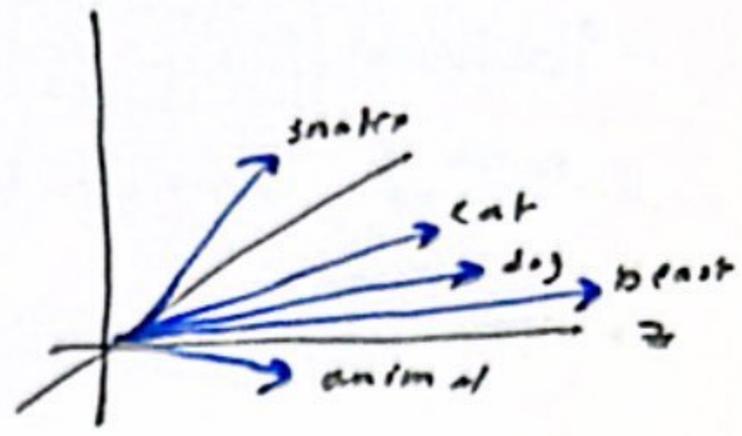
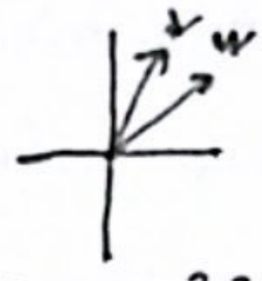
Word Embedding (p-2)

- Also since there are so many dimentions in training the model can learn to associate certian directions with classes like for Ex one dimention can be associated with animals or planets. meaning they would be very close to each other and roughly in the same direction.

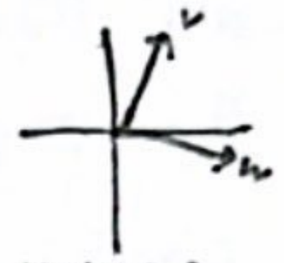


z direction roughly associated with animals

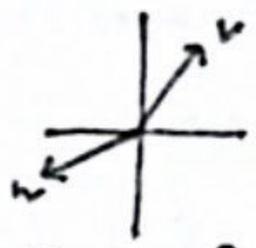
- The dot product of two vectors represents how close they are to each other the closer the are the positivly larger the dot product at 90° they are 0 and at opposite they are negetive and large. So we can use both magnitude and sigh.



$v \cdot w = 3.7$



$v \cdot w = 0$

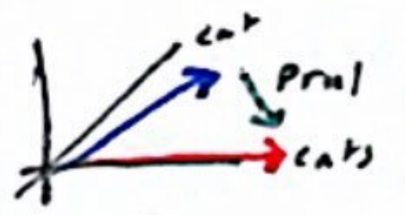


$v \cdot w = -3.11$

$$v \cdot w = \begin{bmatrix} v_1 \\ v_2 \\ v_n \end{bmatrix} \cdot \begin{bmatrix} w_1 \\ w_2 \\ w_n \end{bmatrix}$$

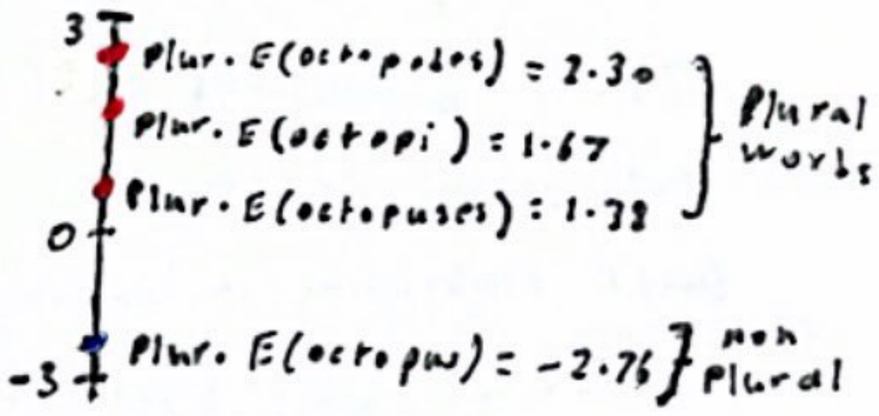
$$= v_1 w_1 + v_2 w_2 + v_n + w_n$$

- now lets say in your model you say $E(cats) - E(cat)$ represents a plurarity direction in this space, then you can compute the dot product of that plurality vector with singular and plural words to see exactly how plural they are compared to others by seeing how large there dot product is.



Ex

$\overrightarrow{Plural} \approx E(cat) - E(cats)$



- The specifics of how words are embedded and meaning is encoded is learned through training and is impossible to fully understand as 13,000 dimentions

- Embeddings also encode info about the position of a word meaning the vectors that represent words change depending on the position of that word

Ex The smartest person is the 51 pulled from the surroundings and for ...

- What started as the embedding for "smartest" might get pulled and tugged in this space by the transformer so its points in a direction that represents intelligence and intelligent people and that its supposed to be a person this context is