptoms

6

Diagnosis Information



Methodology

1

Problem Definition

- **Objective:** Predict the diagnosis of Alzheimer's Disease (Diagnosis: 0 or 1) based on patient demographics, lifestyle, medical history, clinical measurements, cognitive assessments, and symptoms.
- **Output:** A binary classification model with the predicted risk of Alzheimer's disease.

Methodology

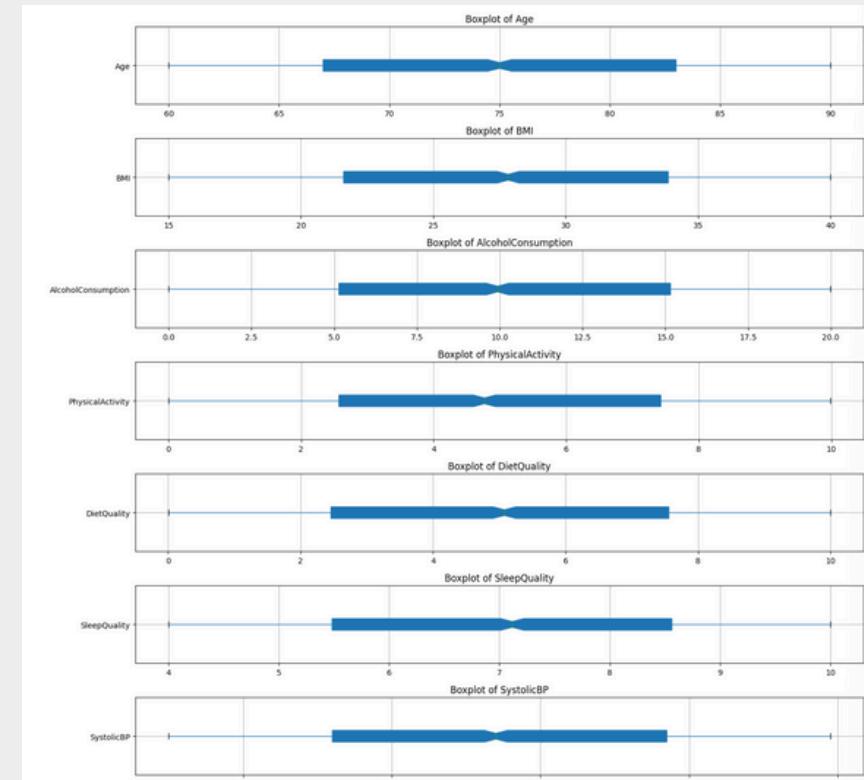
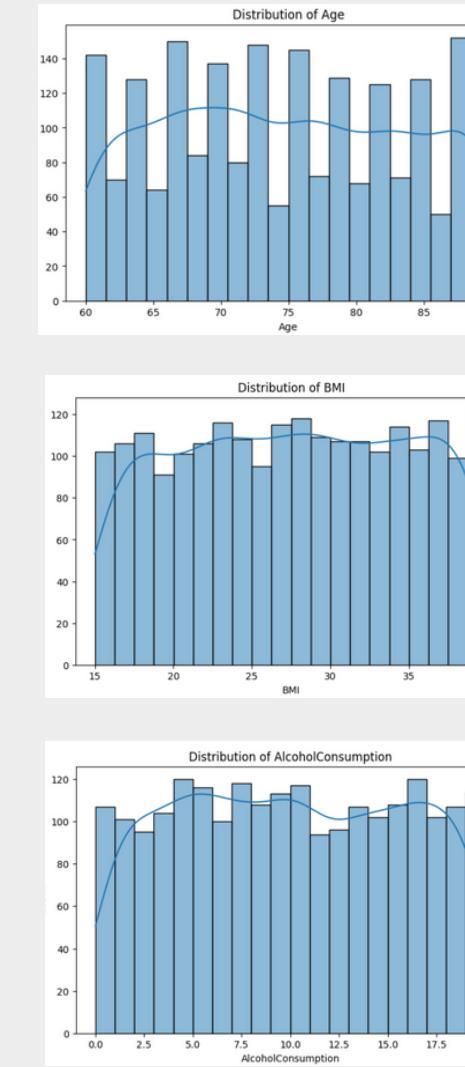
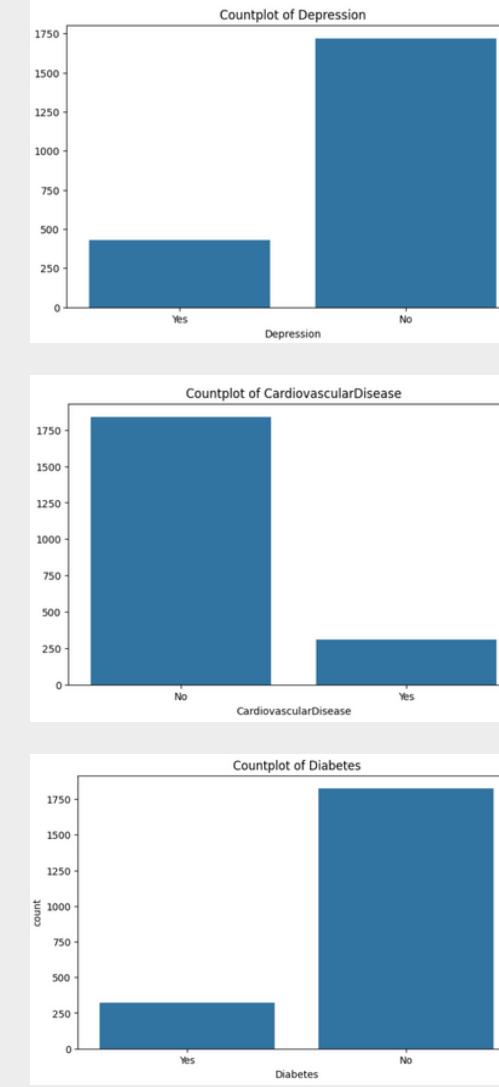
2

Data Preprocessing

- Handle Missing Values
- Encoding Categorical Variables
- Data Visualization
- Initialize the scaler to make all the numerical columns 0-1 using MinMaxScaler.
- Data Splitting:
Split data into training (70%), and test (30%) sets.

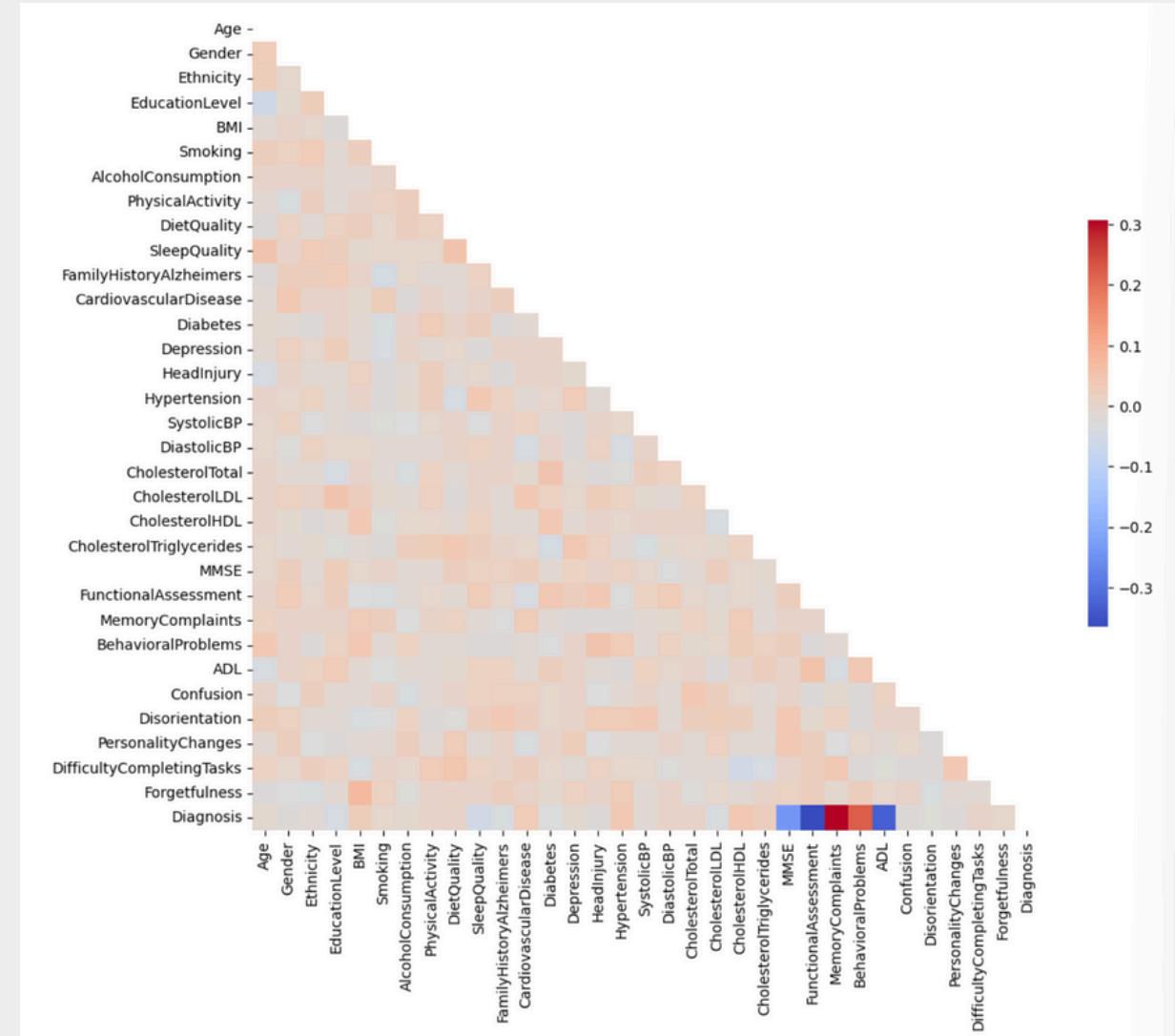
Methodology

Data Visualization



Methodology

Data Visualization



Methodology

3

Neural Network Architecture

- Input layer: Accepts the preprocessed feature set.
- Two hidden layers:
 - Layer 1: 50 neurons with ReLU activation.
 - Layer 2: 25 neurons with ReLU activation.
- Output layer: 1 neuron with a Sigmoid activation function for binary classification.

Methodology

4

Training the model

- Training Setup

Epochs: 15

Batch Size: 32

Validation Split: 20% of the training data was used for validation to monitor overfitting.

Methodology

5

Model Evaluation

- **Test Loss:** Indicates how well the model generalizes to unseen data.
- **Test Accuracy:** Measures the percentage of correctly predicted outcomes.

	precision	recall	f1-score	support
False	0.83	0.85	0.84	401
True	0.74	0.71	0.72	244
accuracy			0.79	645
macro avg	0.78	0.78	0.78	645
weighted avg	0.79	0.79	0.79	645

Methodology

6

Making Predictions & Testing

- **Output:**

Predicted probabilities for Alzheimer's risk.

Binary classification indicating the presence ‘Diagnosis’ / ‘No Diagnosis’.

- **Testing:**

generating new data & test it

Code Execution

