


How To Create A Mind Summary

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1-Sentence-Summary: *How To Create A Mind breaks down the human brain into its components, in order to then draw parallels to computers and find out what is required to let them replicate our minds, thus creating true, artificial intelligence.*

Read in: 4 minutes

Favorite quote from the author:



Ray Kurzweil is known for many things, such as receiving the world's largest innovation prize, writing seven books, five of which are bestsellers, and making predictions about the future, many of which turn out to be accurate years later.

Artificial intelligence is one of the topics most dear to him, which is why he's dedicated this book to describing the prerequisites technology would have to fulfill, in order to create it.

He takes apart the human brain in detail, to then piece it back together with technology, which shows you that we're not nearly as far away as you'd think.

Here are 3 lessons from *How To Create A Mind*:

1. The reason you can recall a lot of memories with just one piece of information is that your brain stores patterns.
2. Pattern recognizers are responsible for most of the things you do, even being angry, creative, or horny.
3. Current artificial intelligence uses the same method of pattern recognition already, for example in Apple's Siri.

Are you curious to find out what the blueprint of your brain looks like? Let's take a look!

Lesson 1: Your brain stores information in sequences, which lets you remember many things with just one tiny hint.

Have you ever returned to a place you haven't been to in a while, looked at a certain object, like a fountain on a square or a sign on the wall, and all of a sudden were flooded with memories from the last time you were there?

That's the power of sequential ordering. **Your brain catalogs all information and memories in a strict, step-by-step order, which is why you only need one small part of it to trigger the entire pattern.**

For example, when your grandma makes cookies, you can vividly remember the last time you ate one just from smelling the new batch as it roasts in the oven. But when you try to remember details from walking on the sidewalk earlier today, that's a lot harder. Only when you think "where did I come from and where was I *before* I walked on the sidewalk" can you recall more details.

Police sketch artists make use of this phenomenon, trying to sketch all details of a criminal's face as accurately as you can describe them, so hopefully you'll be able to recall the entire face from seeing one, perfectly matching detail.

This is also the reason reciting the alphabet backwards is hard, as is playing a piece on the piano from the middle, instead of the beginning!

Lesson 2: Creativity, anger and our sex drive are all originate in the neocortex, where pattern recognizers deal with incoming information.

So how does your brain recognize what information matches which sequence in your head? Simple: with pattern recognizers.

Pattern recognizers consist of around 100 neurons each, you have roughly 300 million of them in your *neocortex*, the newest part of your brain, and they sit right within the 500,000 cortical columns, where all of the step-by-step information is stored. Low-level pattern recognizers can spot the right category of information, for example "letters" and then pass this on to high-level recognizers, which then determine "words" as the next step.

When you touch a hot stove, your *sensory cortex* gets a pain input, which goes to the instinctive *thalamus* that notes "ouch, this hurts and isn't pleasant," before passing the feedback on to a part of the neocortex called the *insula*.

There, so-called *spindle cells* will light up and create a strong, emotional response, in this case probably anger. **Love, sexual desire, sadness, it's all created here, and the reason these feelings make it hard for you to make good decisions lies in the structure of these cells.**

Spindle cells are big, long-winding neurons, which connect very distant parts of your neocortex – so many of your abilities and brain areas are affected when something happens here!

Lastly, when the pattern recognizers get the information, they fire 100 times per second, **letting you decipher millions of metaphors in just a fraction of time and thus interpret the world**, assign meaning to symbols and also, make art.

Lesson 3: Artificial intelligence already uses pattern recognition right now, for example to understand what you're saying.

Since our brains rely so heavily on it, pattern recognition must also be a key part of creating artificial intelligence – and it is! Basing software on pattern recognition allows it to learn on its own. One such pattern recognition system is called **HHMM, the hierarchical hidden Markov model**, and it works like this:

When given a set of new information or data, the software doesn't look at all the data, it starts with just one piece and tries to predict what comes next, based on its past experience. For example if a word-completion tool sees the letters "T" and "H" in sequence, it'll likely suggest "E" as the next one, followed by a space symbol.

If predictions are correct, they're followed by more predictions, and if not, the feedback is saved.

HHMM is already widely used, for example in Apple's Siri, which feels like a lot more than voice recognition. Instead of trying to guess whole word strings correctly, Siri looks for keywords and context, thus acting much more like a human would and being able to understand your request for the nearest restaurant, no matter how exactly you phrase it.

Note: A great movie about artificial intelligence (especially if you like Siri) is Her.

How To Create A Mind Review

A very cool way of approaching artificial intelligence, full of Ray's usual, visionary ideas and an objective status report on something we've been chasing for 70 years. Free biology lesson included. *How To Create A Mind* is a recommended read for sure!

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What else can you learn from the blinks?

- How your neocortex helps you break down your nighttime routine
- Why all "roads" in the brain lead to the neocortex

- How we usually strengthen our neocortex and how we'll do it in the future
- Why it's not unlikely that artificial intelligence could one day have free will
- By what year artificial intelligence will be an integral part of society

Who would I recommend the How To Create A Mind summary to?

The 15 year old computer nerd, who's building cool machines in his spare time, the 34 year old biologist, whose help we'll very much need to make this happen the right way, and anyone who leaves the movie theater with a sense of awe after watching a movie like Iron Man or The Avengers.