So, it's the second day, and at first, I thought I should just take a shot of the code I wrote and call that my progress.

But that felt boring - just a "look, I did something" kind of post.

And honestly, it felt like an injustice - not showing the beauty of what the human mind has achieved in NLP.

Let me try to give it some justice.

We were with the problem of abstract words — how to make a computer understand them the way we do. How do we make a machine think the same way we think about something like apples?

A word is one of the most powerful abstract things humans have ever invented. Take the word "king" - just a single word, and it radiates multiple dimensions of meaning:

King is powerful.

King is generally wealthy.

King is male.

King wears a crown.

King has authority.

And many more.

All of these hit our brain instantly - no one had to list them out for us.

But a computer doesn't get all of that from the word "king." So how do we teach it?

Let's try something.

Say we need to give a number to the words big and small - maybe we go with 20 and 1.

Then say we need to do the same for elephant and ant -again, maybe 1000 and 1, based on size.

But size is not the only thing.

What about threat level?

An elephant might be more dangerous than an ant, so we assign a slightly higher number there too.

But even then - that's not enough.

Elephant and ant differ in intelligence, ecological role, appearance, strength, cultural meaning... There are so many dimensions of difference.

So we realize -instead of assigning just one number, or even using just one scale, we should assign a whole vector -a list of numbers - each one capturing a different dimension of meaning.

And that's exactly what word embeddings do.

They convert a word into a point in a multi-dimensional space — say 100 or 300 dimensions - where similar words end up close together, and relationships between words become patterns in that space.

So close, in fact, that we can say:

king - man + woman ≈ queen

The computer doesn't know what a king looks like. But it knows that the relationship between king and man is the same as queen and woman - because it's learned that pattern from how we use language.

That's how we start making a computer feel like it understands.

Reference:

Mikolov, T., Chen, K., Corrado, G., & Dean, J. (2013).
Efficient Estimation of Word Representations in Vector Space.
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https://arxiv.org/abs/1301.3781