

## Same but different: “common-substring” vs “Kolmogorov complexity”

written by smooch on Functor Network  
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I notice something of an inverse relationship between “*the common-substring problem’s solution*”, and “*Kolmogorov complexity*” — in the sense that “*each is comprised of (and defined by) the set of constituent elements, which are excluded and ignored by the other*”...

... but i can’t find this relationship discussed anywhere: —*might anyone point me towards the correct search-term, or some ‘accessible’ texts, on this relationship?*

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To explain:

1. The solution to the “*common-substring problem*”, is all of the “*common words, and strings thereof*”, between two input texts  
  
*the “common-substring problem” is typically discussed in terms of finding only the “**longest** common-substring” — but rather here, we will be interested in “all commonality”*
2. “*Kolmogorov complexity*” frames the “*randomness*” and “*incompressibility*” of some sequence; and is based upon a process which “*replaces*” sub-strings which exist elsewhere (*typically framed as the result of some generator function*), referred to as compression; leaving only the unrecognised elements behind, which are considered “*random*” (*and incompressible*)

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So, if we consider our two (*input*) strings from the “*common-substring problem*”, imagine:

- i. the first, as “*the source of candidate sub-strings for kolmogorov compression replacement*”, and
- ii. the second, as “*the active sequence which is compressed by every candidate substring from (i) found in itself*” — (*leaving only elements which are not replaced*)

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What I’m pointing at then, is the way in which:

- a) for sequences  $a, b$ , with “*common*” elements  $c$  (*found*  $a \cap b = c$ )

b) the “*uncommon*” elements  $u$  , (*found by*  $a \setminus c = u$  , *or*  $b \setminus c = u$  ), equate to “*incompressible*” elements; which when measured, result in “*kolmogorov complexity*”  $k$  , where  $|u| = k$   
—*is this “correct”?*

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Might anyone point me towards the correct search-term, or some accessible texts, on this relationship?

Many thanks!