Aproximarea scorului motor UPDRS de evaluare a bolii Parkinson

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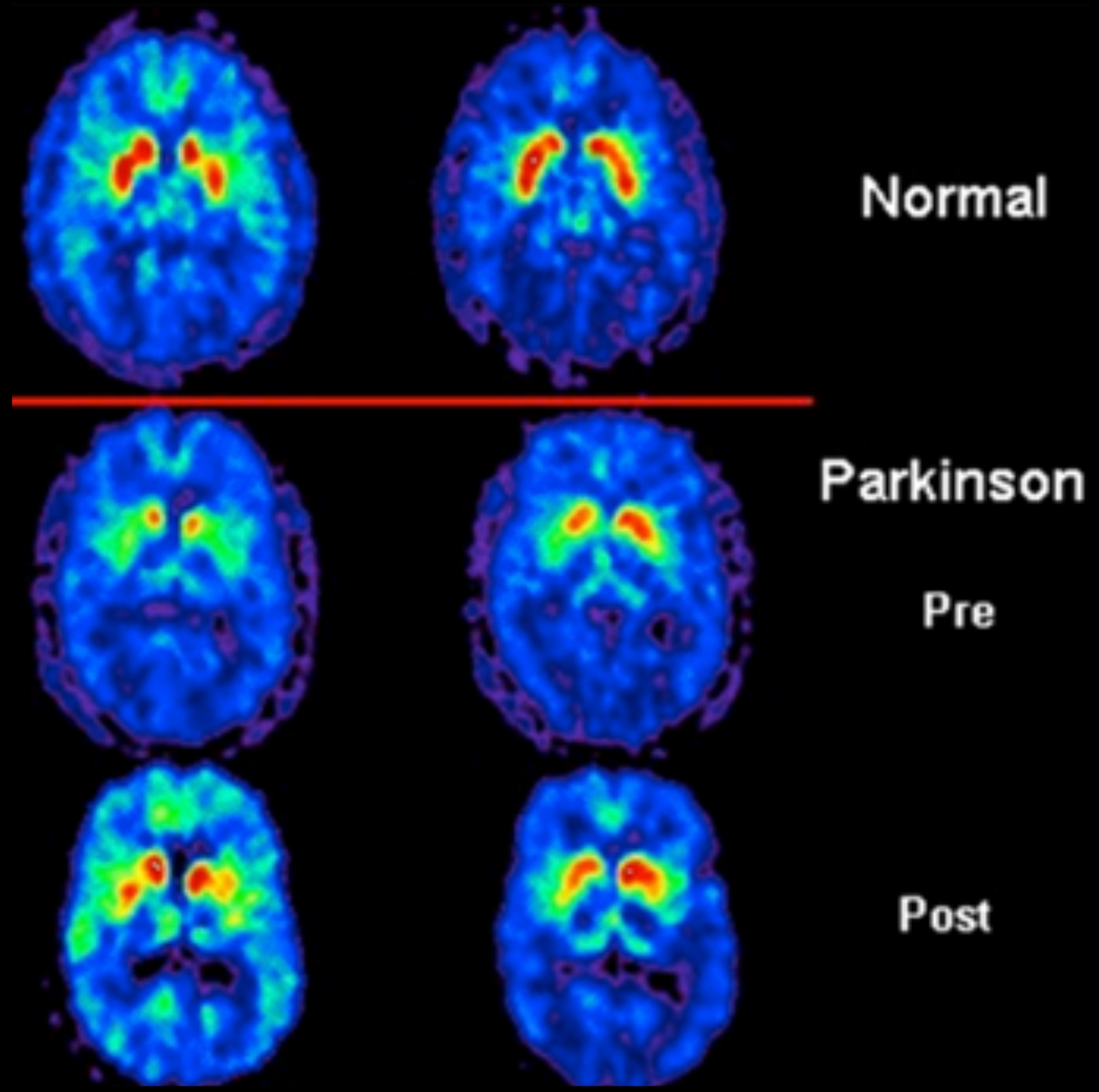
Scurta descriere

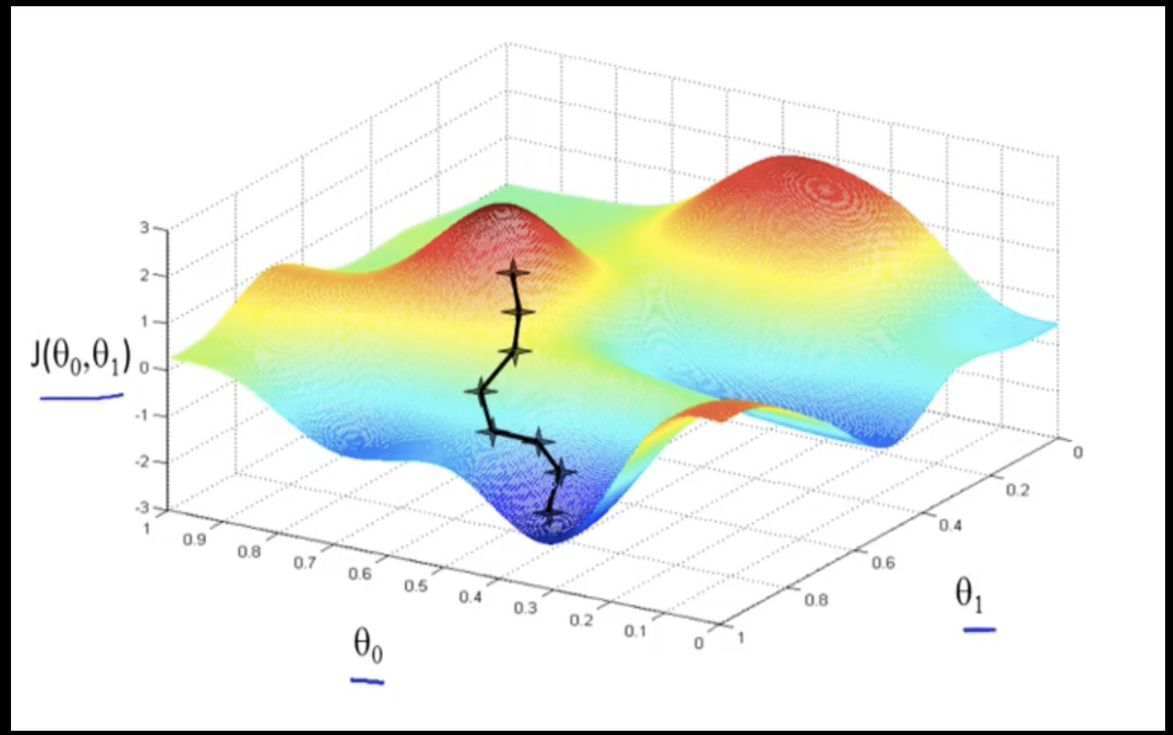
- dezvoltarea unui sistem care invata singur
- folosirea a doi algoritmi de invatare supervizata(regresie, NN)
- aproximarea scorului motor pe baza unor informatii preluate de la un numar de pacienti bolnavi
- exemple de date: sex, varsta, semnale vocale, interval de timp de la inceperea testelor, etc.



Algoritmi de regresie

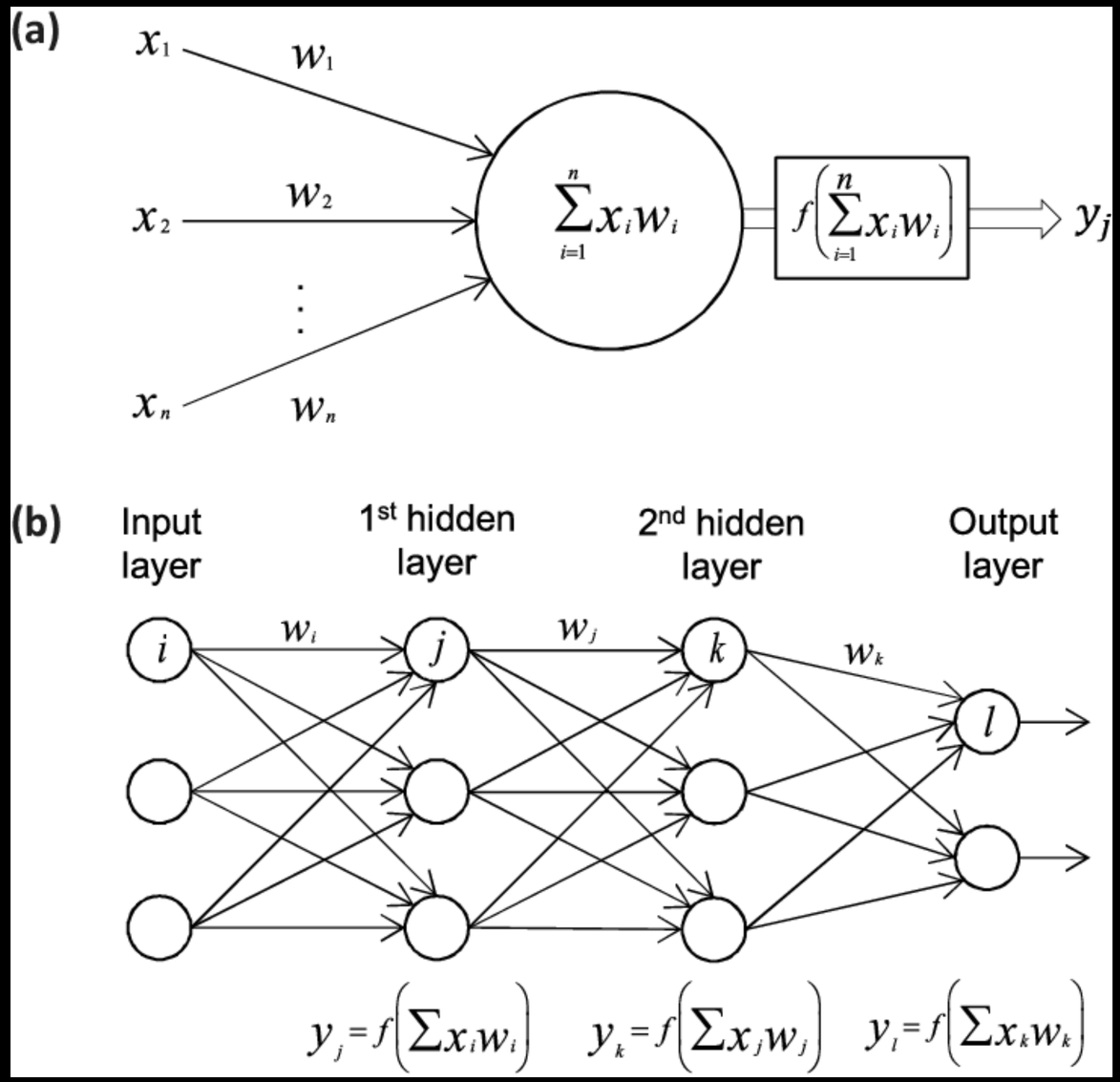
Metoda gradientului descrescator

- cautarea unui model liniar f care transforma x in y
- setul de date se imparte in mai multe parti
- eroare se calculeaza pentru fiecare exemplu de antrenament din “batch”
- modelul se updateaza pentru fiecare exemplu din “batch”



Retele neuronale

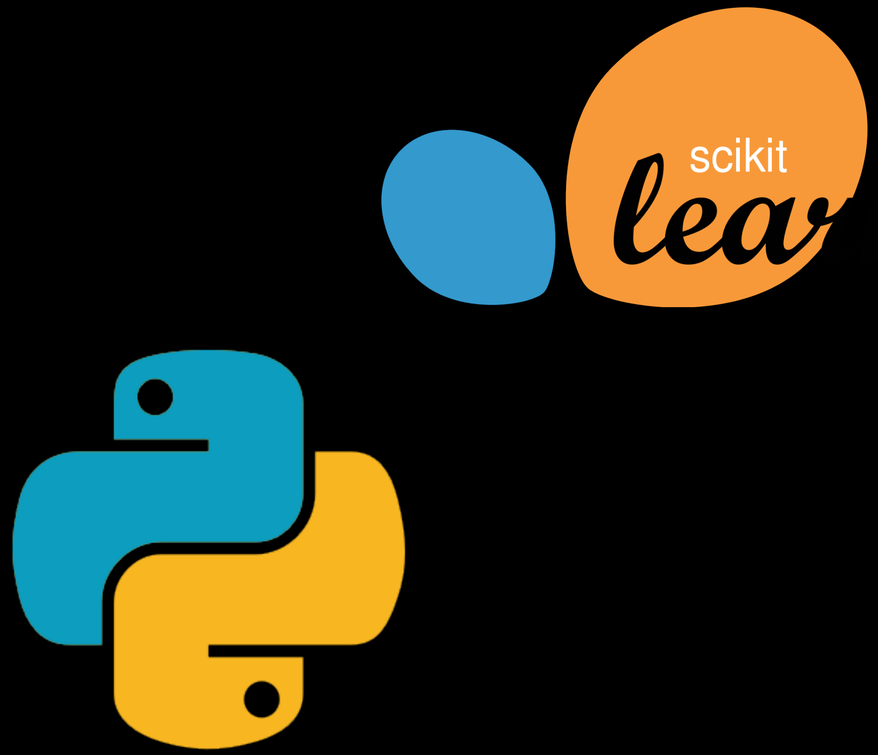
- doua metode: cu ajutorul unui tool(scikit-learn), versiune implementata
- numar de nivele ascunse: 2
- nuamr noduri de intrare: 26
- numar noduri de iesire: 1
- functie de activare: relu



Arhitectura si tehnologii

Limbaje si tool-uri:

- limbaj de programare: Python 3.6
- retele neuronale: scikit-learn
- matematica: NumPy



Arhitectura:

- aplicatie simpla client
- tip terminal
- functionalitati: citire date, ANN, regresie

Testare si mod de comparare

- testarea algoritmului se va face prin calculul eroare patratice medie
- compararea intre algoritmi se va face prin compararea celor doua erori patratice in raport cu viteza si consumul de resures a algoritmilor

Setul de date

- repository: Parkinsons Telemonitoring Data Set*
- numar de atribute: 26
- numar de instante: 5875
- articole relevante: Accurate telemonitoring of Parkinson’s disease progression by non-invasive speech tests**

parkinsons_updrs_data

Jitter(Abs)	Jitter:RAP	Jitter:PPQ5	Jitter:DDP	Shimmer	Shimmer(dB)	Shimmer:APQ3	Shimmer:APQ5
3.38e-005	0.00401	0.00317	0.01204	0.02565	0.23	0.01438	0.01309
1.68e-005	0.00132	0.0015	0.00395	0.02024	179	0.00994	0.01072
2,462E-02	0.00205	0.00208	0.00616	0.01675	181	0.00734	0.00844
2,657E-02	0.00191	0.00264	0.00573	0.02309	327	0.01106	0.01265
2,014E-02	0.00093	0.0013	0.00278	0.01703	176	0.00679	0.00929
2.29e-005	0.00119	0.00159	0.00357	0.02227	214	0.01006	0.01337
2,404E-02	0.00212	0.00221	0.00637	0.04352	445	0.02376	0.02621
2,471E-02	0.00226	0.00259	0.00678	0.02191	212	0.00979	0.01462
2,854E-02	0.00156	0.00207	0.00468	0.04296	371	0.01774	0.02134
2,702E-02	0.00258	0.00253	0.00773	0.0361	0.31	0.0203	0.0197
2,553E-02	0.00238	0.0026	0.00715	0.02132	188	0.01069	0.01214
3,216E-02	0.00236	0.00278	0.00709	0.02377	282	0.01001	0.01375
3,287E-02	0.00235	0.00251	0.00704	0.02493	0.24	0.01176	0.01395
2,388E-02	0.00142	0.0015	0.00427	0.02107	171	0.00847	0.0104
3,181E-02	0.00241	0.00231	0.00724	0.02791	291	0.0131	0.0126
2,908E-02	0.00152	0.00194	0.00457	0.02878	264	0.01379	0.01494
3.93e-005	0.00329	0.00285	0.00987	0.0281	274	0.01468	0.0143
3,783E-02	0.00313	0.00311	0.0094	0.03011	0.32	0.01603	0.01733
3,711E-02	0.00296	0.00293	0.00889	0.02522	223	0.0126	0.01466
2,221E-02	0.00181	0.00195	0.00542	0.0323	288	0.01458	0.01732
1,646E-02	0.00079	0.00109	0.00237	0.01524	133	0.00567	0.00682
3,574E-02	0.00278	0.00293	0.00835	0.03791	338	0.01915	0.02174
2,221E-02	0.00157	0.00175	0.00471	0.02477	244	0.0112	0.01283

- *= https://archive.ics.uci.edu/ml/datasets/parkinsons+telemonitoring
- **= A Tsanas, MA Little, PE McSharry, LO Ramig (2009), IEEE Transactions on Biomedical Engineering