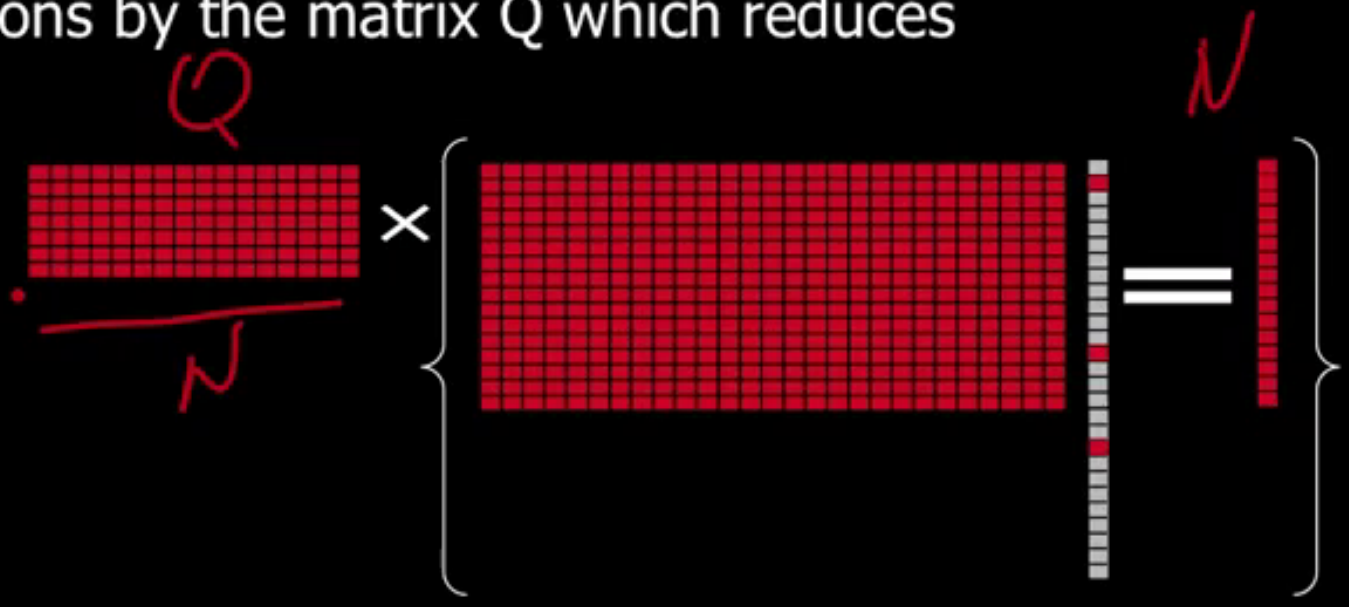
Side Note: Compressed-Sensing

- Compressed Sensing is leaning on the very same concepts, leading to alternative sampling/sensing theorems.
- Assume: the signal $\underline{x}$ has been created by $\underline{x}=D\underline{\alpha}_0$ with very sparse $\underline{\alpha}_0$.
- Multiply this set of equations by the matrix Q which reduces the number of rows.



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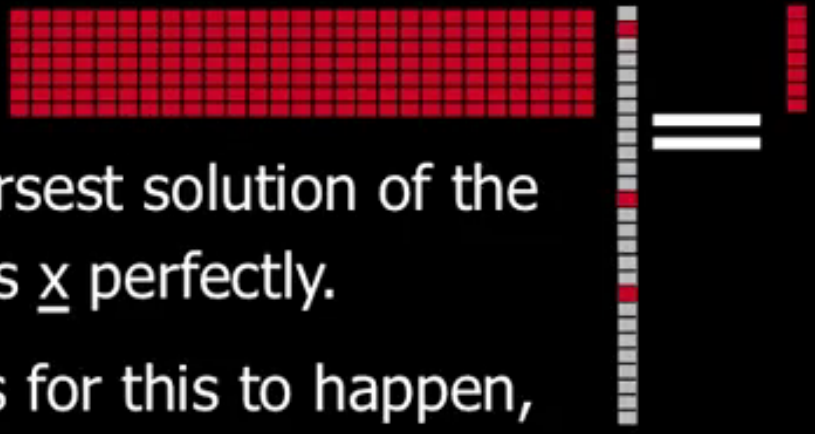
- Assume: the signal $\underline{x}$ has been created by $\underline{x}=D\underline{\alpha}_0$ with very sparse $\underline{\alpha}_0$.
- Multiply this set of equations by the matrix Q which reduces the number of rows.
- The new, smaller, system of equations is

$$\mathbf{QD}\underline{\alpha} = \mathbf{Q}\underline{x} \quad \Rightarrow \quad \tilde{\mathbf{D}}\underline{\alpha} = \underline{\tilde{x}}$$



- If $\underline{\alpha}_0$ was sparse enough, it will be the sparsest solution of the new system, thus, computing $D\underline{\alpha}_0$ recovers $\underline{x}$ perfectly.
- Compressed sensing focuses on conditions for this to happen, guaranteeing such recovery.