



## Why

Linear predictors are simple and we know how to select the parameters. The main downside is that there may not be a linear relationship between inputs and outputs.

## Definition

A *feature embedding* for postcepts  $A$  is a mapping  $\phi : A \rightarrow \mathbf{R}^d$ . In this setting, we call  $a \in A$  the *raw input record* and we call  $\phi(a)$  an *embedding*, *feature embedding* or *feature vector*. A feature embedding is *faithful* if, whenever records  $a_i$  and  $a_j$  are in some sense “similar” in the set  $A$ , the embeddings  $\phi(a_i)$  and  $\phi(a_j)$  are close in the vector space  $\mathbf{R}^d$ .

Since it is common for raw input records  $a \in A$  to consist of many fields, it is regular to have several embedding functions  $\phi_i$  which operate component-wise on the fields of  $a$ . These are sometimes called *basis functions*.<sup>1</sup> We concatenate these field embeddings and commonly add a constant feature 1. Since  $\mathbf{R}^d$  is a vector space, it is common to refer to it in this case as the *feature space*.

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<sup>1</sup>Future editions will clarify, and perhaps remove.



