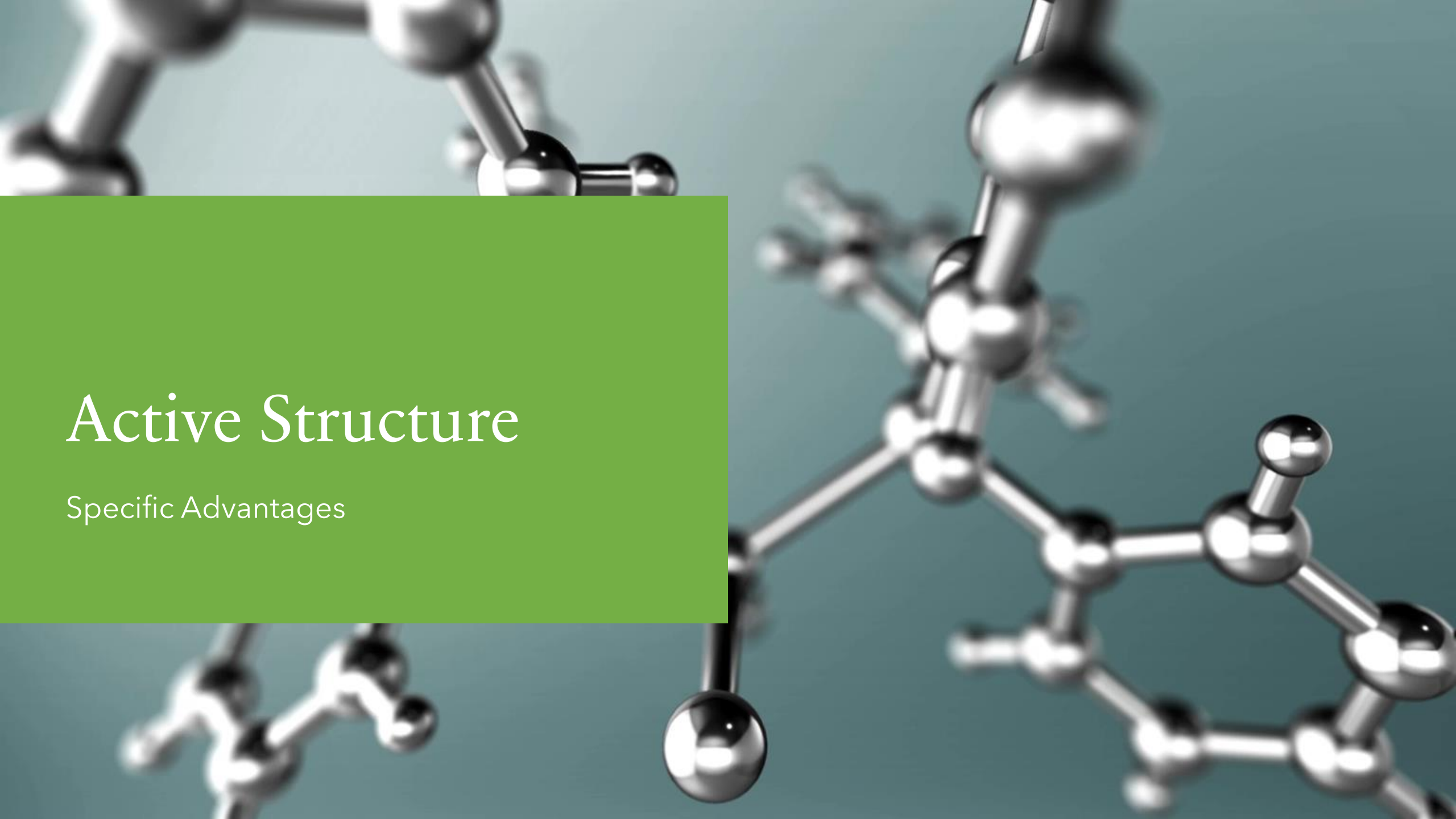

Active Structure

Specific Advantages

What Are the Advantages?

Undirected Structure – the algorithm is the structure and the direction of flow

Merge of hard (analytic) and soft (psychological) knowledge

Rapid Adaption to change using human-readable material

Handles multiple meanings of words

Not using training text – a new idea doesn't have to be in the text

You tell it something – it changes its structure – it remembers

The structure can operate on itself – check itself, modify itself, patch itself

Intended for complex, dynamic problems, where an all-out effort is justified

Undirected Structure

The overall structure is not initially directed to any particular purpose. That means it is not efficient, in the way an earthworm is efficient. An earthworm does what it can, and doesn't think about what it can't do.

We can create new connections, rewire our existing systems and redirect them – we have intelligence. If we give these properties to a machine, it can help us where we are weak. Our weakness is a severe limit on how much our conscious mind can think about at any one time.

Merge of Hard and Soft Knowledge

A = B + C is a simple formalism, but far too simple to handle complex problems, where there are undercurrents of hard science and overlays of soft science, like psychology.

The English language manages to combine all these aspects, so it would seem reasonable to use it to describe complex problems, and allow the machine to sort out what is needed for the particular problem.

Rapid Adaption to Change

The machine can look up a dictionary for new words it encounters, and bring the definitions it finds into its own structure (with some on-the-fly and post-first-use curating). It maintains a “word forge”, adding meanings where the dictionary writers can’t be bothered (gerunds, for example, or little used adverbs).

It has an array of morphemes for otherwise unknown words, but many words appearing to be constructed from morphemes have picked up other meanings along the way (unbelievable as an example), so construction is only used as a last resort.

Multiple Meanings of Words

Some people take the approach that the domain of operation should be kept small, so words only have one meaning. Nearly impossible – “cervical vertebra” and “cervical cancer” – but the biggest problem is that the machine and the person then have a complete mismatch in understanding what a text means, and the machine is somehow stupid.

We take the approach that the machine should “understand” every meaning of every word it reads. Yes, it slows down the operation, but most complex tasks favour precision over a dirty mess.

No Training Text

The machine operates using definitions supplied by a dictionary for words and small groups of words, like “bank account” or “natural selection”. New problems and ideas can be described in words long before there is text to describe them,.

A good example is “cold fusion”, which turned out to be a nonsense, but showed how easily putting two words together that normally wouldn’t go together can trigger a huge scientific response.

If you have to wait for a textbook, the problem has probably already solved itself. The problems humanity faces are not in the data, so differentiating out of date data to solve them is a little stupid

The Structure Can Modify Itself

It’s fine to build a machine that can solve complex problems, but if it creates a huge human workload for its builders, it will fail. Ideally the machine should be capable of working from instructions in English to modify itself, at every level.

If it can do this, it has the huge advantage of being inside itself, and can easily see things we can’t.

Complex, Dynamic Problems

Active Structure is not intended to be a toy, or an advanced chatbot. It is intended to be used to read complex text, such as military equipment specifications or legislation, or handle complex economic or interdisciplinary problems, where the multiplicity of interacting factors make it difficult for a person to handle, or where specialists have no common vocabulary (economists and epidemiologists or climate scientists, say).

Is it finished today? It is already useful to make sure everyone (including the machine) is on the same page (see next slide), and its underlying structure, of an undirected state-transmissible network encompassing objects, relations and logical wiring, should still be useful in twenty years time – it is a whole-problem solution.

AML Act

- **Same-person electronic funds transfer instructions**
- *Multiple-institution same-person electronic funds transfer instruction*
- (1) For the purposes of this Act, if:
- (a) a person (the ***payer***) instructs a person (the ***ordering institution***) to transfer money controlled by the payer to a third person (the ***beneficiary institution***) on the basis that the transferred money will be made available to the payer by:
- (i) being credited to an account held by the payer with the beneficiary institution; or
- (ii) being paid to the payer by the beneficiary institution; and

The words are turned into a piece of machinery, with all the objects and actions (the ordering institution, accounts, payments) being represented, so money can flow in a circle, as described.

But Isn't It Application-Specific?

Ninety percent of the work has been done for any application.

Sure, extra "stuff" has to be added for specific applications

- Specifications (Physics, Existential, Propositional, Temporal Logic)
- Legislation (Whatever)
- Economics Problems (Many interdependent factors, Psychology)
- Genetic Analysis Problems
- Climate Change Problems (Physics, Economics, Psychology, Time)

The biggest hurdle was always the English language, with its flexibility and range. Active Structure handles that.

Active Structure

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