Алгоритмы и структуры данных

Алгоритм Штрассена умножения матриц

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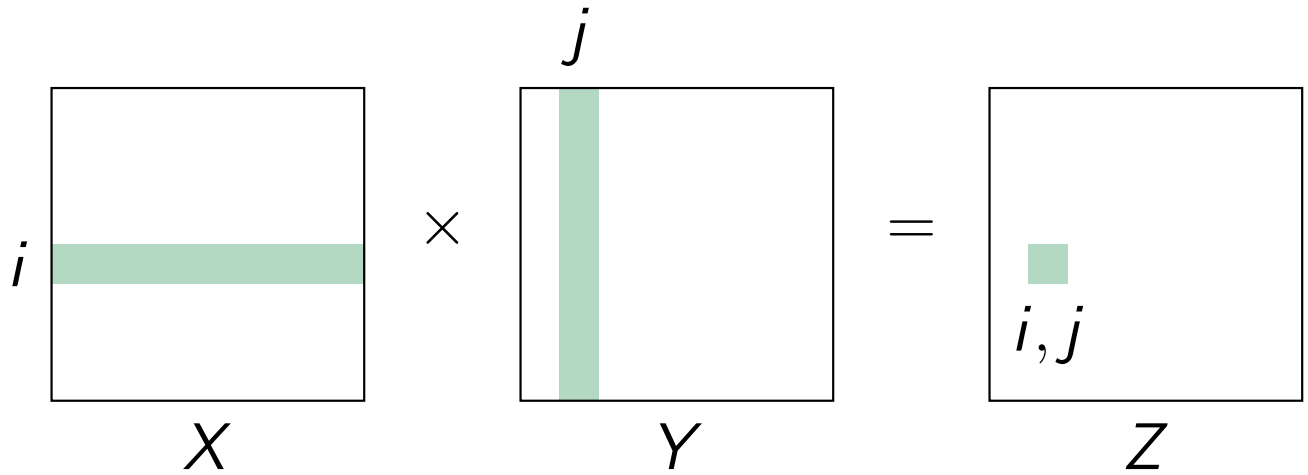
Умножение матриц



$$Z[i,j] = \sum_{k=1}^{n} X[i,k] \cdot Y[k,j]$$

$$X = \begin{bmatrix} X_{11} & X_{12} \\ X_{21} & X_{22} \end{bmatrix} \quad Y = \begin{bmatrix} Y_{11} & Y_{12} \\ Y_{21} & Y_{22} \end{bmatrix}$$

$$XY = \begin{bmatrix} X_{11}Y_{11} + X_{12}Y_{21} & X_{11}Y_{21} + X_{12}Y_{22} \\ X_{21}Y_{11} + X_{22}Y_{21} & X_{21}Y_{21} + X_{22}Y_{22} \end{bmatrix}$$

Алгоритм Штрассена

$$XY = \begin{bmatrix} X_{11}Y_{11} + X_{12}Y_{21} & X_{11}Y_{21} + X_{12}Y_{22} \\ X_{21}Y_{11} + X_{22}Y_{21} & X_{21}Y_{21} + X_{22}Y_{22} \end{bmatrix}$$

$$XY = \begin{bmatrix} P_5 + P_4 - P_2 + P_6 & P_1 + P_2 \\ P_3 + P_4 & P_1 + P_5 - P_3 - P_7 \end{bmatrix}$$

$$P_1 = X_{11}(Y_{21} - Y_{22})$$
$$P_2 = (X_{11} + X_{12})Y_{22}$$
$$P_3 = (X_{21} + X_{22})Y_{11}$$
$$P_4 = X_{22}(Y_{21} - Y_{11})$$
$$P_5 = (X_{11} + X_{22})(Y_{11} + Y_{22})$$
$$P_6 = (X_{12} - X_{22})(Y_{21} + Y_{22})$$
$$P_7 = (X_{11} - X_{21})(Y_{11} + Y_{12})$$

Оценка времени работы