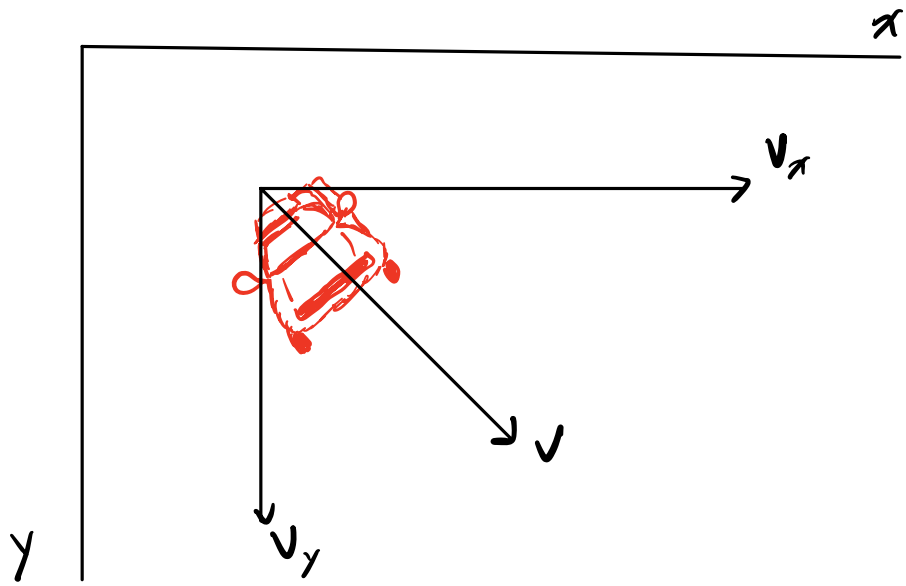
Vector

- An array of numbers, either continuous or discrete.
- The space consisting of vectors is called a vector space.
- Vector space dimensions can be either finite or infinite.
  - ↳ Most ML or DS problems deal with fixed-length vectors.

ex Velocity of a car moving in the plane with velocities V_x and V_y in the x- and y- direction respectively.



- Vectors are crucial since ML deals with multidimensional data.
  - ↳ ex If we want to predict housing prices in a region based on the area of the house, number of bedrooms, and population density of that locality... these are all input-feature vectors!

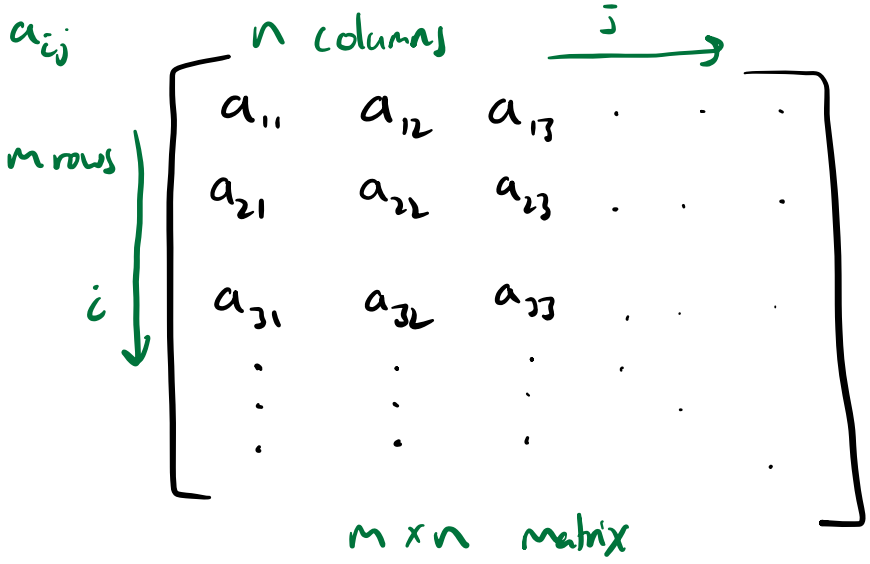
Scalar

- A one-dimensional vector is a scalar.
- A scalar is a quantity that has only magnitude and no direction.
  - ↳ Since it only has "one direction to move in" the direction isn't important and we only care about the magnitude.

ex height of a child, weight of fruit, etc.

Matrix

- A 2-dimensional array of numbers arranged in rows and columns.
- An $A_{m \times n}$ matrix has m rows and n columns, with $m \times n$ total elements.



- A few vectors belonging to the same vector space form a matrix.

Tensor - A multi-dimensional array of numbers.

- Vector = 1-d tensor
- Matrix = 2-d tensor

Application Tensors as storage in Deep Learning