Theory of mechanical information

Saturday, 11 May 2019

Complexity

Mechanical space and time have a single, local reference frame within a “silicon” unit of processing hardware. In the local reference frame, it is normal to separate space and time. In this context, we relate space and time as

$$O_\tau \leftarrow \chi_\sigma .$$

That is, an input processor consumes time as a function of input quantity.

The order of magnitude of time consumed in proportion to input quantity has interest. When time consumed per unit input is fairly constant, we happily proclaim the input processor to have linear complexity.

As a tool feature, linear complexity recommends itself as friendly and predictable. A quantity

multiplied by a factor yields a practical expectation of performance.

Syntax

In the processing of machine readable text, the complexity of a machine language is syntactic. We may parse objects from text in linear time where syntactic structures are lexically constant.

The class of linear syntactic complexity is large. By illustration, we could analyze the ASCII character set as the specification of lexical structures. The matching quotes and grouping pairs, the characters, numbers, punctuation, and space represent the specification of lexical spans and sequences. The class of syntax that employs the spans and sequences of this lexical feature set has linear complexity. This writer will identify the class as “data code”.

Data code languages are easy to parse and format. A grouping pair -- brace or bracket -- is always matched to form a span. All other characters are accumulated into subsequences by class. And then, spans are branched (recursively).

The production and consumption possibility spaces of data code languages are larger than the possibility spaces of languages having other complexity.

These figures represent a vibrant intercourse, and that character of linear complexity is a degree of technological determinism.

Determinism

When we describe a solution as mapping onto a problem, we refer to a crisp fitness of solution to problem. The problem set has no unmet elements under the solution set. And as a result, the representation of the problem set is completed by the representation of the solution set.

When a problem and solution have been well defined, a contribution has been made to our knowledge. Our epistemological horizon has been expanded. Our future has gained a degree of determinism.

Review

Mechanical complexity relates space to time. Technological determinism relates complexity to economics.

Future work

The development of the space of the mechanical frame.

The development of positivistic metaphysical information framing.

Notes

[McCarthy 1960] Recursive functions of symbolic expressions, John McCarthy, MIT, 1960

> *Surely there are volumes of work in the examination of linear syntactic complexity. This is one. S-expressions have been a landmark, very well developed in this paper.*

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