

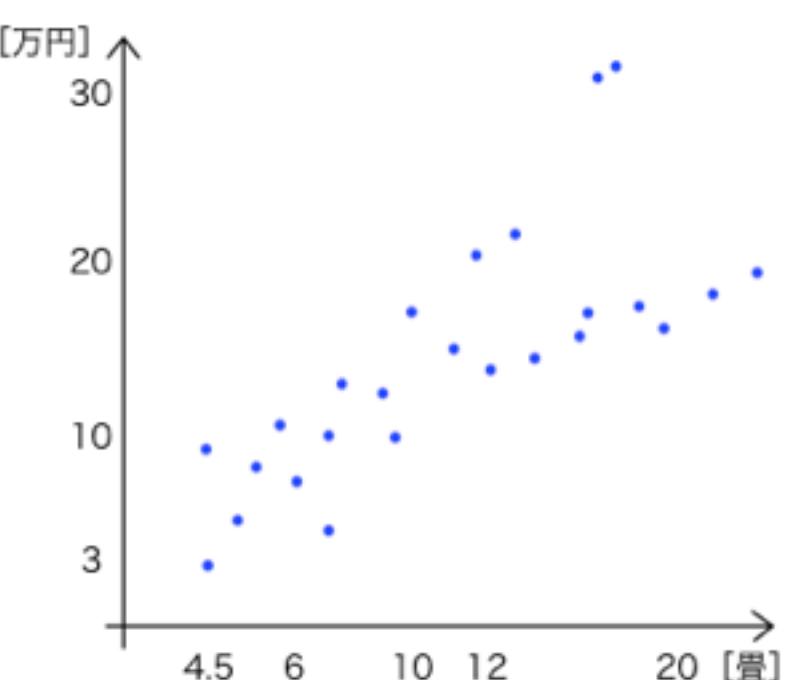
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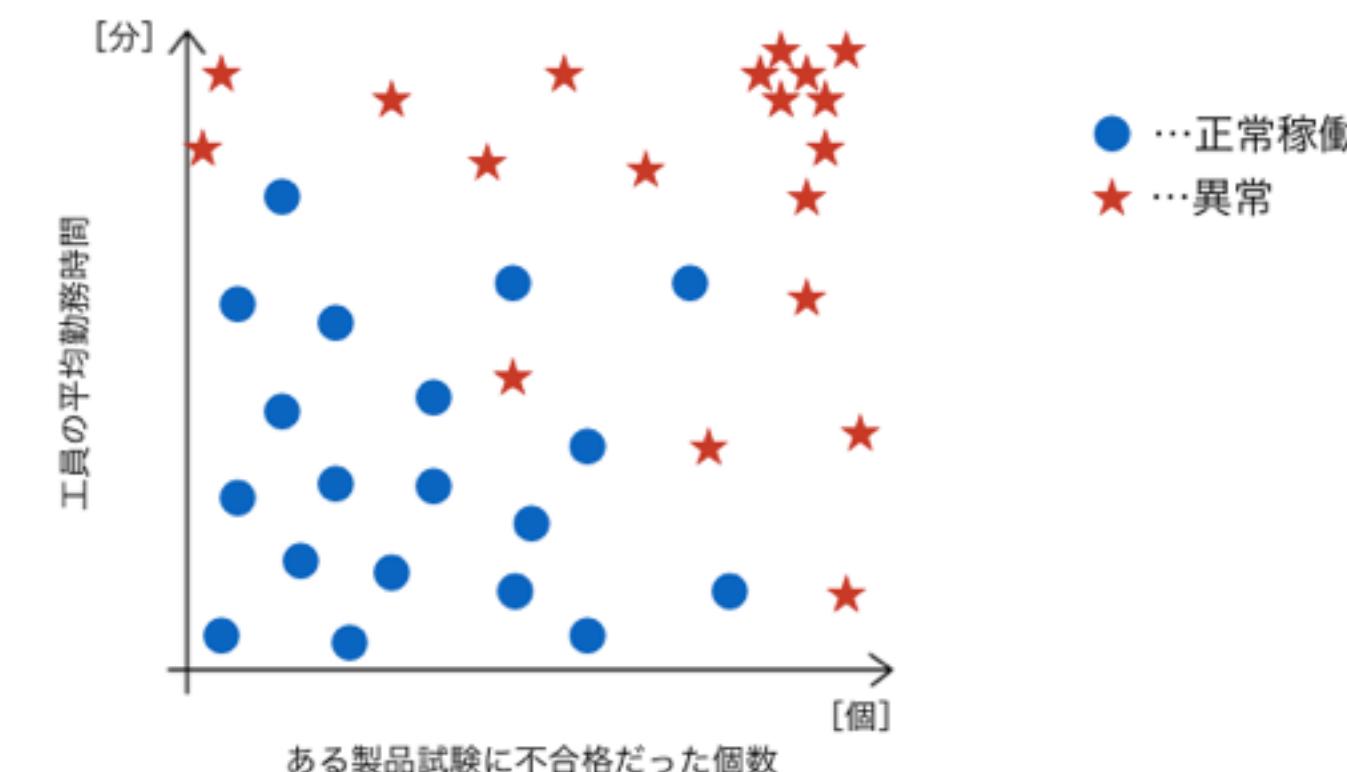
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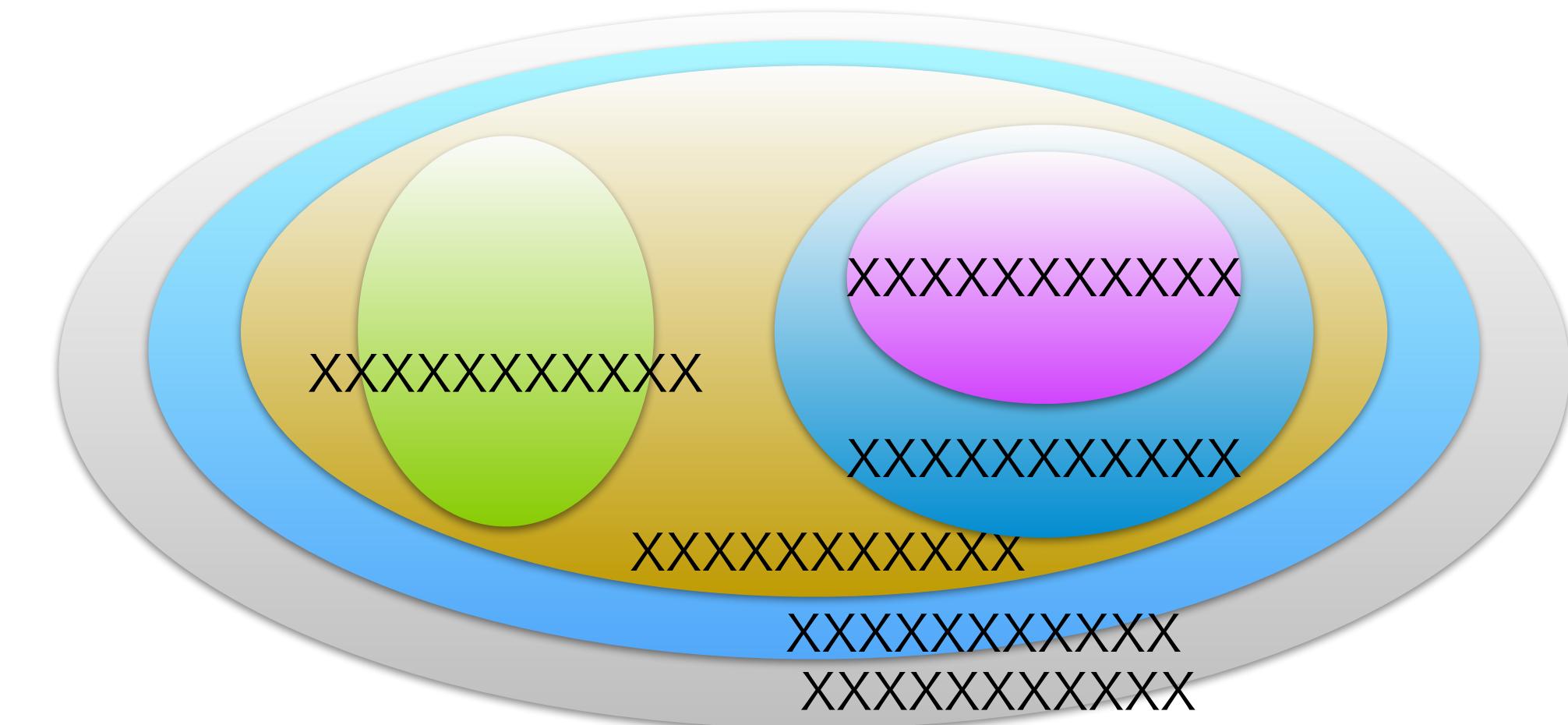


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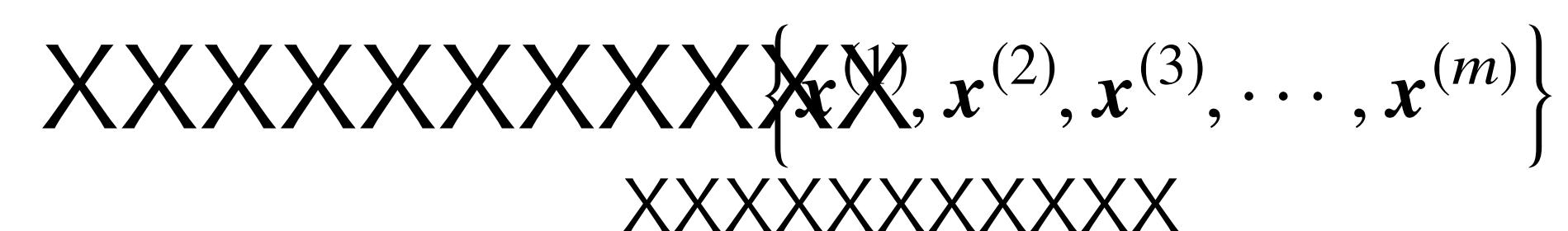
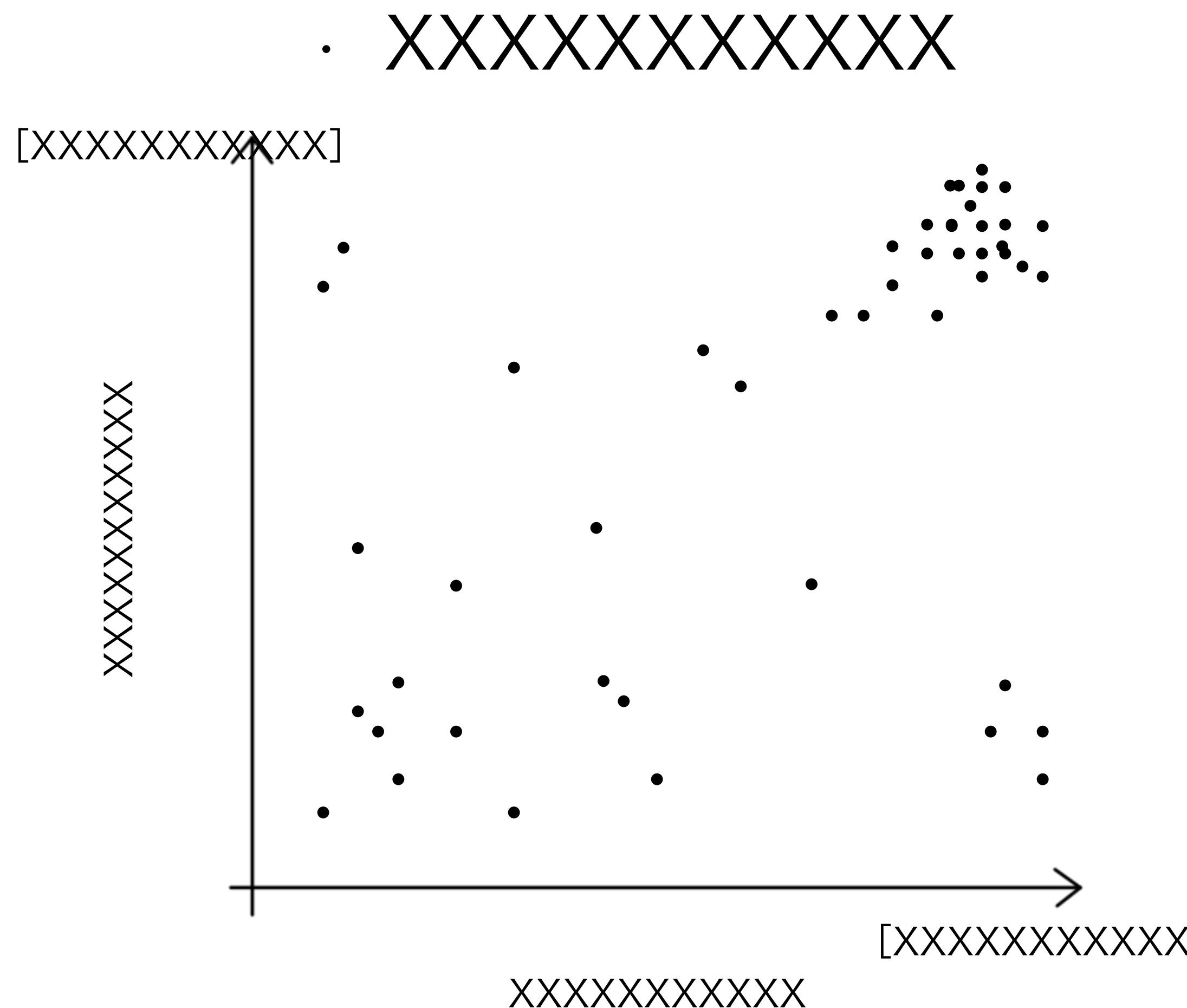
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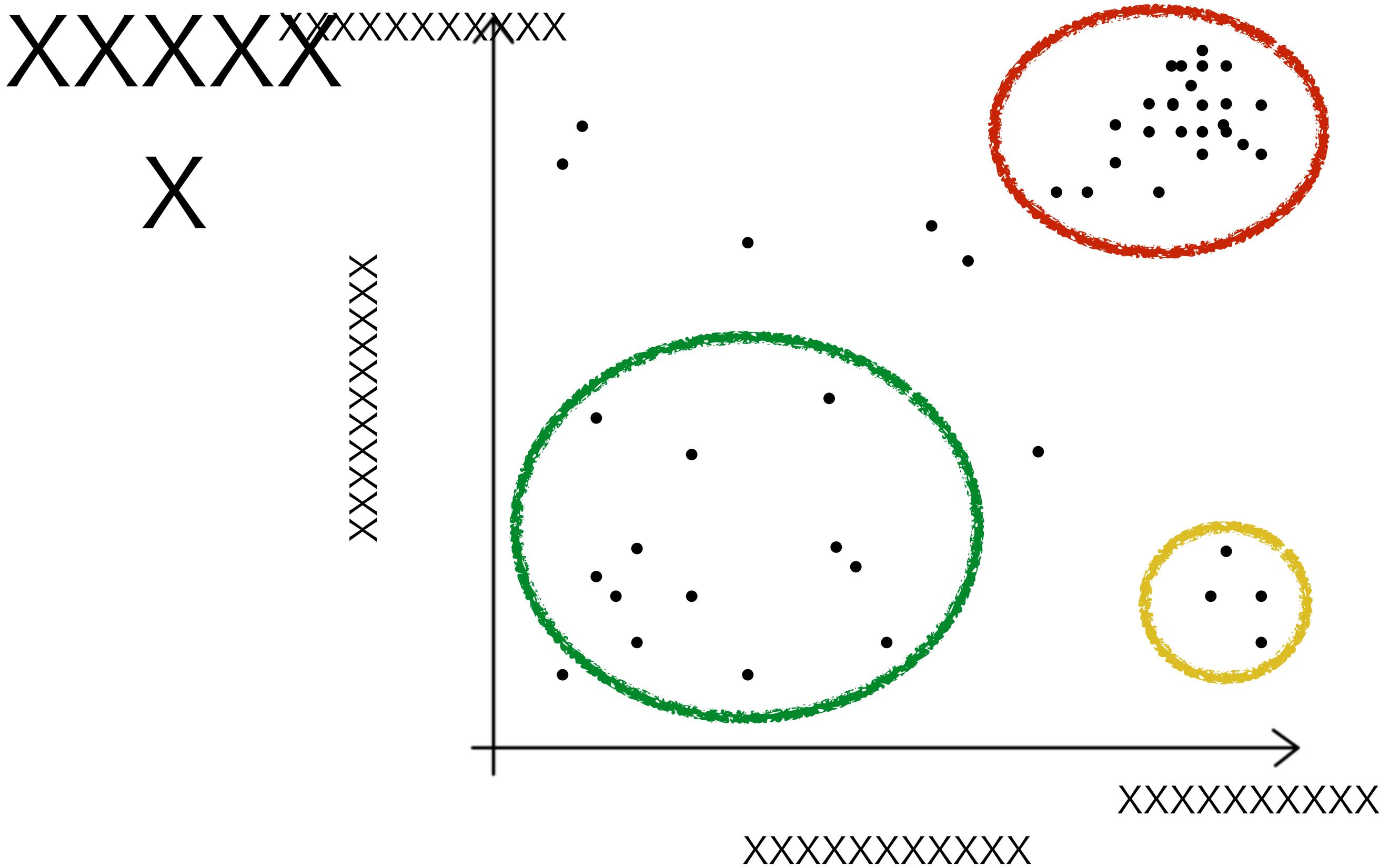
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$$\{(\mathbf{x}^{(1)}, y^{(1)}), (\mathbf{x}^{(2)}, y^{(2)}), (\mathbf{x}^{(3)}, y^{(3)}), \dots, (\mathbf{x}^{(m)}, y^{(m)})\}$$

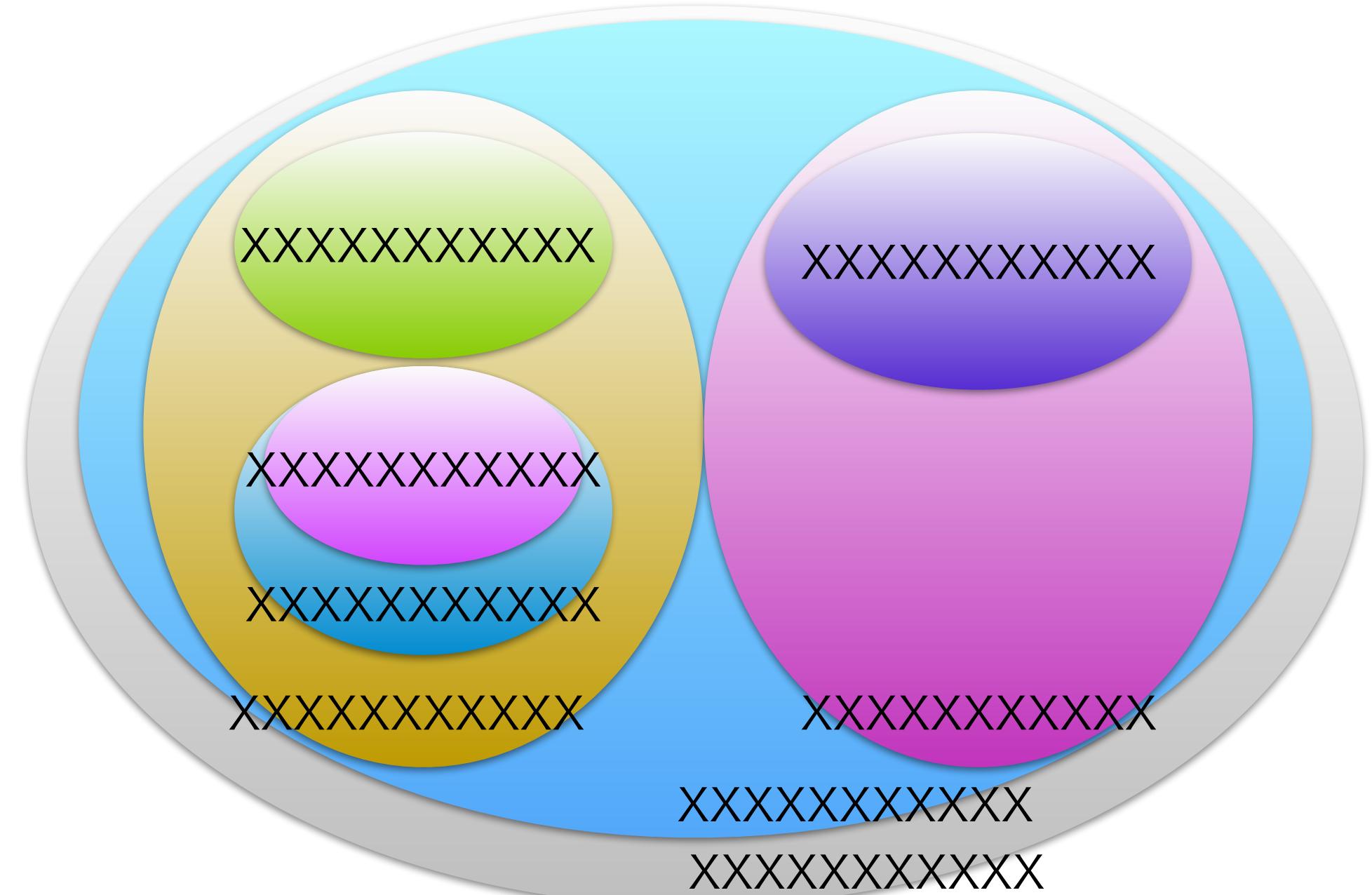


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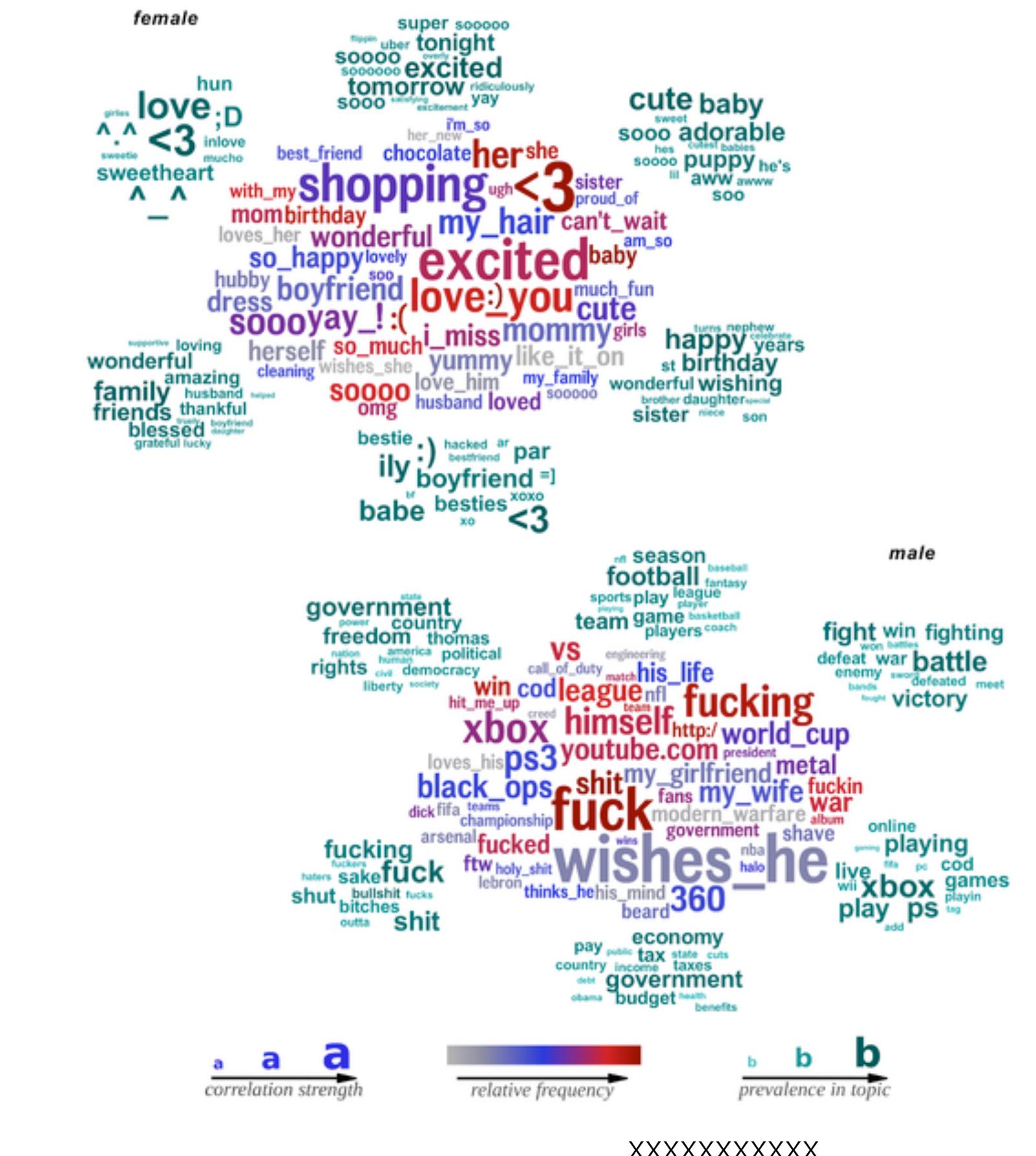


XXXXXX| $x^{(1)}, x^{(2)}, x^{(3)}, \dots, x^{(m)}$



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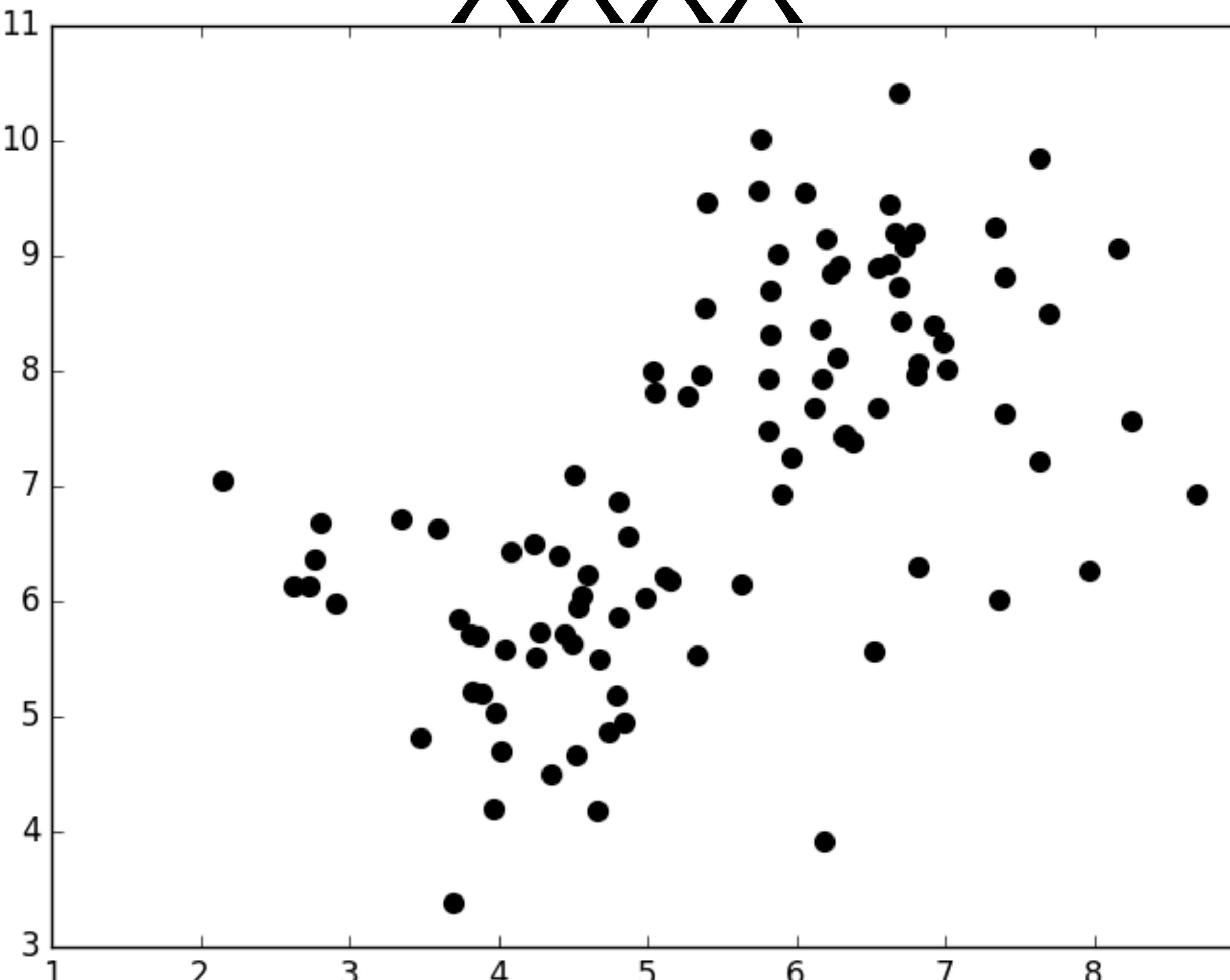
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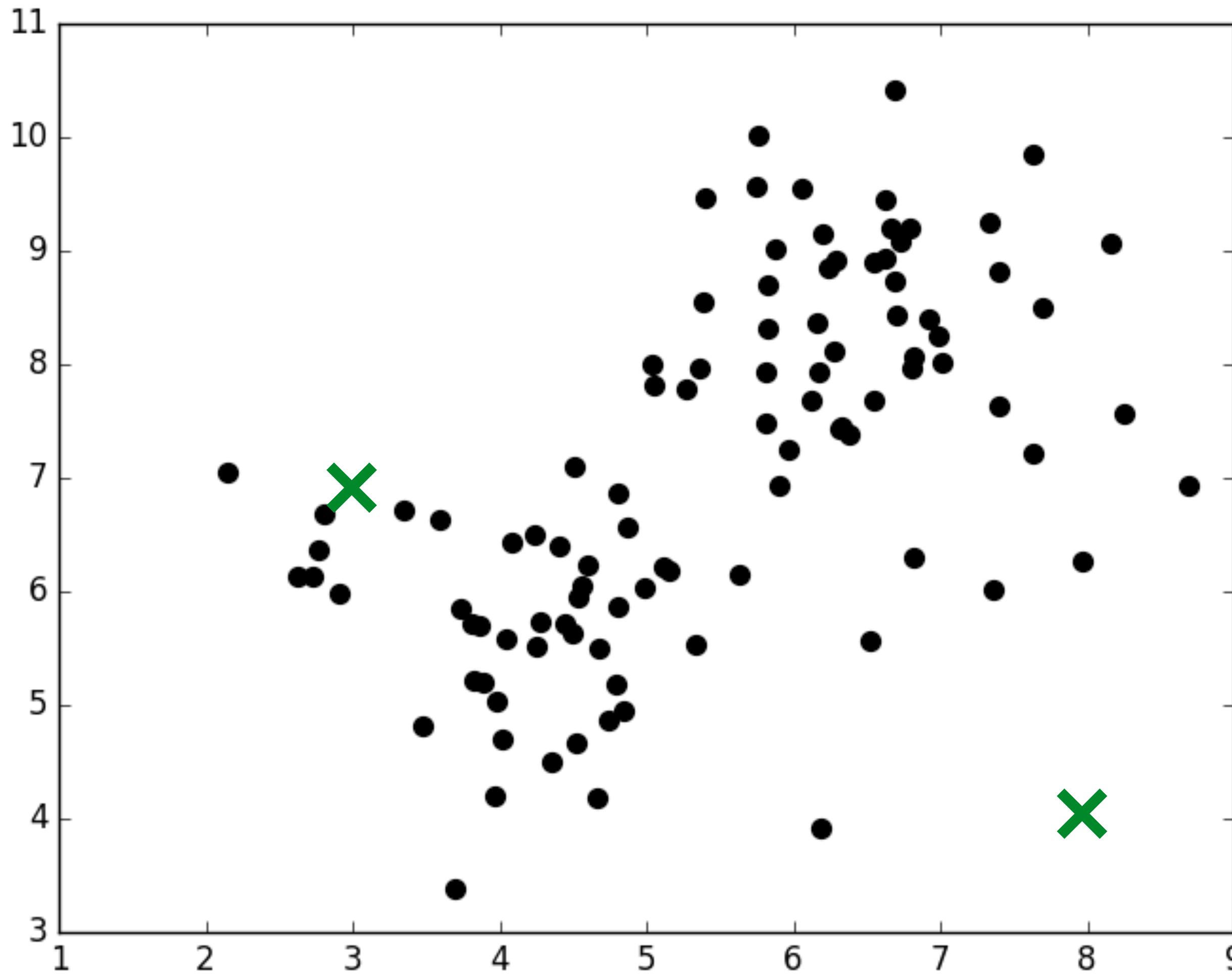
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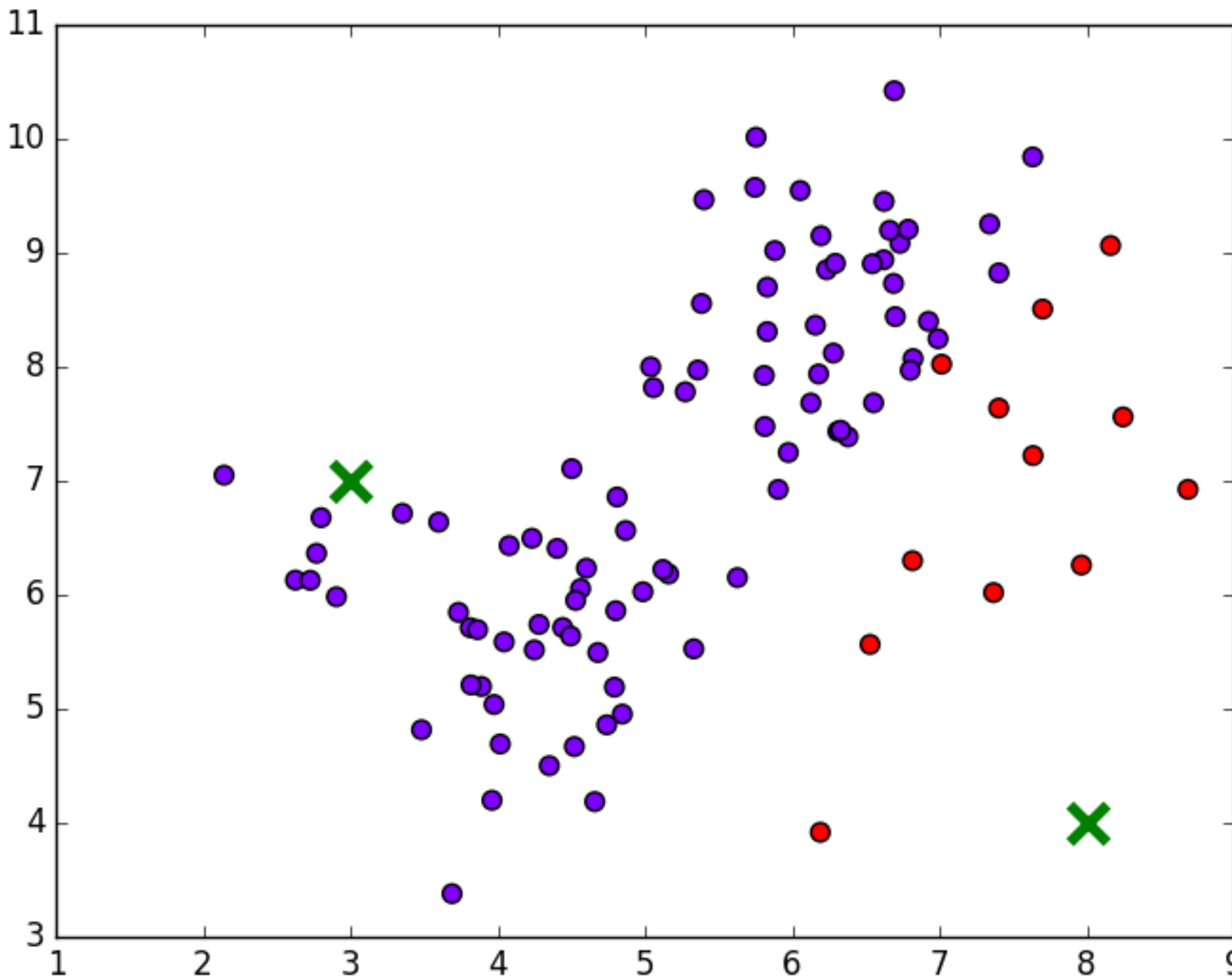
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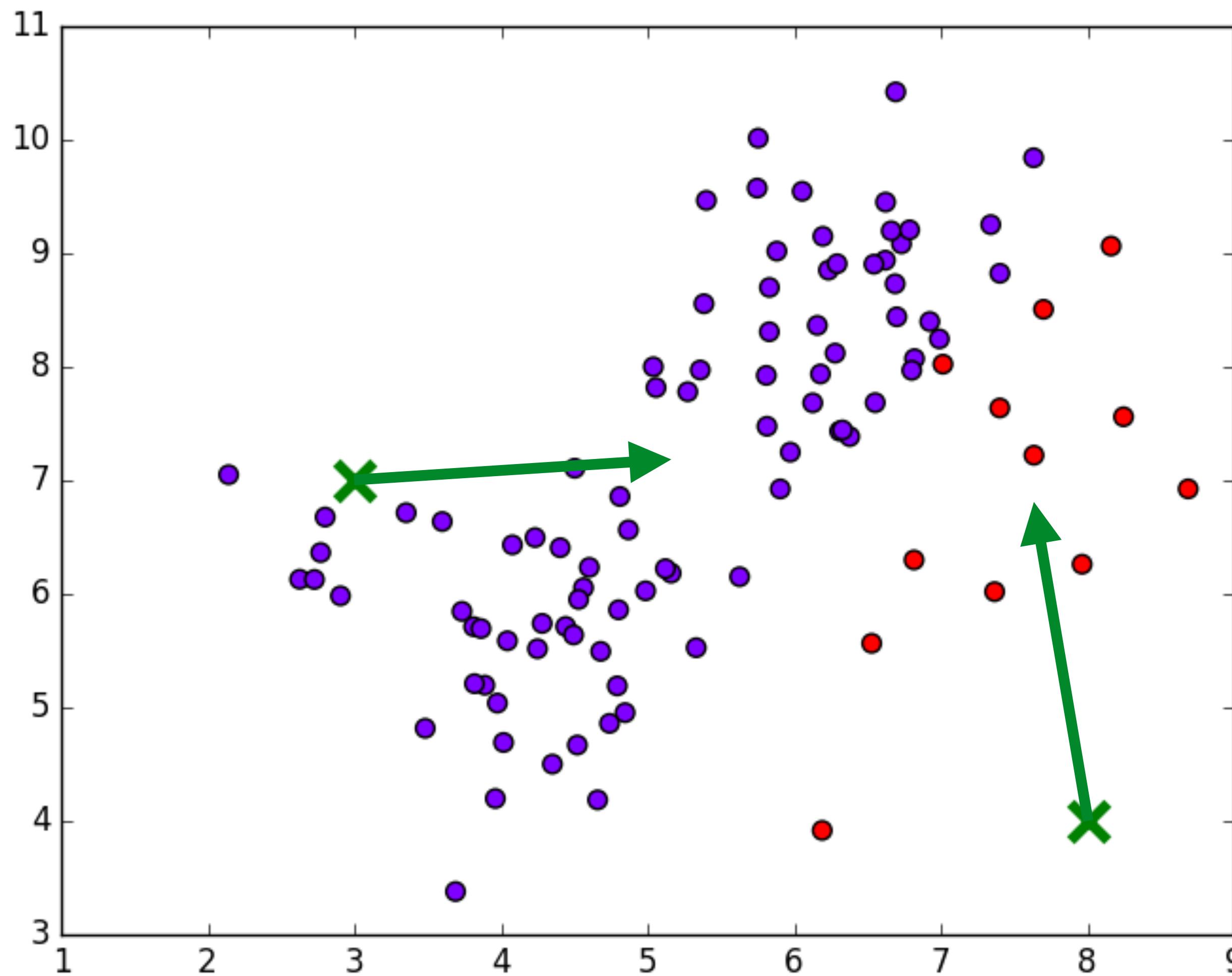
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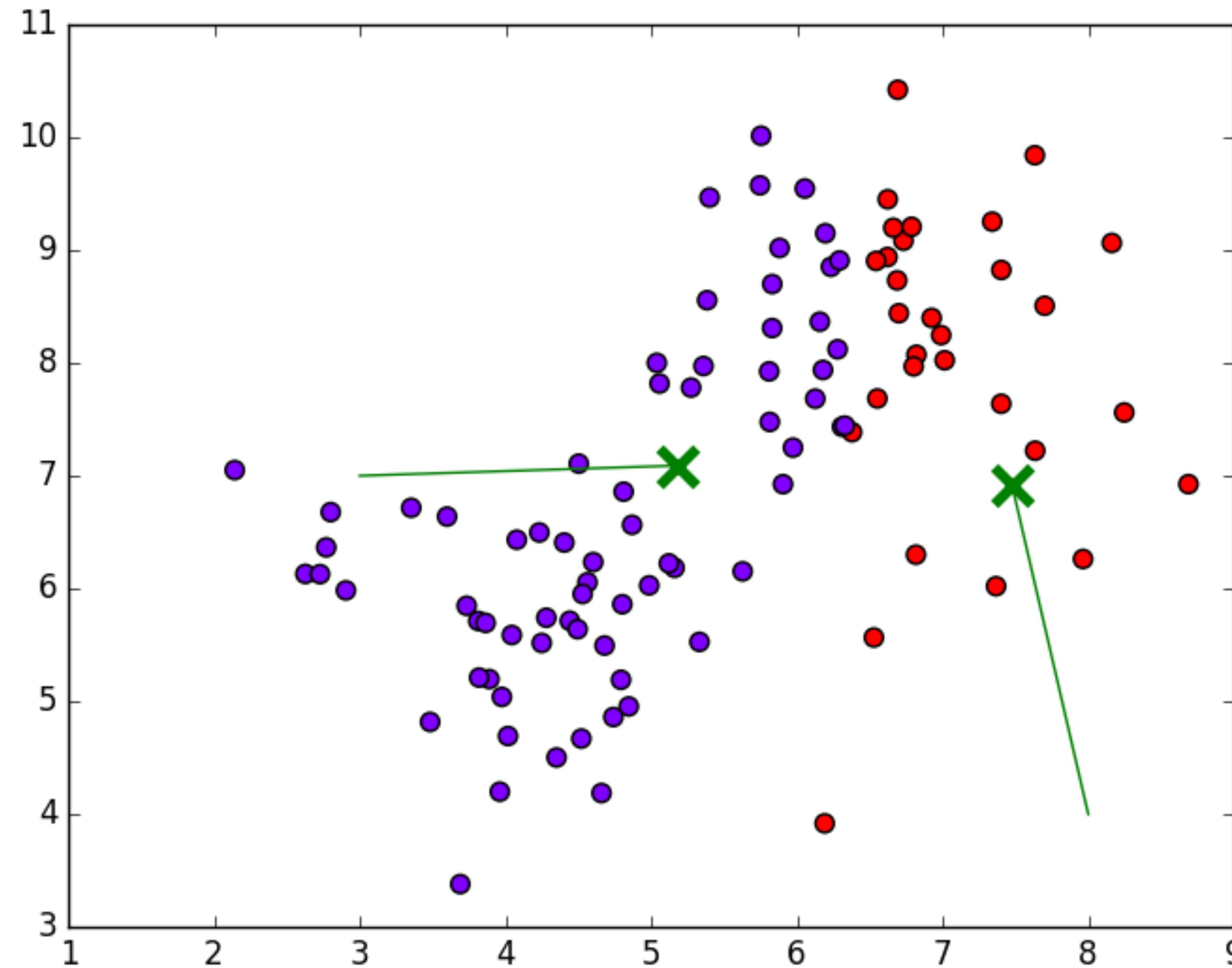
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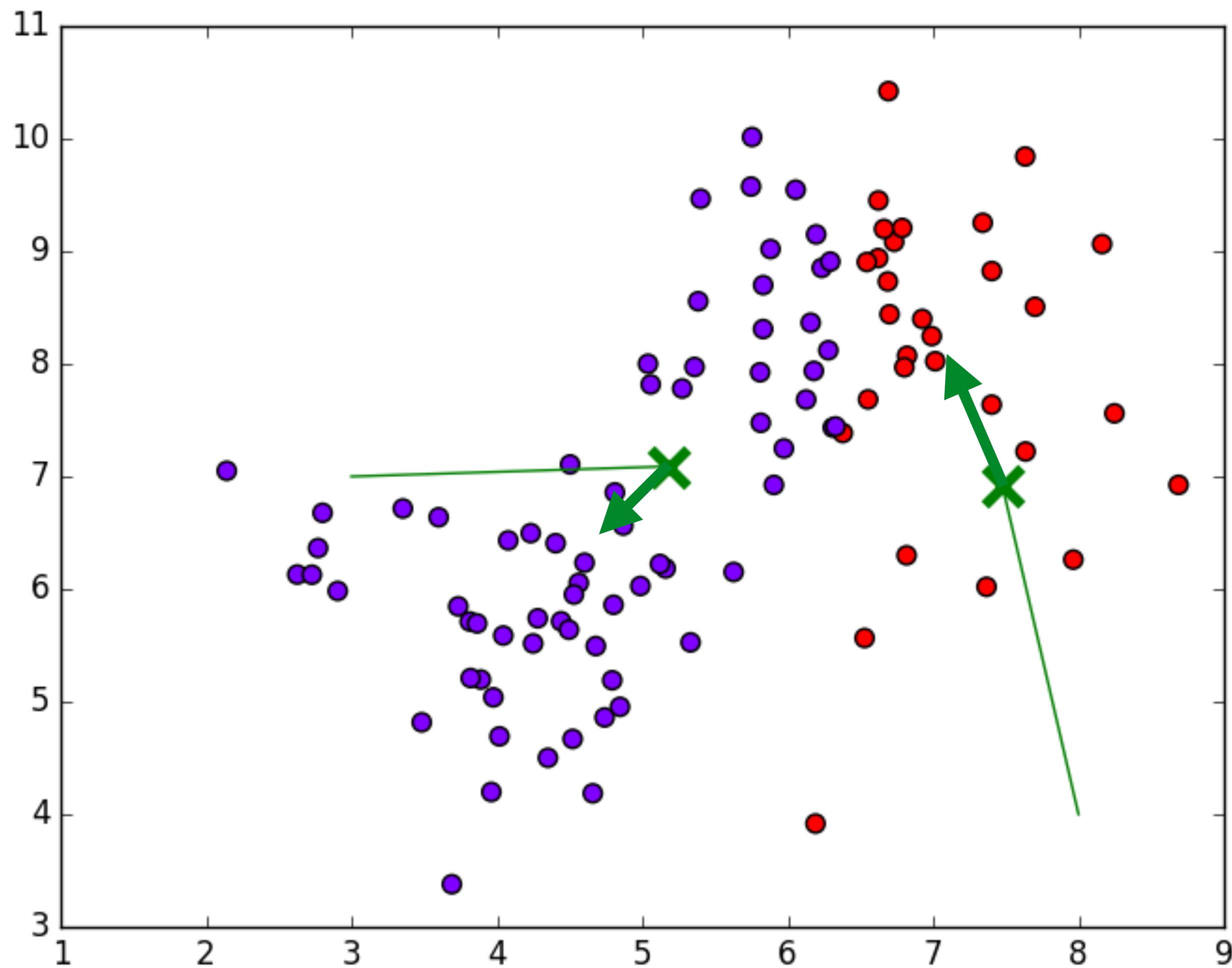
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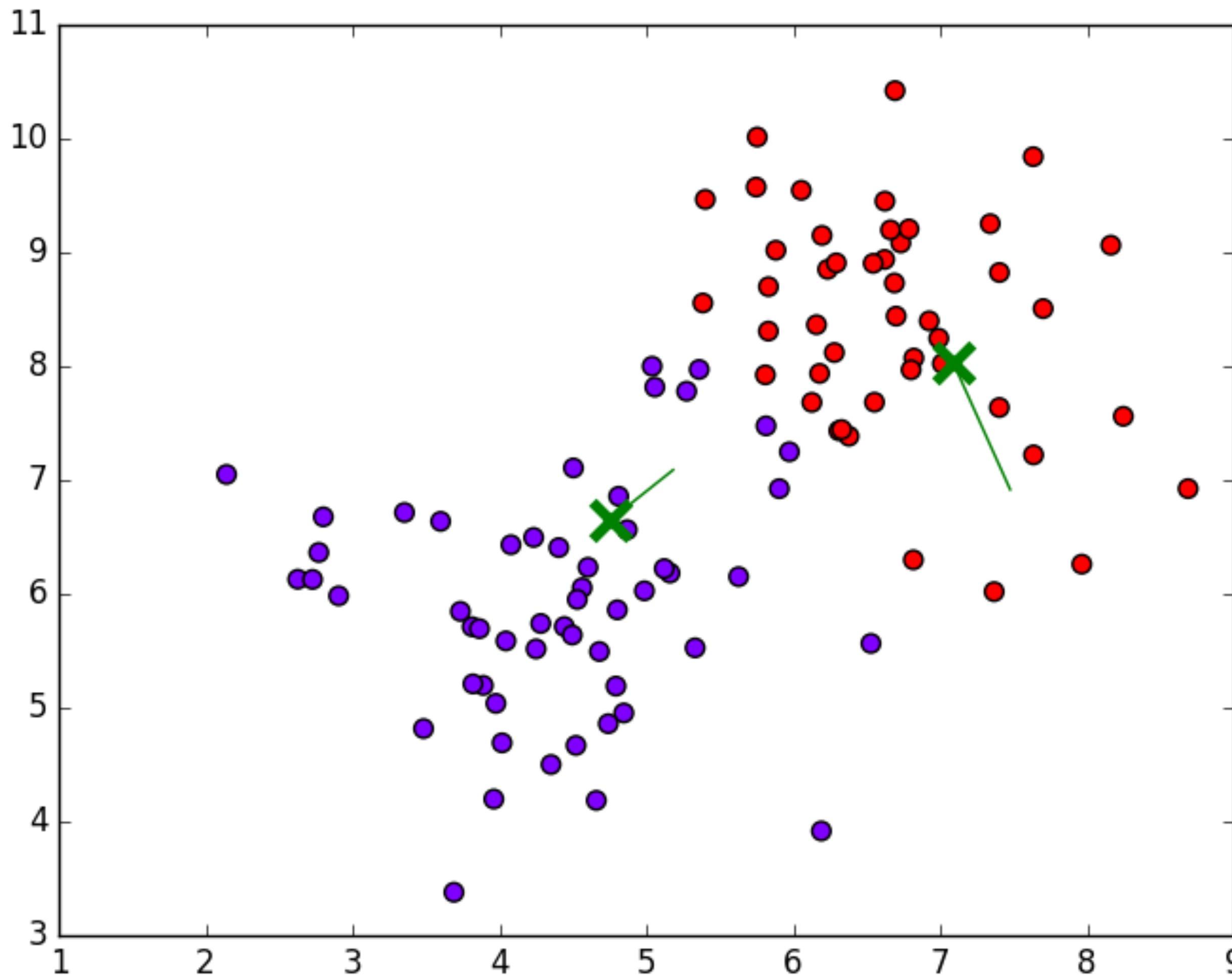
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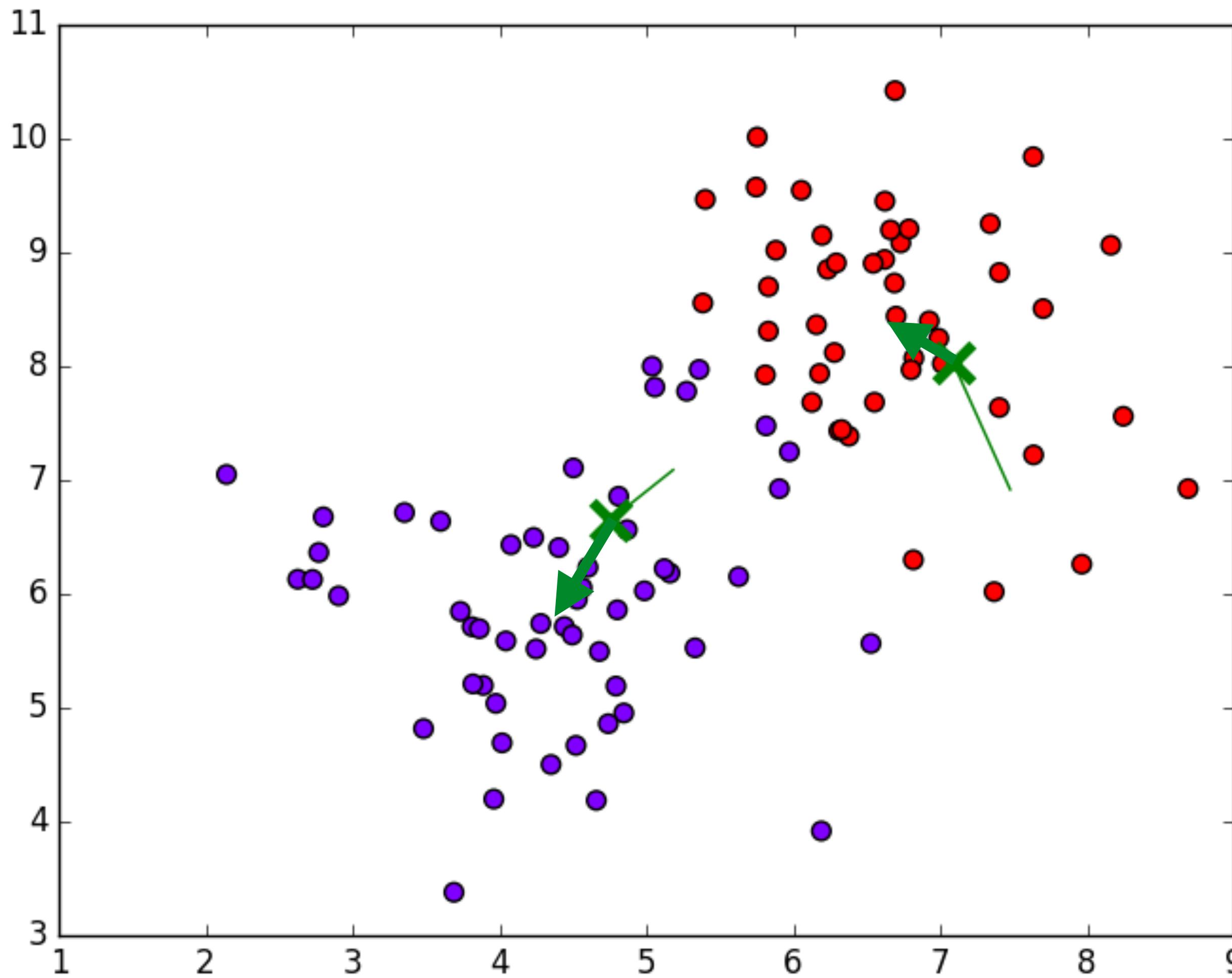
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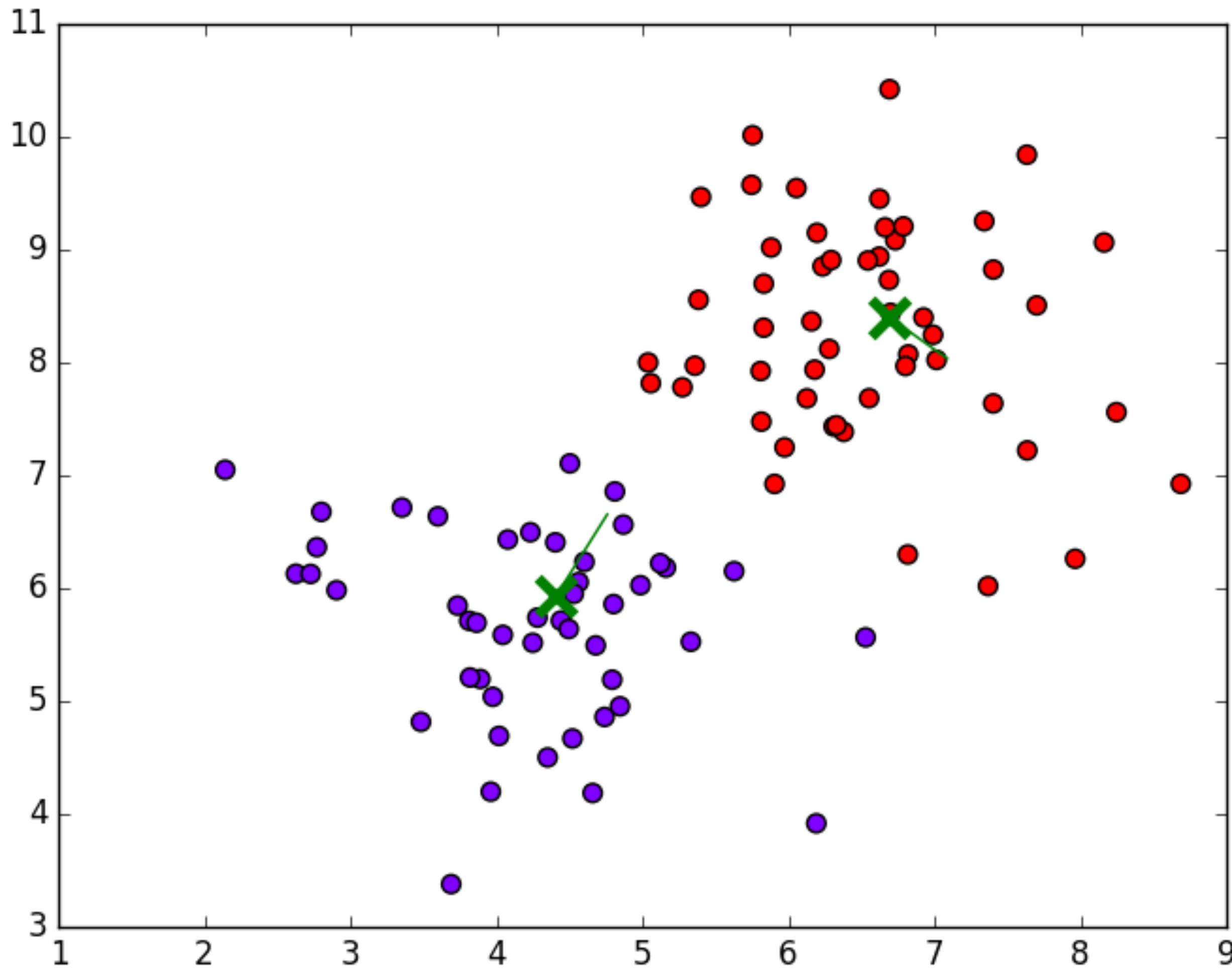
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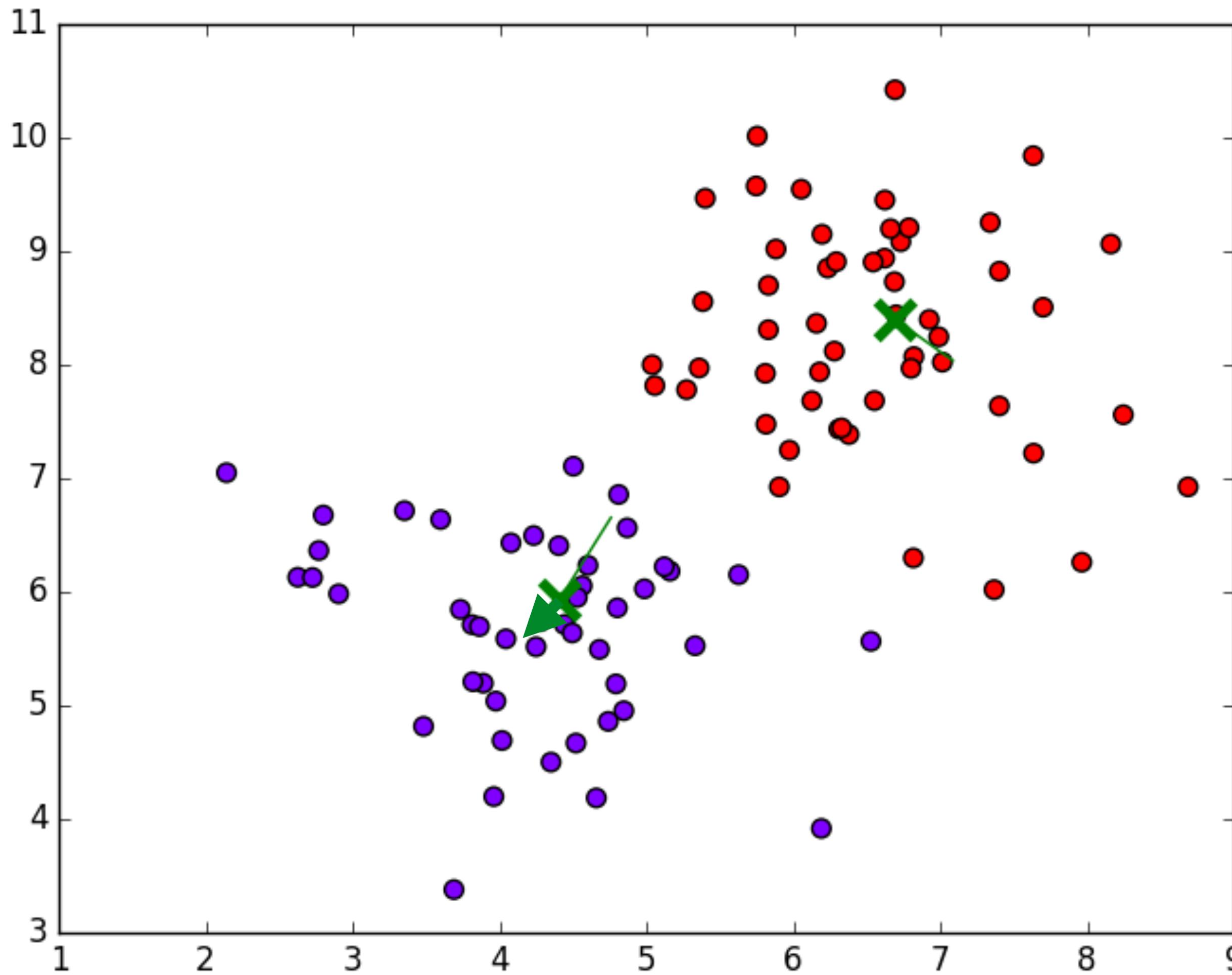
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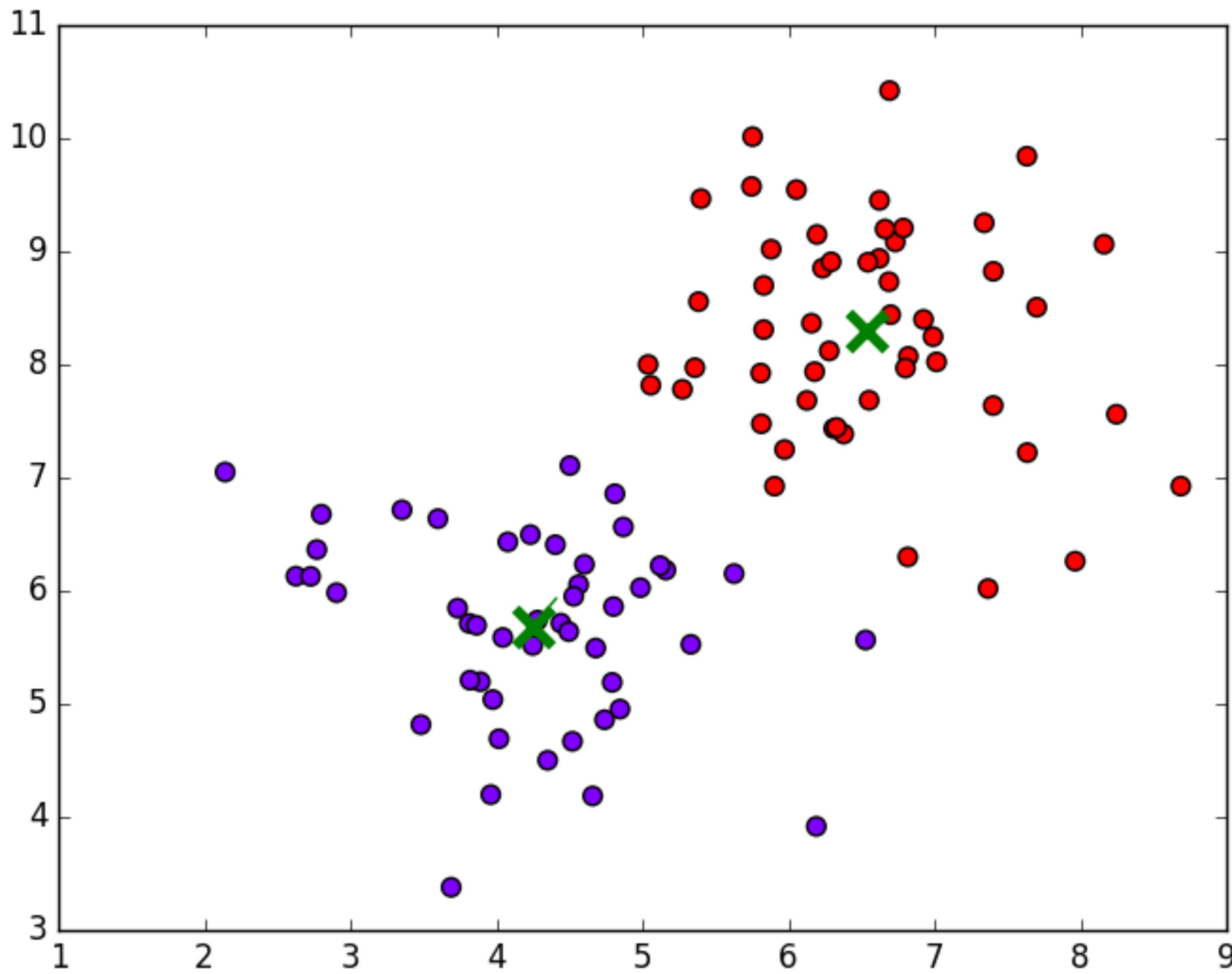
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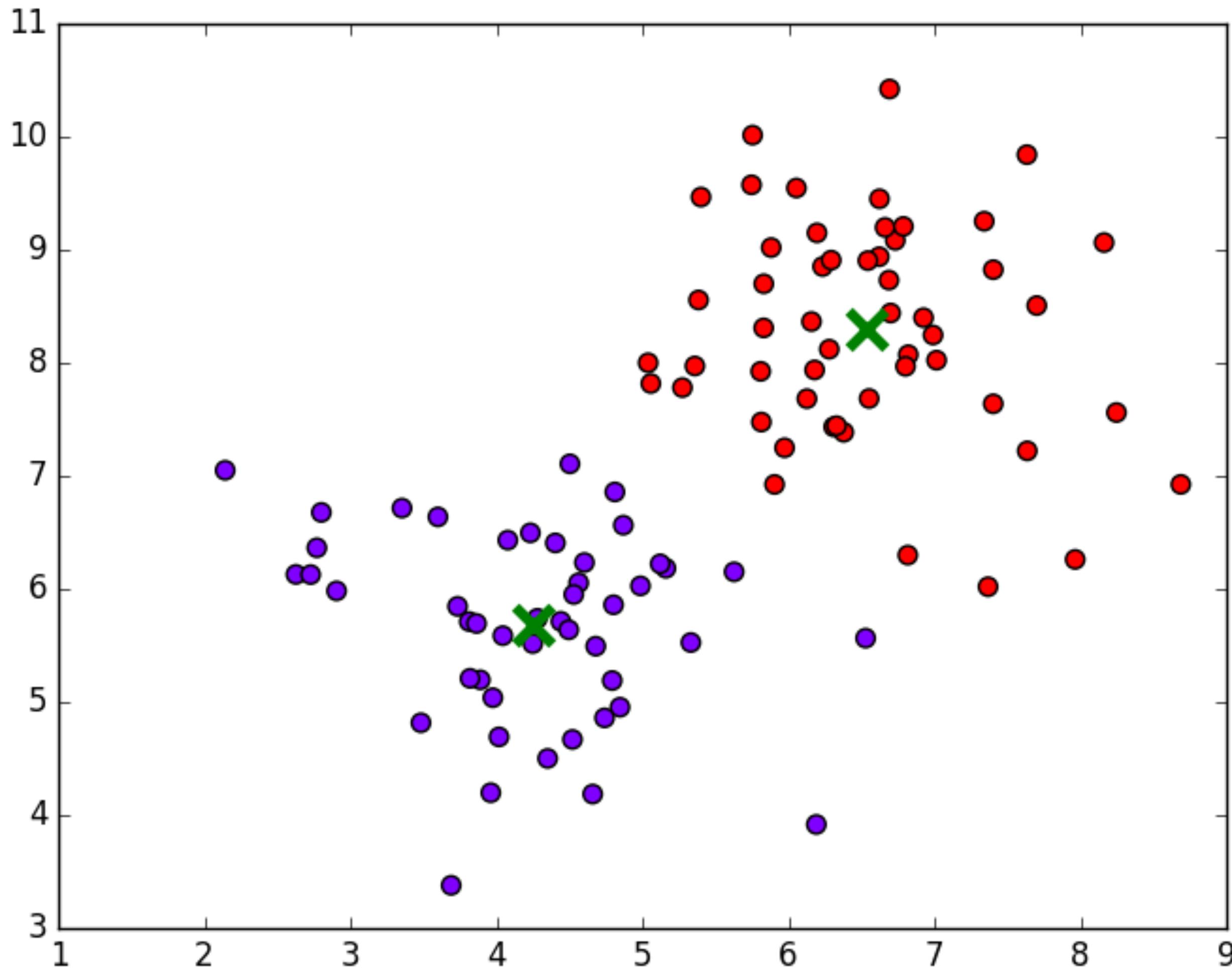
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$$\{x^{(1)}, x^{(2)}, x^{(3)}, \dots, x^{(m)}\} \quad x^{(1)} \in \mathbb{R}^n$$

$$\frac{\|x^{(i)} - \mu_0\|^2}{\sum_k \|x^{(i)} - \mu_k\|^2} = 1$$

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$$\mu_1, \mu_2, \dots, \mu_K \in \mathbb{R}^n$$

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$$x^{(1)}, x^{(3)}, x^{(7)}, x^{(8)}$$

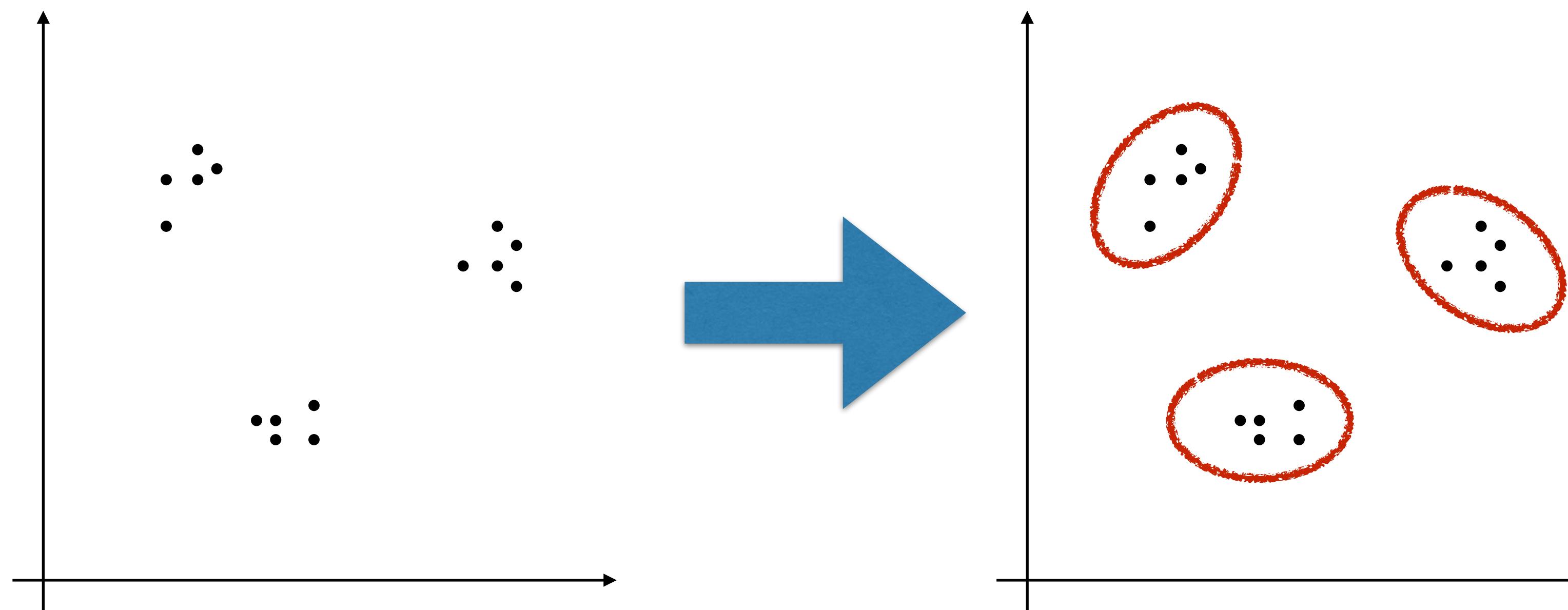
$$\text{XXXXXXXXXXXX}$$

$$c^{(1)} = 2, c^{(5)} = 2, c^{(6)} = 2, c^{(10)} = 2$$

$$\text{このとき、 } \mu_2 = \frac{1}{4}(x^{(1)} + x^{(3)} + x^{(7)} + x^{(8)}) \in \mathbb{R}^n$$

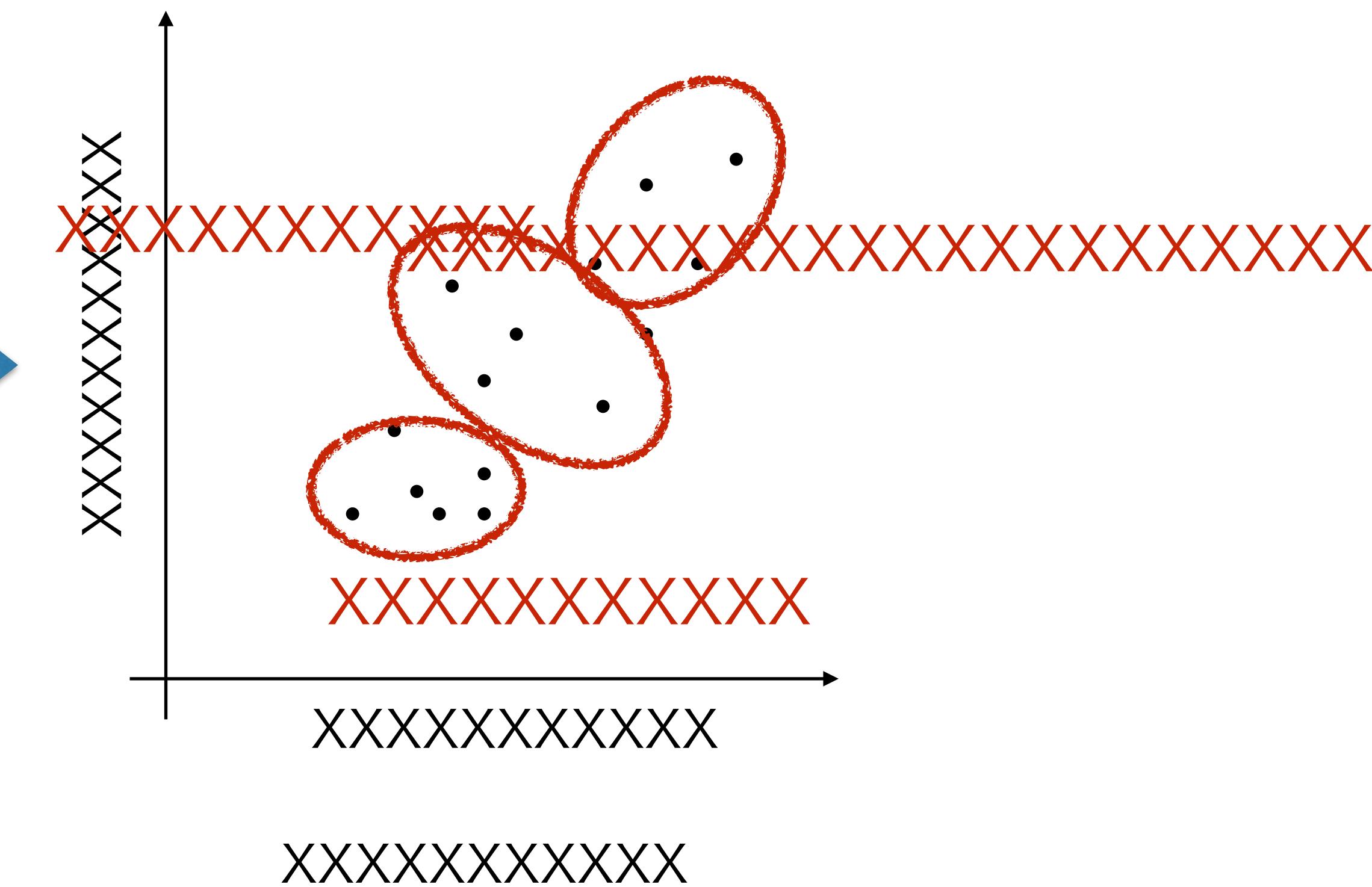
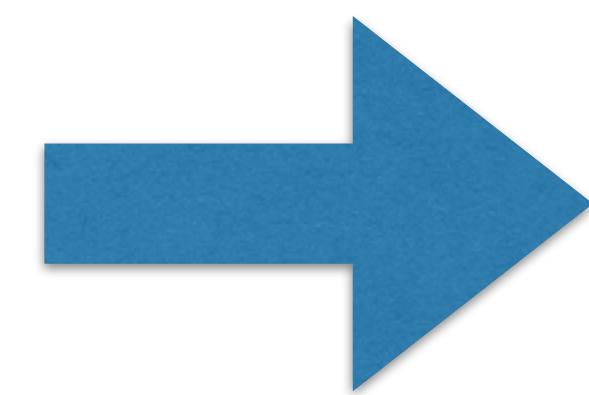
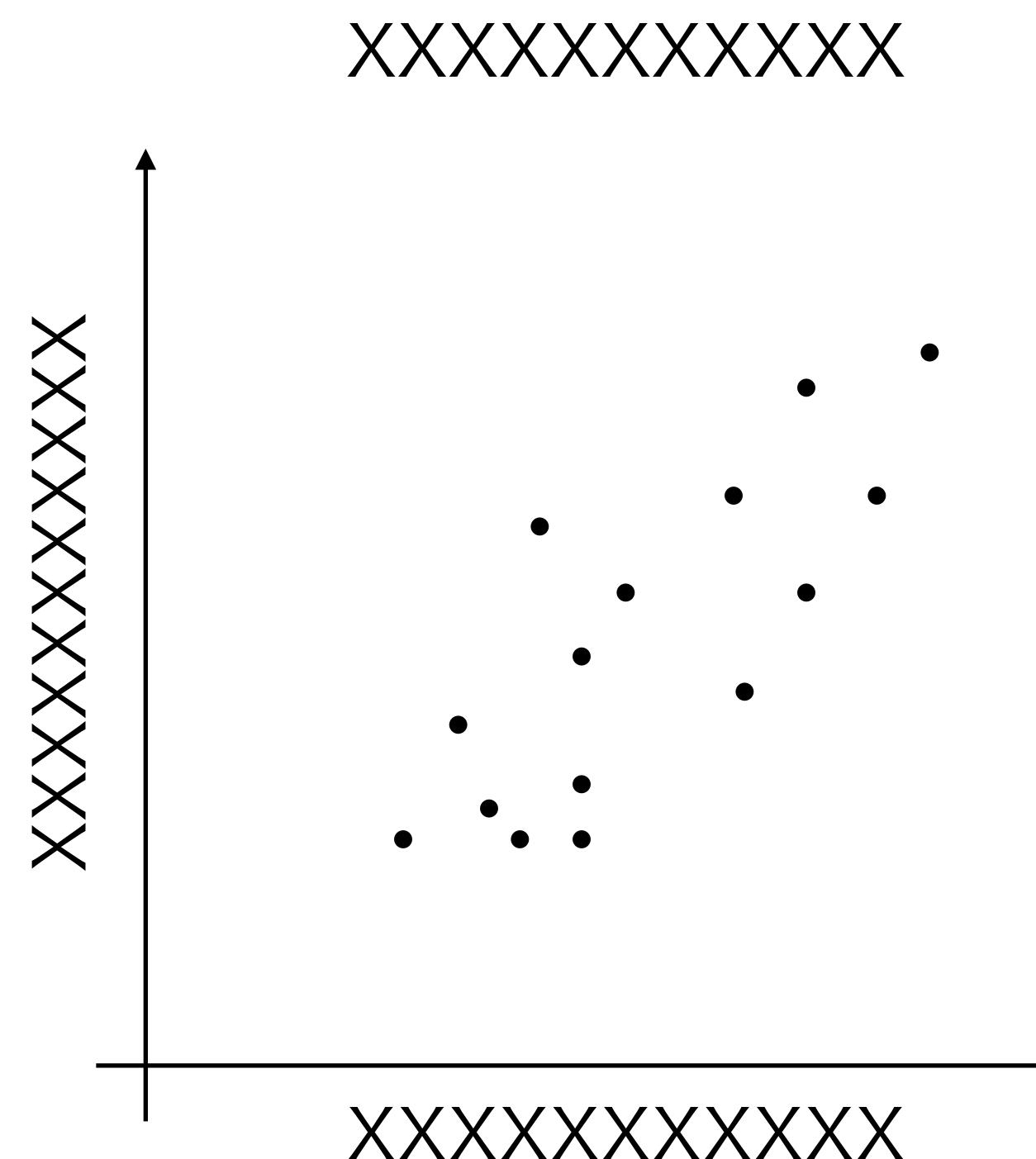
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$$\boldsymbol{\mu}_k \in \mathbb{R}^n \quad k \in \{1, 2, \dots, K\}$$

$\boldsymbol{\mu}_{c^{(i)}}$ XXXXXXXXXXXXXXX

$$\text{XXXXXXXXXXXXXX} \quad c^{(i)} = 5 \quad \boldsymbol{\mu}_{c^{(i)}} = \boldsymbol{\mu}_5$$

$$\text{XXXXXXXXXXXXXX} J(c^{(1)}, \dots, c^{(m)}, \boldsymbol{\mu}_1, \dots, \boldsymbol{\mu}_K) = \frac{1}{m} \sum_{i=1}^m ||\boldsymbol{x}^{(i)} - \boldsymbol{\mu}_{c^{(i)}}||^2$$

$$\min_{\substack{c^{(1)}, \dots, c^{(m)}, \\ \boldsymbol{\mu}_1, \dots, \boldsymbol{\mu}_K}} J(c^{(1)}, \dots, c^{(m)}, \boldsymbol{\mu}_1, \dots, \boldsymbol{\mu}_K)$$

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$$\mu_1, \mu_2, \dots, \mu_K \in \mathbb{R}^n$$

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$$\mu_1, \mu_2, \dots, \mu_K$$

$\overbrace{\text{XXXXXXXXXXXX}}^{\text{XXXXXXXXXXXX}} \text{XXXXXXXXXXXX} \boxed{\text{XXXXXXXXXXXX}} c^{(1)}, c^{(2)}, \dots, c^{(m)} \quad \text{XXXXXXXXXXXXXX} \quad \text{XXXXXXXXXXXXXX}$

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$$\text{XXXXXXXXXX} \cancel{\mu_1} \cancel{\mu_2}, \dots, \mu_K \quad \text{XXXXXXXXXXXX} \quad c^{(1)} \cancel{\chi} \cancel{\chi}^{(2)} \cancel{\chi} \dots \cancel{\chi}^{(m)} \cancel{\chi}$$

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$$\mu_1, \mu_2, \dots, \mu_K \in \mathbb{R}^n$$

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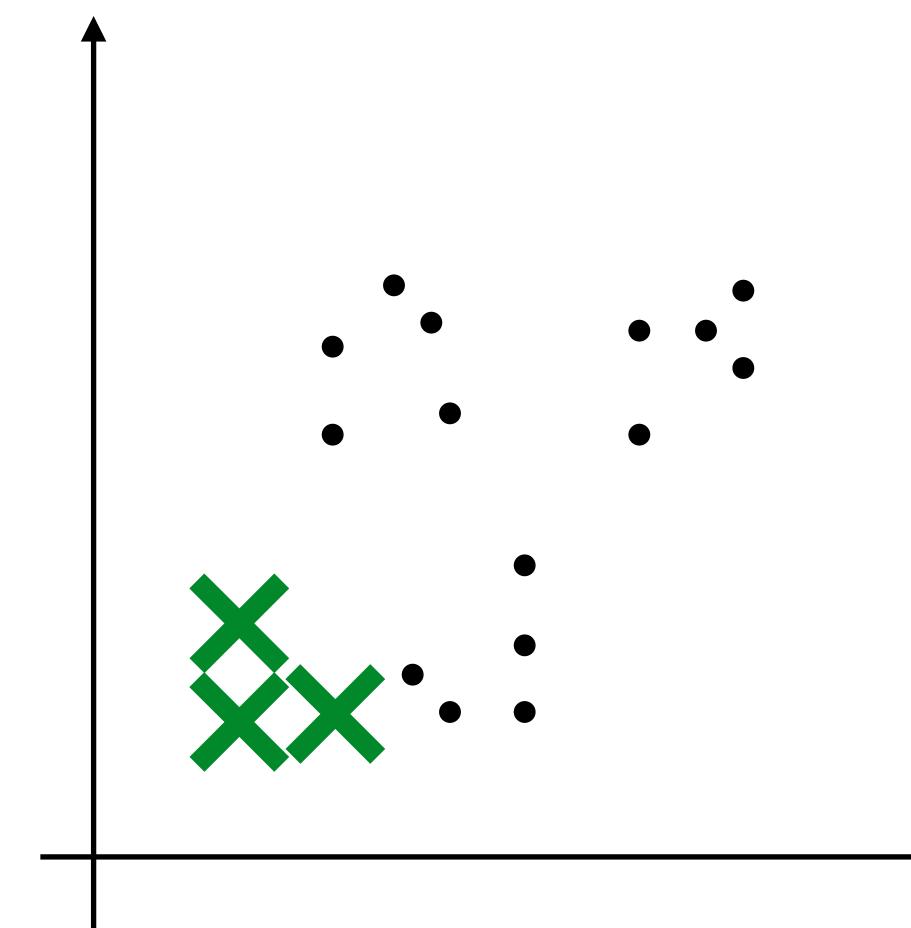
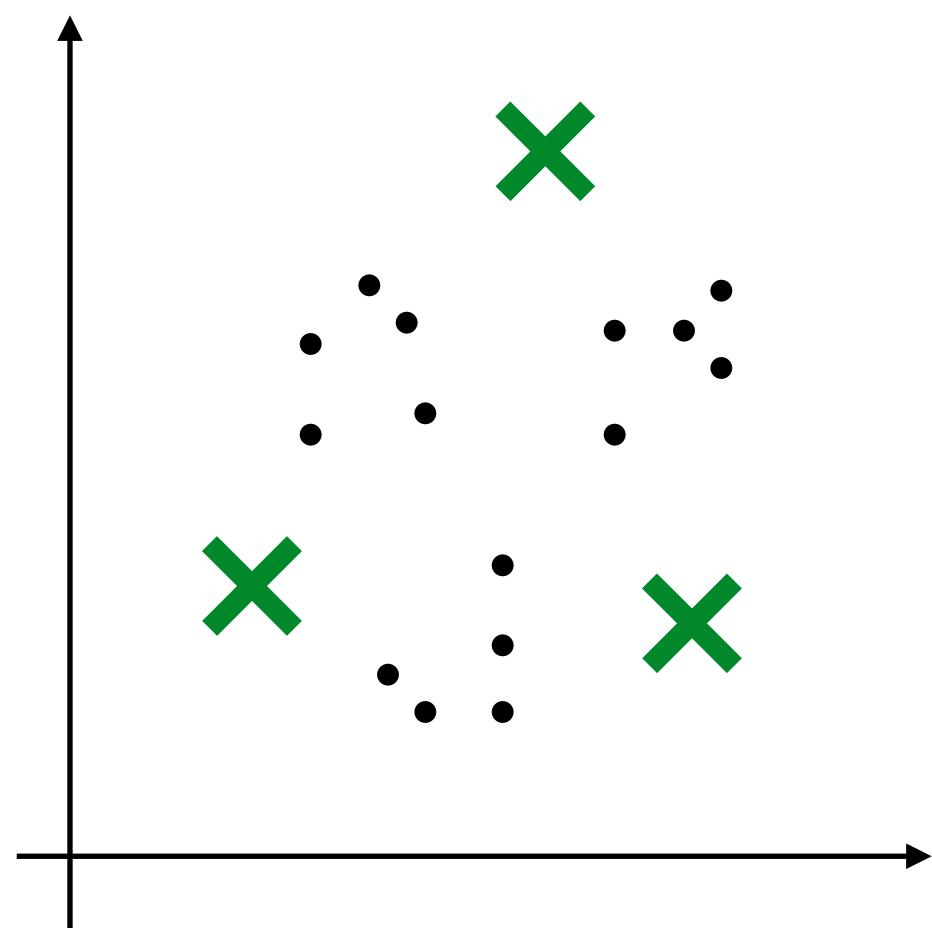
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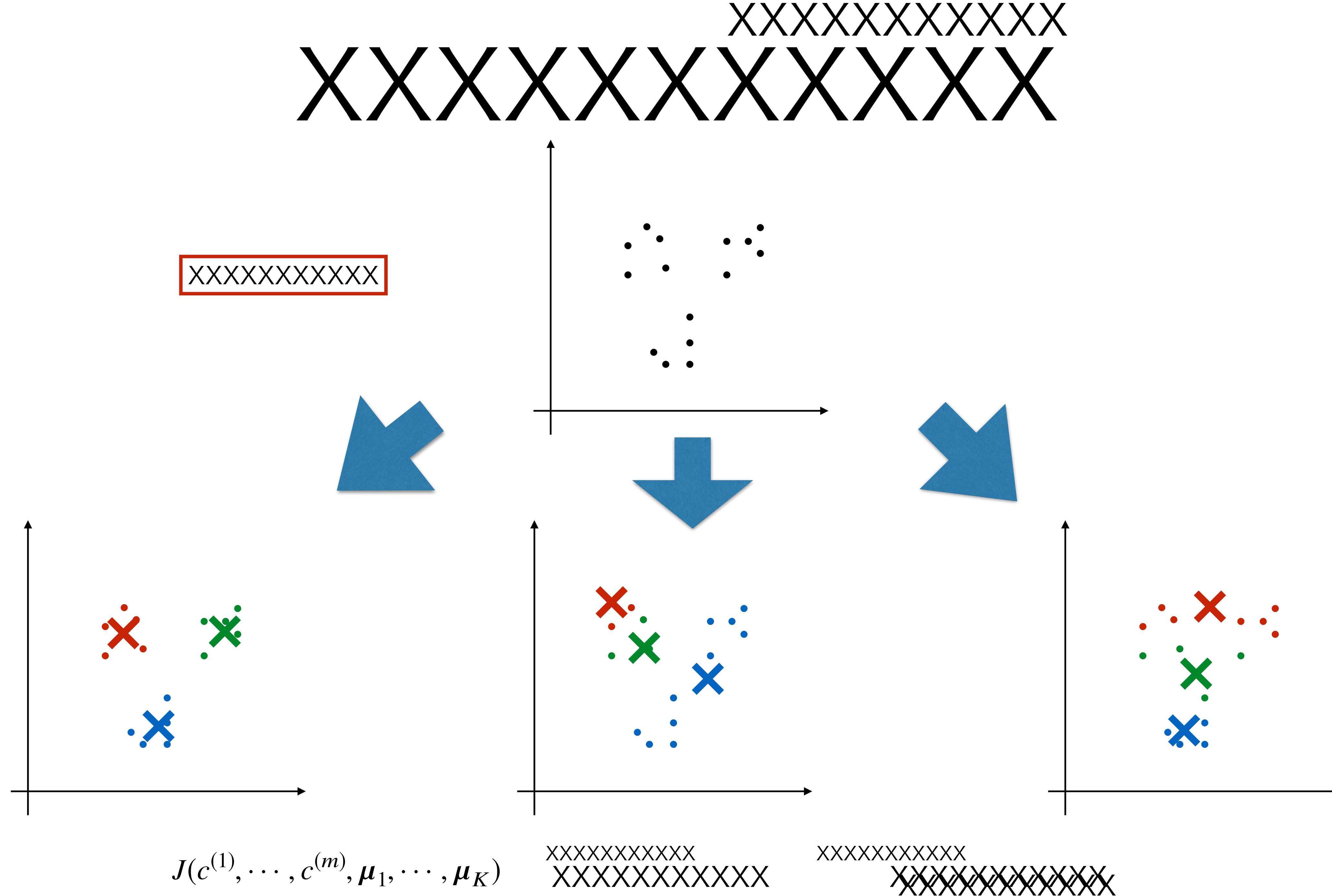
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$$\mu_1 = x^{(i)}, \mu_2 = x^{(j)}, \dots$$



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$c^{(1)}, \dots, c^{(m)}, \mu_1, \dots, \mu_K$

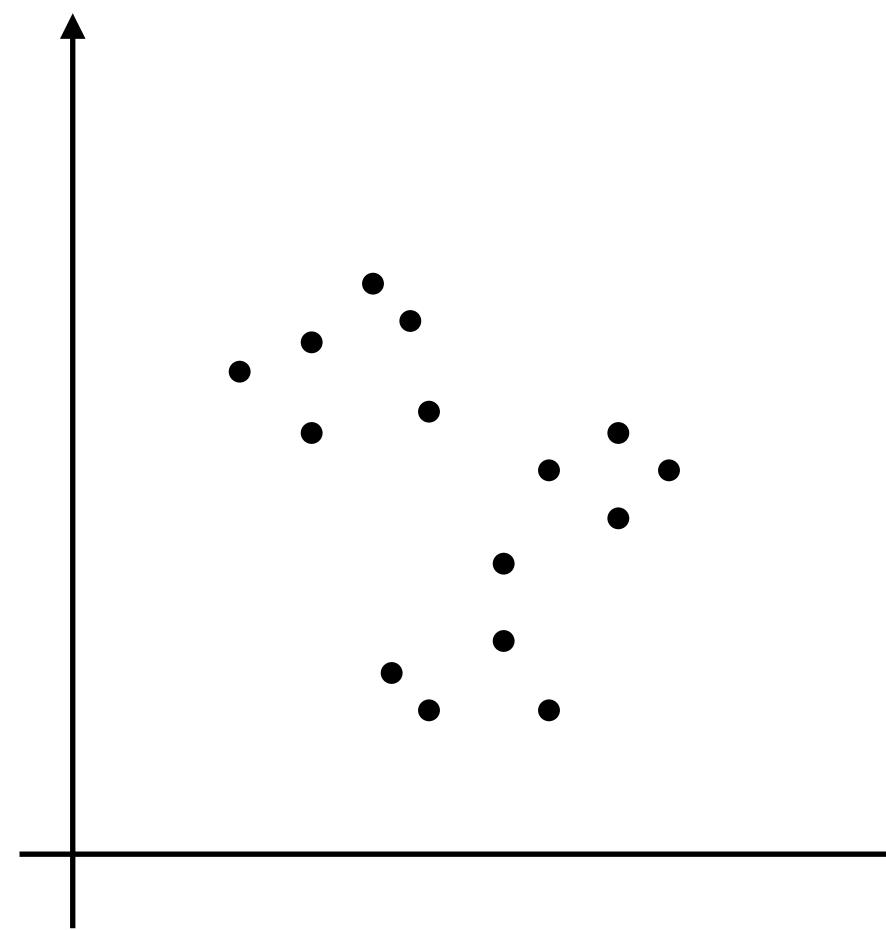
$J(c^{(1)}, \dots, c^{(m)}, \mu_1, \dots, \mu_K)$

XXXXXX XXXX $c^{(1)}, \dots, c^{(m)}, \mu_1, \dots, \mu_K$ XXXXXX

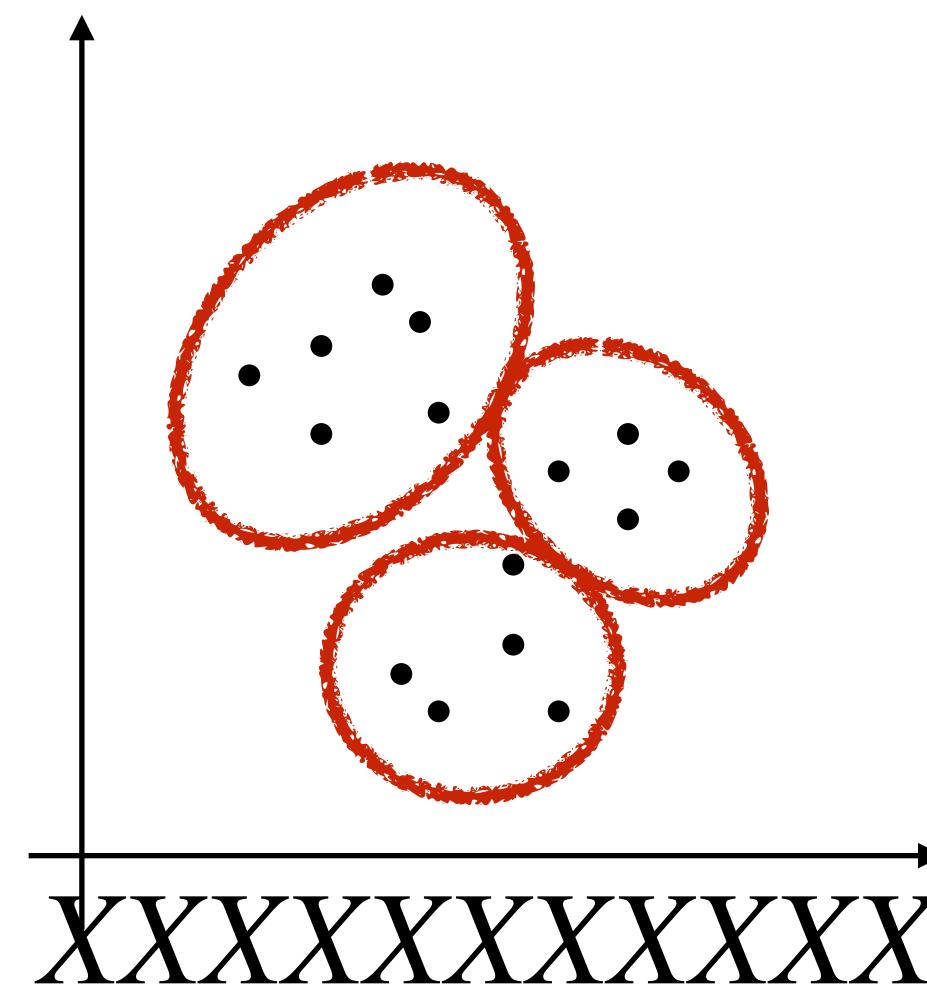
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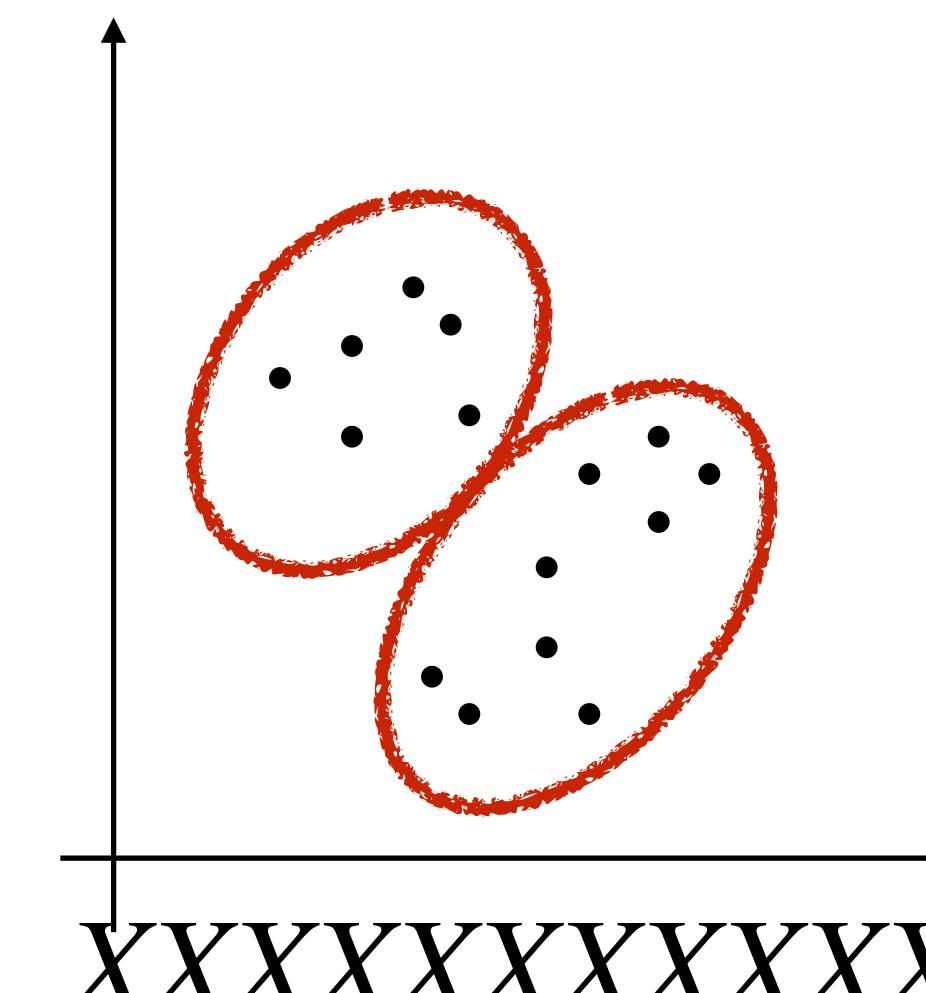


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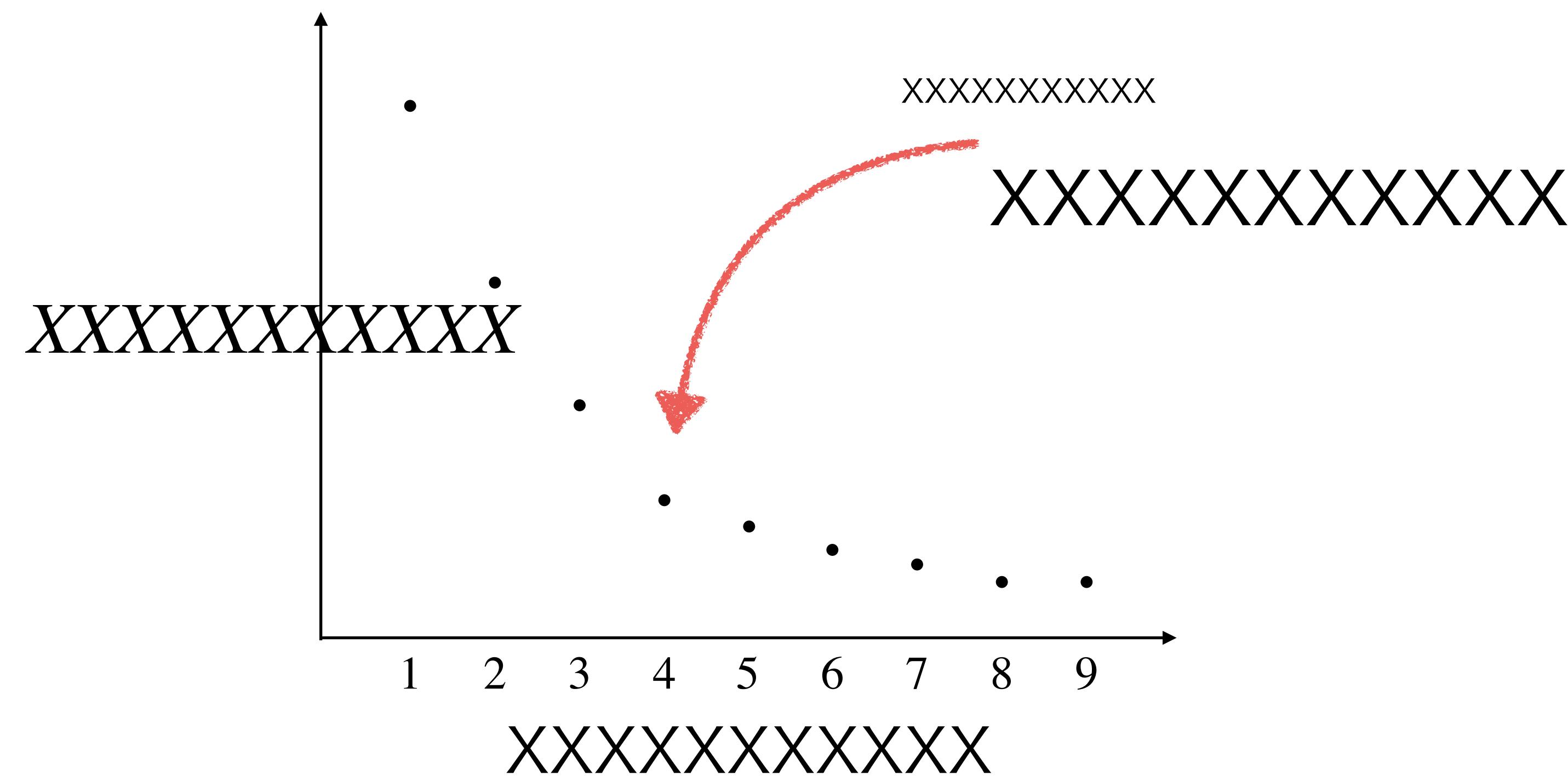


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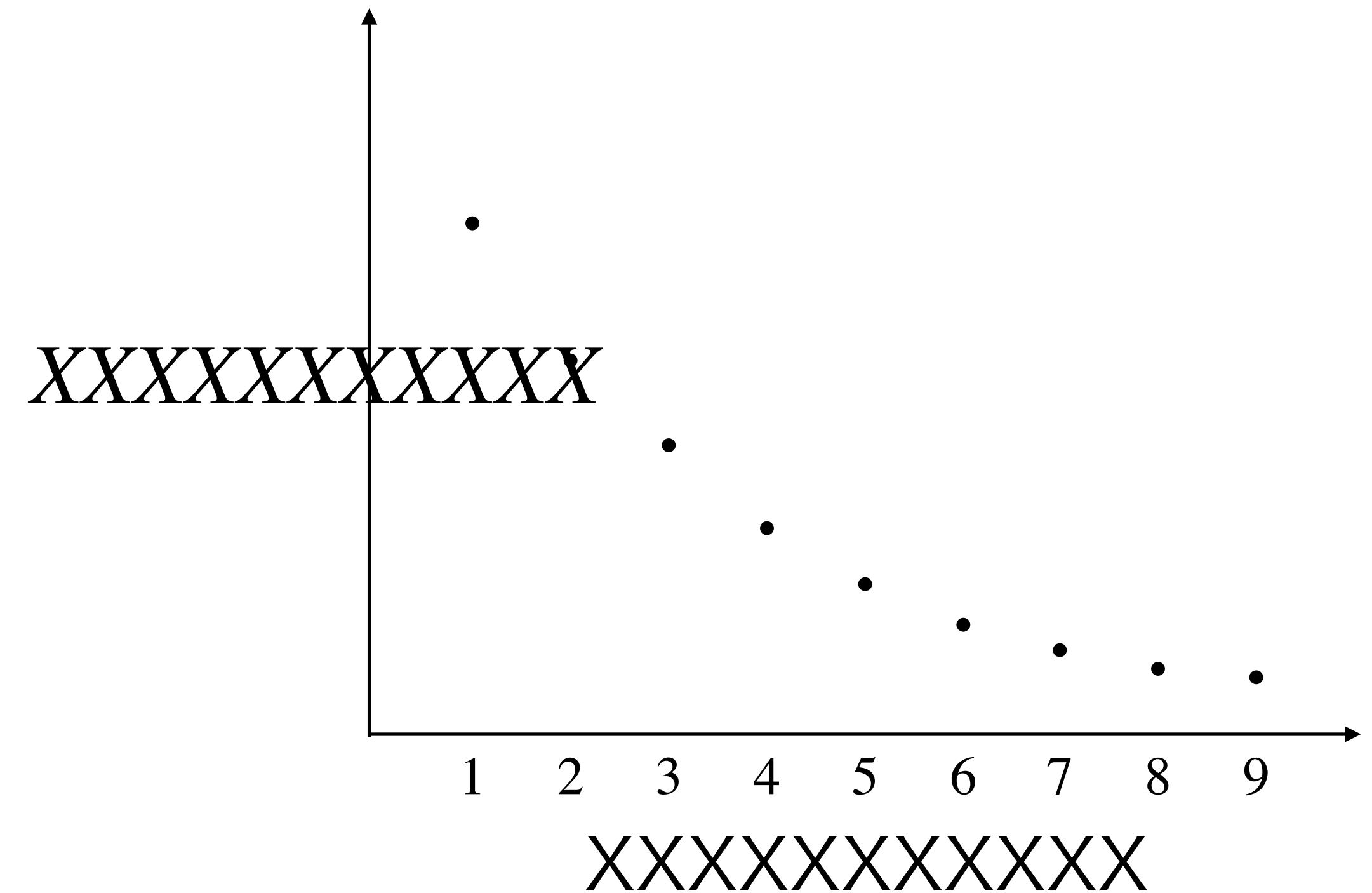
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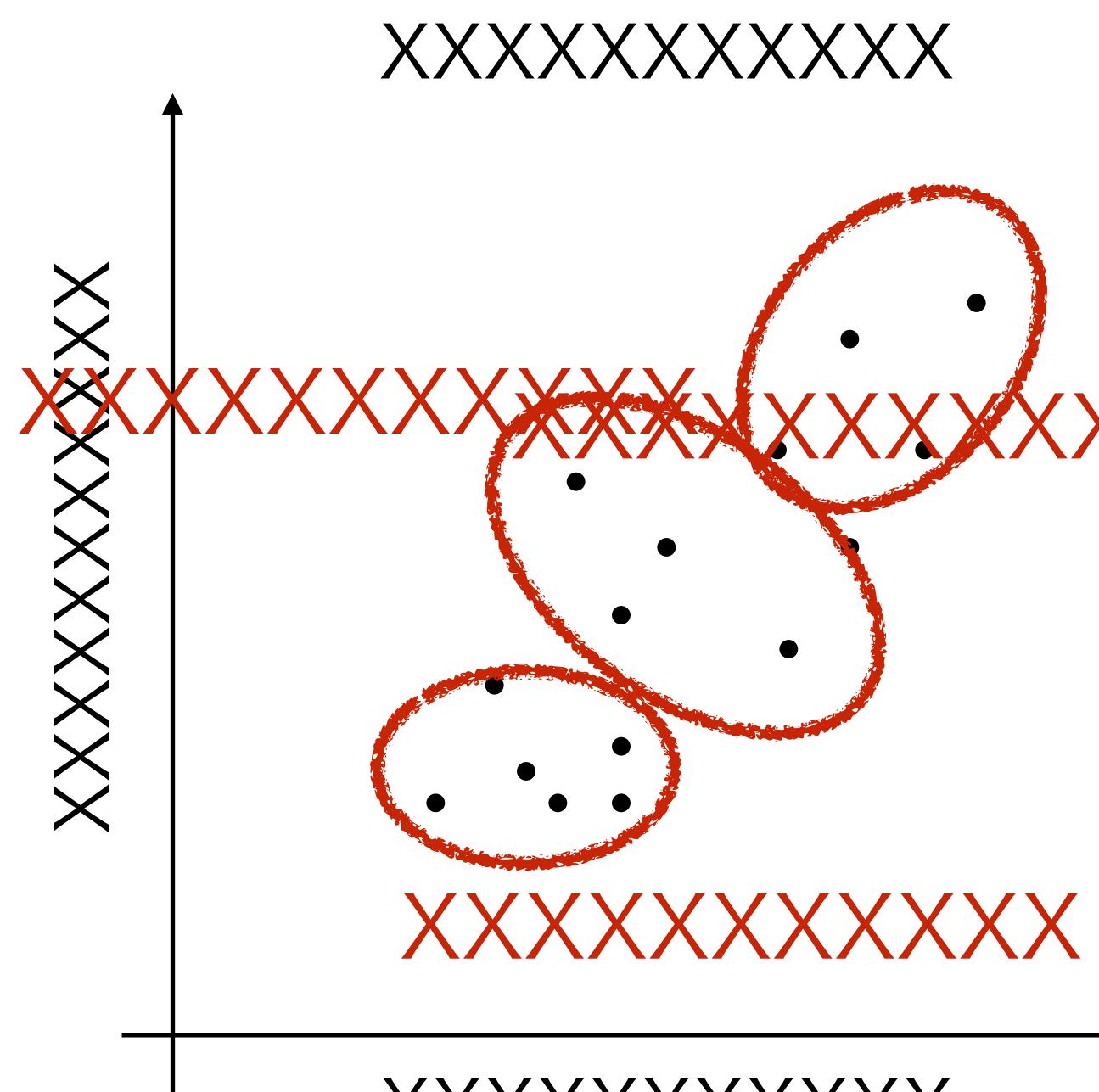


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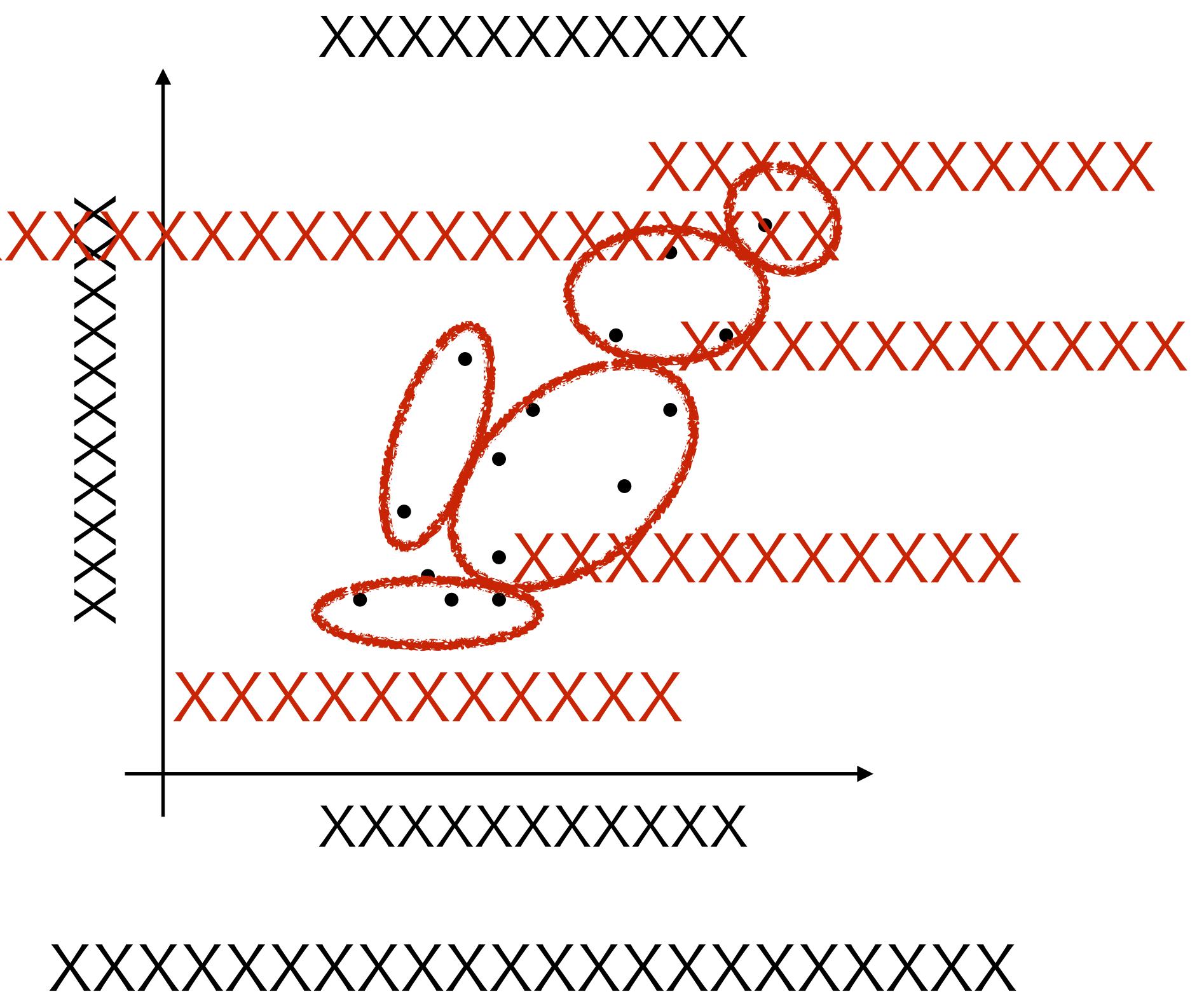
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