

MENTI 12 Q4)

$[-2, 5]$ 3 bita (7)

-2, -1, 0, 1, 2, 3, 4, 5

000, 001, ..., 110, 111

-1 $\begin{bmatrix} 0 & 1 \end{bmatrix}$ 01
4 $\begin{bmatrix} 1 & 0 \end{bmatrix}$ 10 \Rightarrow 212 101

21 2014/15

1) Rosenblattovo pravilo: $w(i+1) \leftarrow w(i) + \eta(t-o)x(i)$

w -weight η -learning rate t -expected o -output x -input

2) Konektivistički pristup - umjetne neuronske mjere

Simbolistički - logičko programiranje, ekspertni sustavi, pretraživanje prostora, igranje igara

3) Ant System isparivanje feromona $\tau \leftarrow \tau(1-\rho)$

4) x pripada neizrazitom skupu A (fuzzy) Dilatacija (više-manje) A

$$Dil(A) = \alpha_A(x)^{1/2} \quad 0.5 < \mu(x) < 1$$

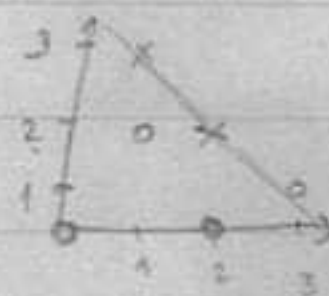
Concentration (very) A

$$Con(A) = \alpha_A(x)^2$$

5) $(0,0), (2,0), (1,2), (3,1)$ pozitivni

koje navedene negativne nije moguće naučiti TLU

$(1,3)$ & $(2,1)$



TLU ograničen na linearno odvajanje.

6) Ekspertni sustav s ulančavanjem unatrag prikladan je kada: /

7) "Kineska osoba" /

8) Nadzirano učenje: (ulaz, izlaz)

Nenadzirano (samo ulaz)

9) Genetički traži maksimum $f(x)$. Funkcija dobroće? $2 \cdot f(x)$

- 10) $\{a, b, c, d\}$ nezavisni skupovi $X = \{0.1/a + 0/b + 0.3/c + 1/d\}$
 $Y = \{0.5/a + 0.4/b + 0/c + 0.2/d\}$
 $Ne\ Z\ iz\ (X; Y)$ $Z = \{1/a + 0/b + 0/c + 0.5/d\}$

Not A: $1-a$

A or B: $\max(a, b)$

A and B: $\min(a, b)$

$\Rightarrow \{0.1/a + 1/b + 1/c + 0.5/d\}$

- 11) $P(E|H) = 0.7$, $P(E|\neg H) = 0.1$, $P(H) = 0.4$, $P(H|E) = ?$

$$P(H|E) = \frac{P(E|H)P(H)}{P(E)}$$

$$P(E) = P(E|H)P(H) + P(E|\neg H)P(\neg H) = 0.34$$

$$P(H|E) = 0.82$$

- 12) Ekspertni sustav /

- 13) Genetički algoritam traži min $f(x, y) = 3(x^2 + y^2) - 2x + 1$

Najbolje rješenje je kromozom 101000 111010. Koliko iznosi minimum

— nema dovoljno podataka, fali raspon u kojem smo tražili

▽
0

- 14) Algoritam propagacije pogreške unazad (backpropagation) služi: Unaprijedne NN sa sigmoidalnim jedinicama. (aktivacijska funkcija mora biti diferencijabilna, zato ne može TLU perceptron koji koristi step funkciju).

- 15) Algoritam ACO koristi τ — jačina feromonitnog traga.

21. 2014 / 15

16) Ekspertni sustav

17) Neizrazita logika

a) definirajte jezičnu varijablu (linguistic variable)

(x, T_x, U, G_x, M_x)

x - the name

T_x - set of linguistic terms

U - universe of discourse

G - the formal grammar

M_x - semantic function

eg: AGE, $x = \text{AGE}$

$T(\text{AGE}) = \text{young, not young,}$

$+ \text{very young} + \dots$

$U = \{0, 1, \dots, 99, 100\}$

$M_x: \{ \text{young: } 0.2/20, 0.2/30, 0.4/30 \}$

b) Koji zakoni logike ne vrijede u neizrazitoj logici. Demonstrirajte

$\{1/a + 0.5/b + 0/c\}$

$\neg \Rightarrow \{0/a + 0.5/b + 1/c\}$

Law of excluded middle $A \vee \neg A \equiv T \Rightarrow \{1/a + 0.5/b + 1/c\}$

not excluded

Law of contradiction $A \wedge \neg A \equiv F \Rightarrow \{0/a + 0.5/b + 0/c\}$

not contradicted

c) Modus ponens (razlika od klasične)

Premise $\rightarrow x$ is A1

Banana is very yellow.

Implication \rightarrow If x is A then y is B

If yellow, then it is ripe.

Conclusion $\rightarrow y$ is B1

Banana is very ripe.

18) Naive Bayes Classification

a)

b) (Istra, ne, hotel, avion) $y = da: P(da) P(\text{Istra} | da) P(\text{ne} | da) P(\text{hotel} | da) P(\text{avion} | da)$

DA $\rightarrow 0.011 = y = da: \frac{2}{7} \cdot \frac{2}{3} \cdot \frac{1}{3} \cdot \frac{1}{3} \cdot \frac{1}{3}$

$0.007 = y = ne: \frac{4}{7} \cdot \frac{1}{4} \cdot \frac{3}{4} \cdot \frac{1}{4} \cdot \frac{1}{4}$

c) (Kvarner, da, kamp, avion)

$y = da: \frac{2}{7} \cdot \frac{0}{2} = 0$

$y = ne: \frac{4}{7} \cdot \frac{2}{4} \cdot \frac{2}{4} \cdot \frac{1}{4} = \frac{1}{7} \rightarrow NE$

Overfitting. Kvarner yes not in dataset.

