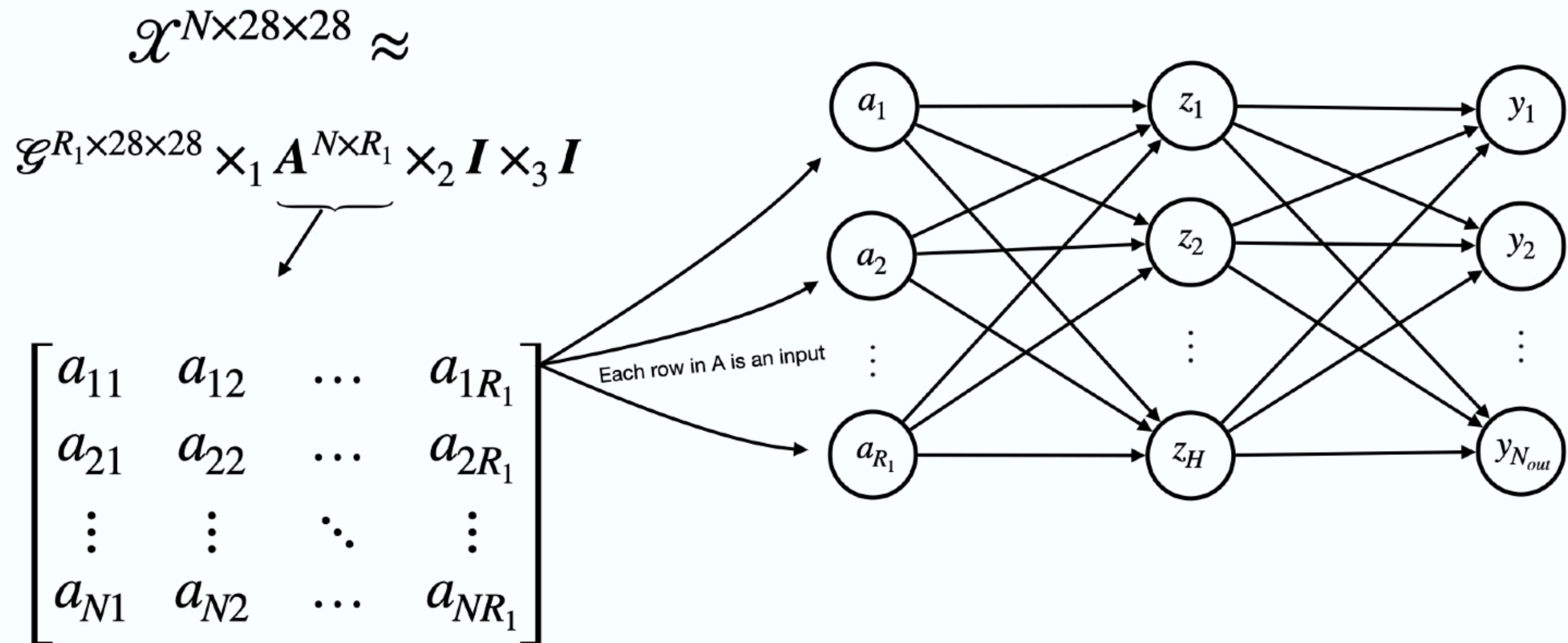# Proposing 2 Methods

Method 1

- Compressing the **input** into an **ANN**

- Decomposition acts as part of the learning

- Hopefully aids the ANN

Method 2

- Compressing a **pre-trained CNN**

- Using a model that is know to work

- Speeding up the evaluation of a forward push

Method 1

$$\mathcal{X}^{N \times 28 \times 28} \approx$$

$$\mathcal{G}^{R_1 \times 28 \times 28} \times_1 \underbrace{A^{N \times R_1}} \times_2 I \times_3 I$$

$$\begin{bmatrix} a_{11} & a_{12} & \dots & a_{1R_1} \\ a_{21} & a_{22} & \dots & a_{2R_1} \\ \vdots & \vdots & \ddots & \vdots \\ a_{N1} & a_{N2} & \dots & a_{NR_1} \end{bmatrix}$$

Each row in A is an input

R_1 is the rank of the decomposition

Example using N 28x28
black / white pictures