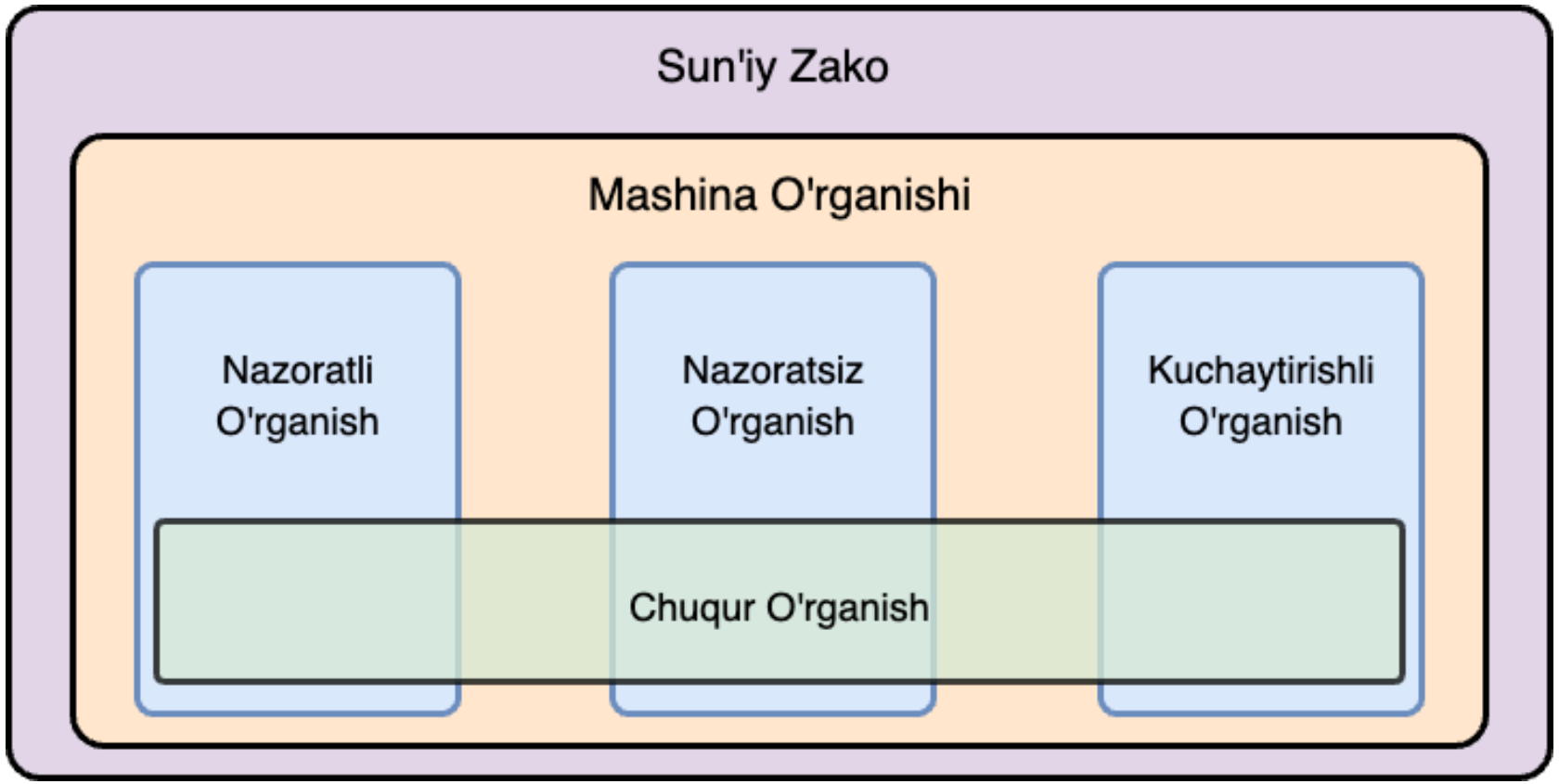
Shug’ullantirish va Optimallashtirish - 1

Ikboljon Sobirov © 2024

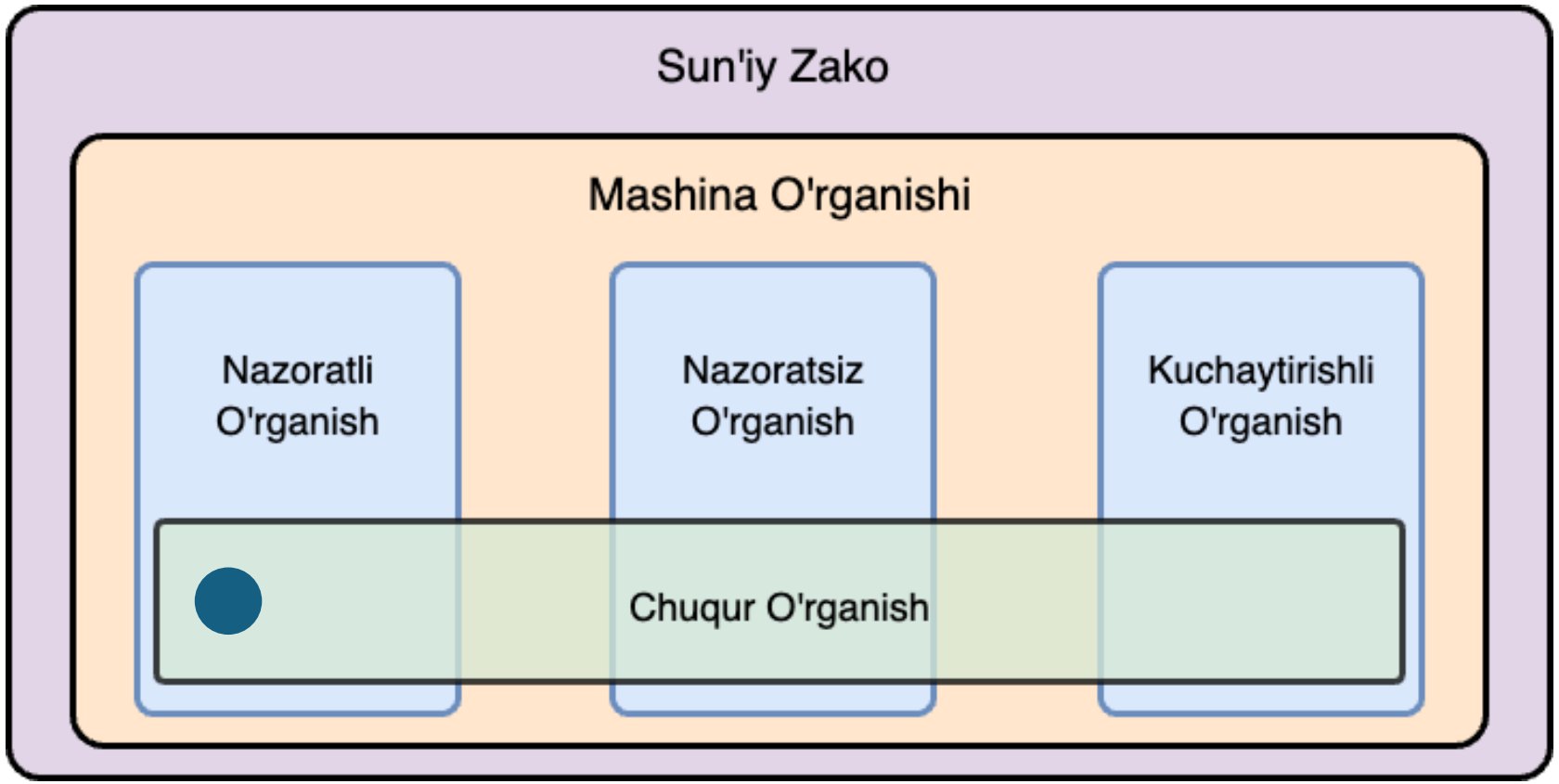
Agenda

- Eslaymiz
- Asosiy qismlar
- Iris ma’lumotlar to’plami
- Oddiy tasnifchi
- Yo’qotish funksiyasi
- Funksiya

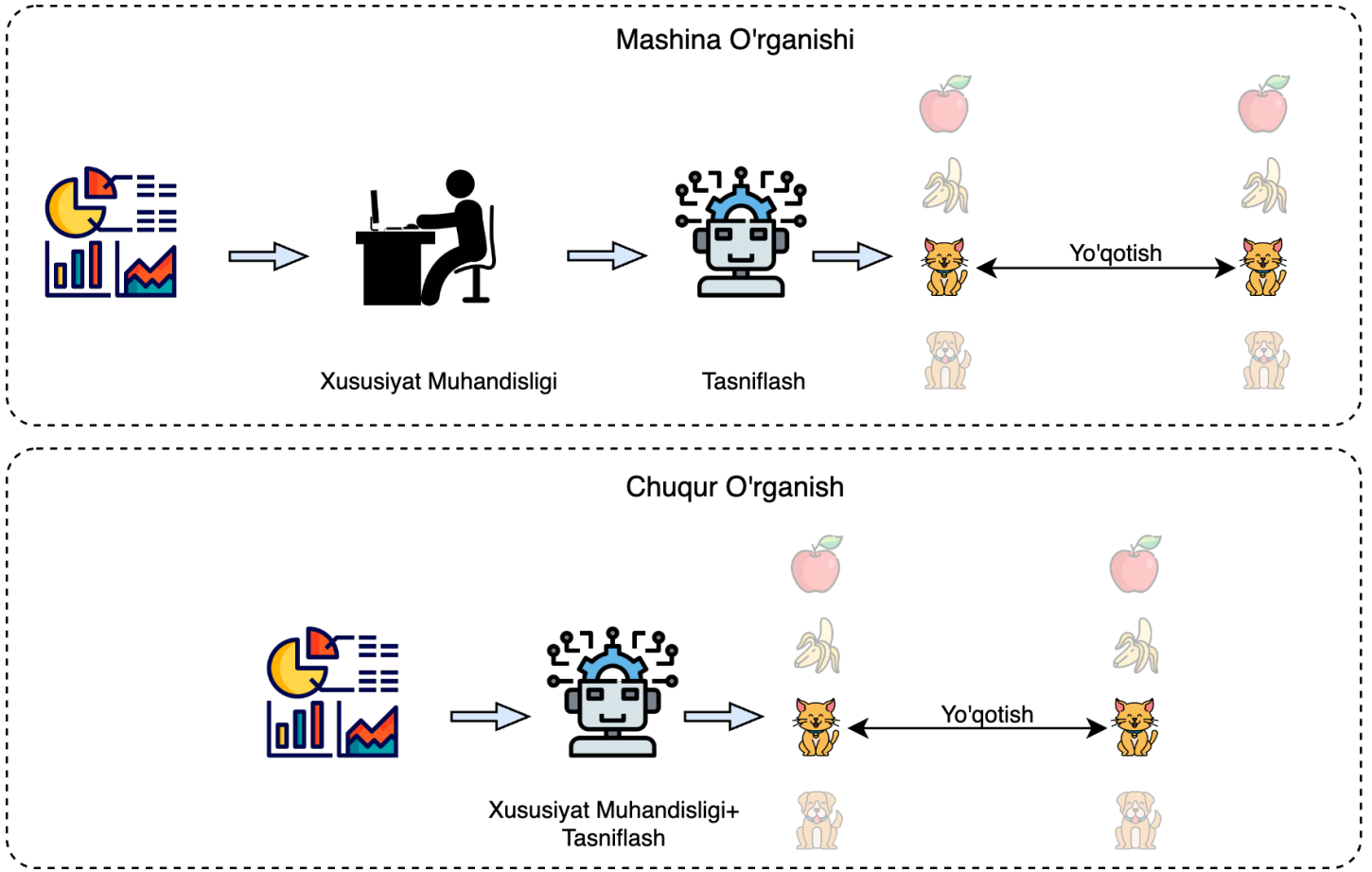
Eslaymiz



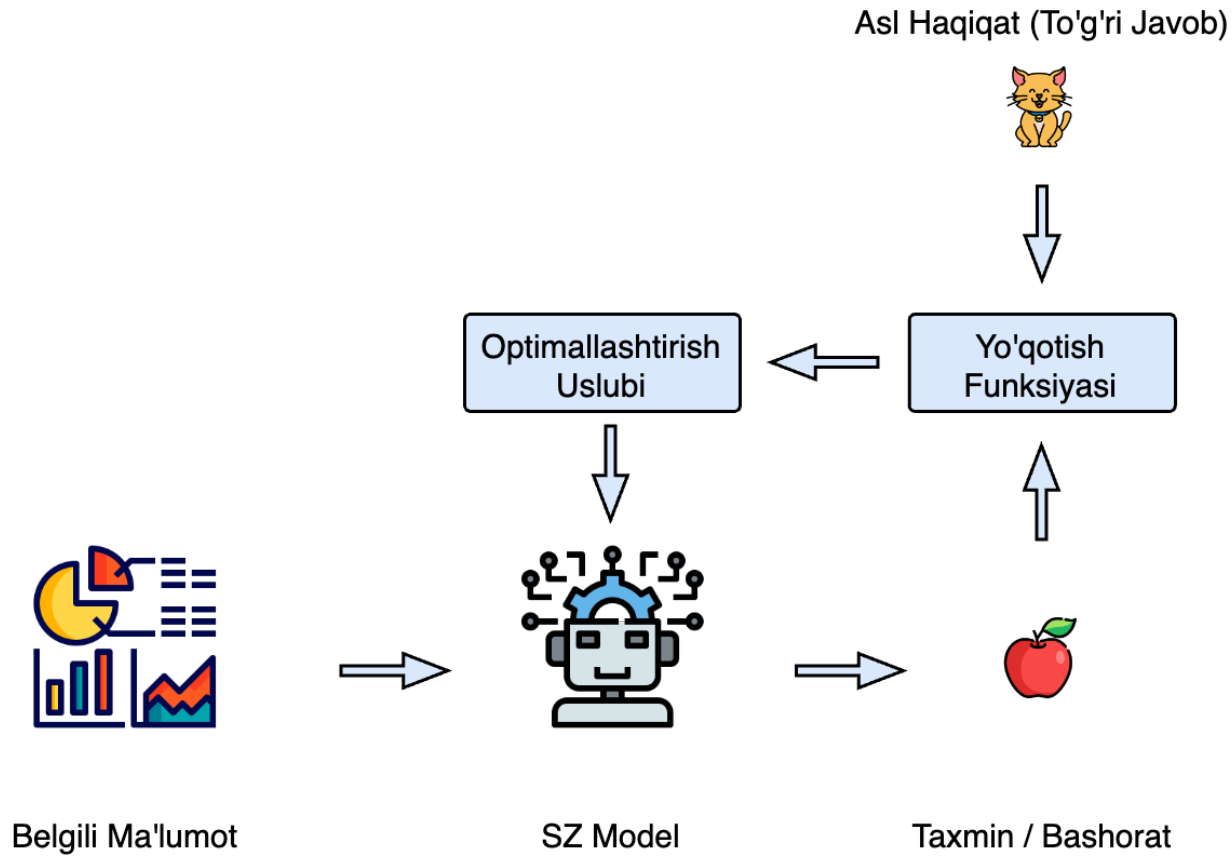
Eslaymiz



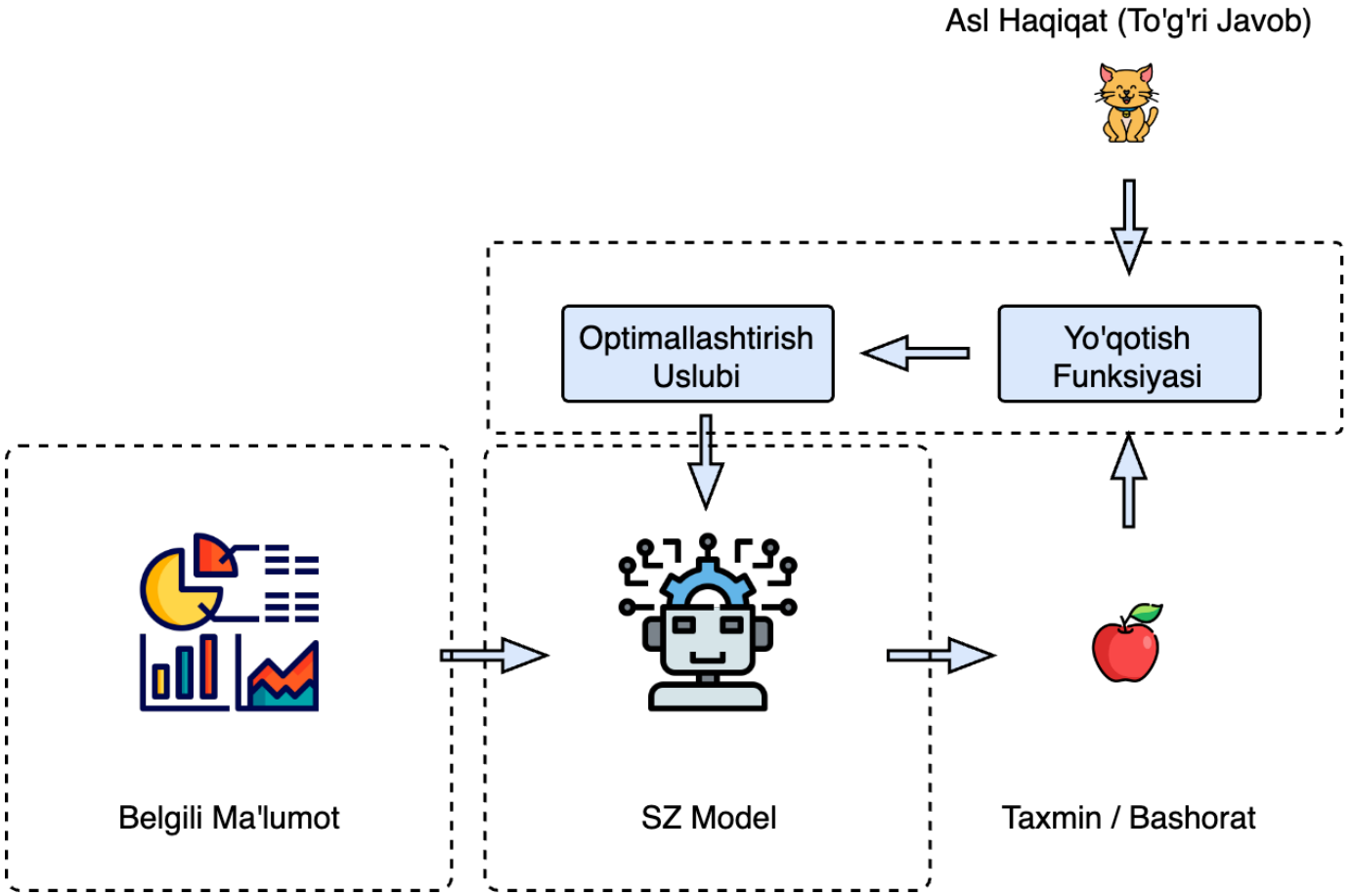
Eslaymiz


Mashina O'rganishi
Xususiyat Muhandisligi
Tasniflash
Yo'qotish
Chuqur O'rganish
Xususiyat Muhandisligi+
Tasniflash
Yo'qotish

Asosiy Qismlar



Asosiy Qismlar



Iris Ma’lumotlar To’plami

(a)

Setosa

(b)

Versicolor

(c)

Virginica

Iris Ma’lumotlar To’plami

index	g_e	g_e	b_u	b_e	Belgisi
0	5.1	3.5	1.4	0.2	Setosa
1	4.9	3.0	1.4	0.2	Setosa
	...				
50	7.0	3.2	4.7	1.4	Versicolor
	...				
149	5.9	3.0	5.1	1.8	Virginica

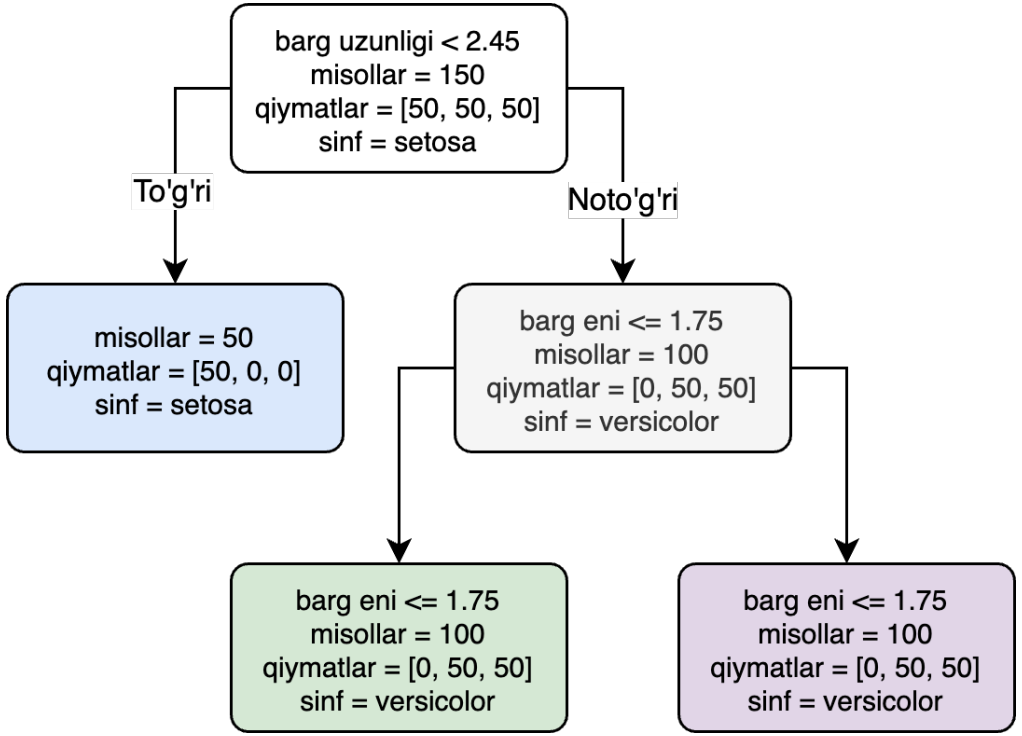
Iris Ma’lumotlar To’plami

- Jadvalli ma’lumot
- 3 turga tasniflash vazifasi
- 150ta kiruvchi ma’lumot (har biri uchun 50tadan)
- 4ta xususiyat/o’lchamga ega: $\mathcal{X} = \mathbb{R}^4$
- *N x D*

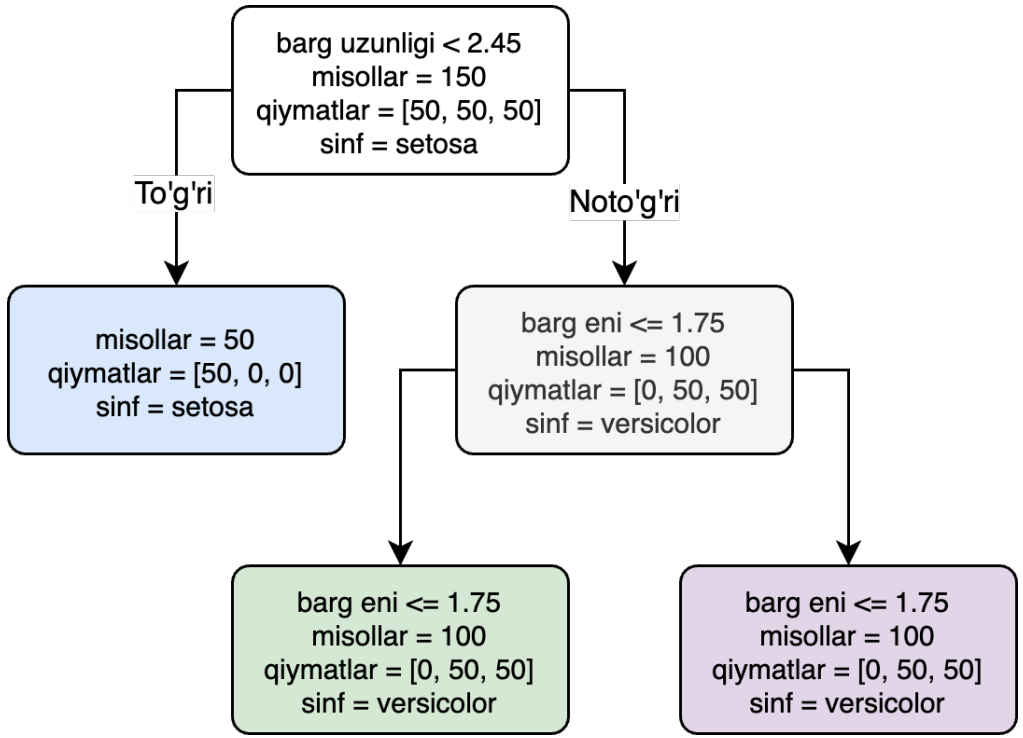
Oddiy Tasnifchi

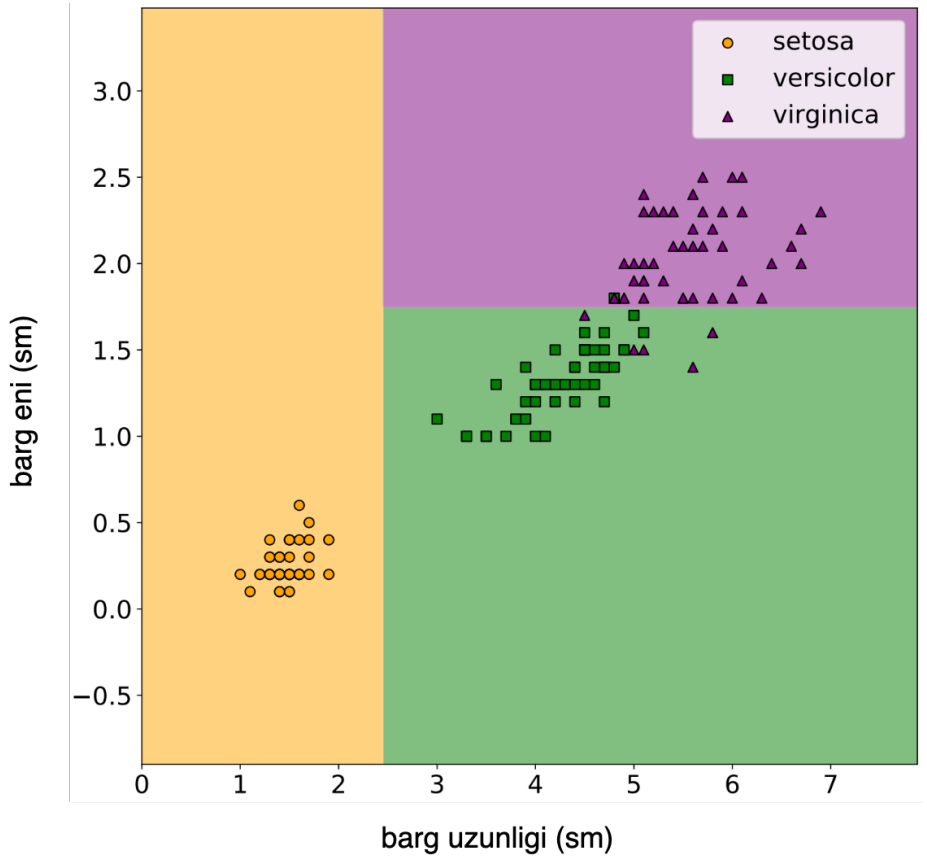
$$f(x;\theta) = \begin{cases} \text{Setosa, agar barg uzunligi} < 2.45 \\ \text{Versicolor yoki Virginica, ask holda} \end{cases}$$

θ – model o’rganuvchi parametrlar



Oddiy Tasnifchi





Yo’qotish funksiyasi (Riskni minimallashtirish)

$$\mathcal{L}(\boldsymbol{\theta}) \triangleq \frac{1}{N}\sum_{n=1}^{N} \mathbb{I}\left(y_n \neq f(\boldsymbol{x}_n;\boldsymbol{\theta})\right)$$

$$\mathbb{I}\left(e\right) = \begin{cases} 1 & \text{agar } e \text{ to’g’ri bo’lsa} \\ 0 & \text{agar } e \text{ noto’g’ri bo’lsa} \end{cases}$$

$$\mathcal{L}(\boldsymbol{\theta}) \triangleq \frac{1}{N}\sum_{n=1}^{N} \ell(y_n, f(\boldsymbol{x}_n;\boldsymbol{\theta}))$$

Yo’qotish funksiyasi (Riskni minimallashtirish)

- Model shug’ullantirish (yoki modelni moslash) – minimallashtiradigan parametrlarni topish

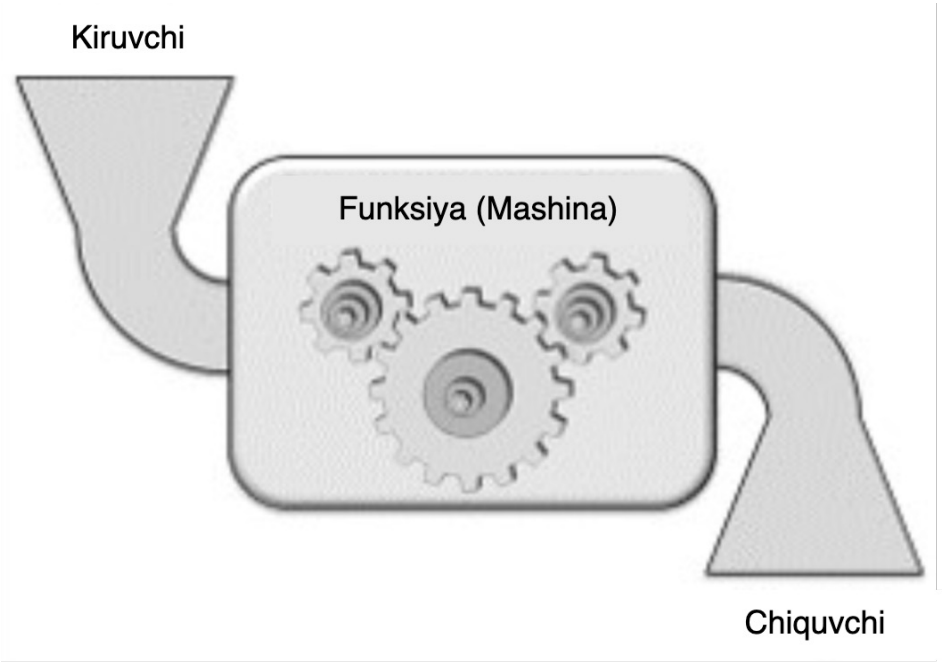
$$\hat{\boldsymbol{\theta}} = \underset{\boldsymbol{\theta}}{\operatorname{argmin}}\, \mathcal{L}(\boldsymbol{\theta}) = \underset{\boldsymbol{\theta}}{\operatorname{argmin}}\, \frac{1}{N} \sum_{n=1}^{N} \ell(y_n, f(\boldsymbol{x}_n; \boldsymbol{\theta}))$$

Tanaffus

Funksiya

- Chiziqli funksiya
- Gradient (*a*) va kesuvchi (*b*)
- O’zgaruvchi
- Kiruvchi va chiquvchi
- GoodNotes’da davom etamiz

$$f(x) = ax + b$$



Tanaffus

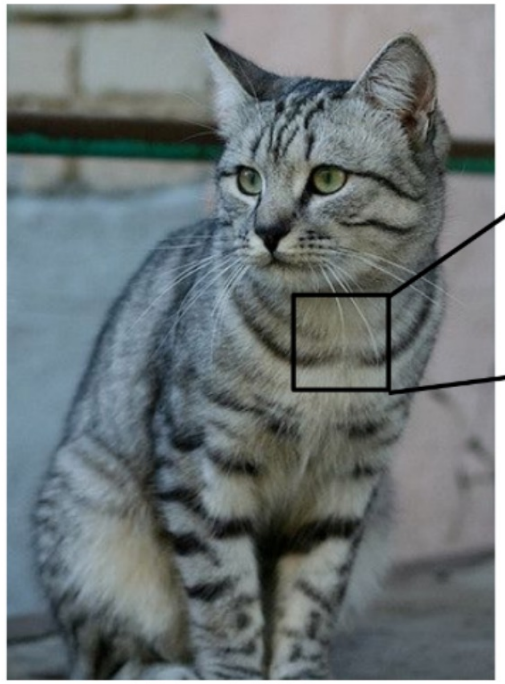
Parametrlashgan Funksiya

- θ – model parametrlari
- w - (o'zgaruvchi) vazn – weight
- x – kiruvchi
- $f(x; \theta)$ – chiquvchi
- b – statistik buzilma – bias

$$f(x) = ax + b$$

$$f(x; \theta) = b + wx$$

Parametrlashgan Funksiya



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```

Kompyuter ko'radigan ma'lumot

Rasm - bir katta kataklar jamlanmasi. Unda [0, 255] sonlari orasidagi qiymatlar yotadi.

Misol:

$$800 \times 600 \times 3$$

3ta kanalli rasm (RGB - QYK)

Parametrlashgan Funksiya

$32 \times 32 \times 3$

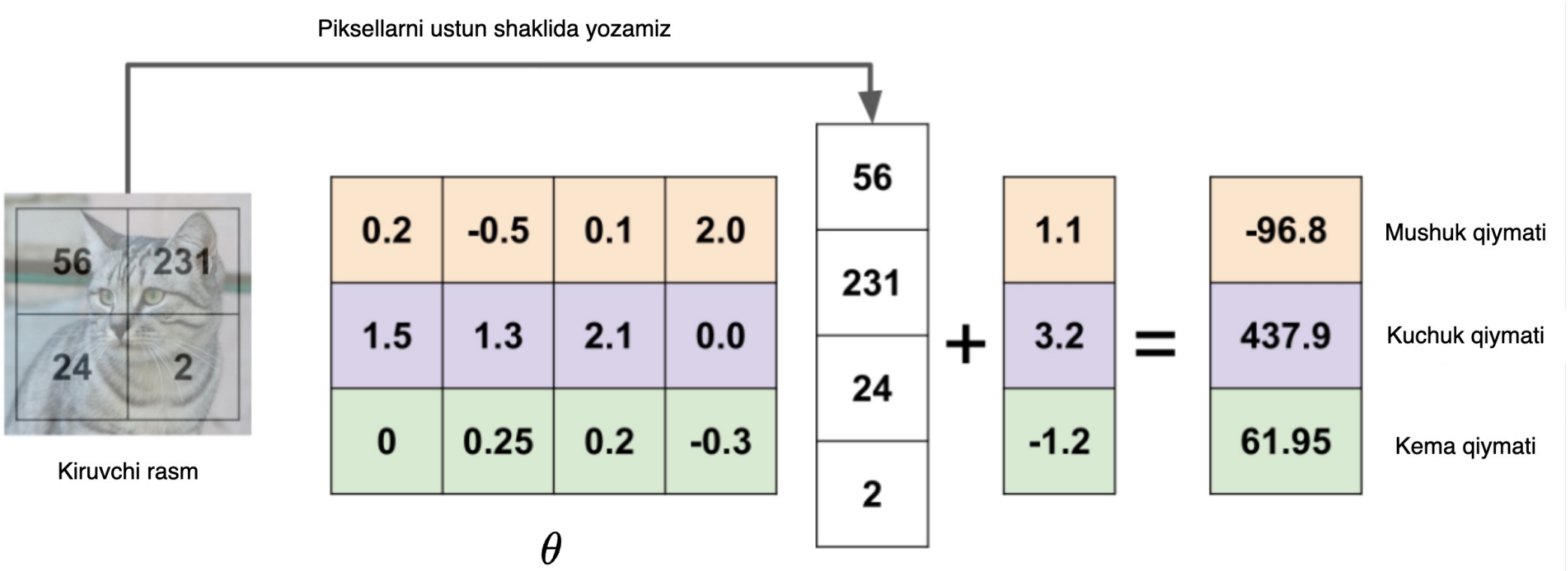
$f(x;\theta)$

Parametrlar yoki vazn

$[0.25, 0.022, 0.34, \ldots, 0.004]$

n-ta sinf

Parametrlashgan Funksiya



Ikkinchi qismda

- Muvaffaqiyatni qanday o’lchaymiz?
- Qanday qilib parametrlarni yangilaymiz?
- Gradient tushushi
- Stokastik gradient tushishi

Rahmat