



Georgetown
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Refresher: Linear Algebra

First, why is this important?

By convention, we typically represent data as a matrix of values

- Columns correspond to features
- Rows correspond to observations of those features

$$D = \begin{bmatrix} x_{1,1} & \cdots & x_{1,N} \\ \vdots & \ddots & \vdots \\ x_{M,1} & \cdots & x_{M,N} \end{bmatrix} \quad \begin{array}{l} \text{where } x_{i,j} \text{ represents } j^{th} \text{ feature value of } i^{th} \text{ observation} \\ N = \text{number of features} \\ M = \text{number of observations} \end{array}$$

- ▶ Linear algebra underpins much of language modeling with neural networks, topic modeling, LSA, etc...