

Category Theory for Language

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Category theory can be applied in different fields in mathematics and extend functional programming languages such as haskell, but it can also be used to describe a vocabulary used by a conversational robot. In category theory a category is a bunch of objects that satisfies the following premises: abstraction, composition, identity. I'll use these premises to explain a category in a vocabulary:

abstraction - Using abstraction, we remove all unnecessary details from the particular object we're working with, and in the case of a vocabulary that object is a word. A word can have a definition associated with it, a grammatical category (noun, verb, etc.), a sound, perhaps an image, and more, but with abstraction we clear away all those things leaving only the word, a string of characters.

identity (isomorphism) - In a vocabulary all the words in a category have the same "meaning in use", they are interchangeable with each other in any context.

composition - Say you have three words: capable, capabilities, talented. If capable "has the same sense" as capabilities and capabilities "has the same sense" as talented, and capable "has the same sense" as talented, then the composition premise is satisfied.

So this category, or bunch of words (another example: accomplish, succeed, achieve) satisfying the above premises, describes a fundamental building block of a vocabulary. There's more to it, and perhaps in a later post I'll talk about types.

Applying category theory to language may help create conversational software.