From events to objects: investigating Alfred N. Whitehead's process of abstraction in artificial intelligence

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Abstract. In 1920, the mathematician and philosopher Alfred North Whitehead argued: "If we are to look for substance anywhere, I should find it in events which are in some sense the ultimate substance of nature" (Whitehead 1920, 'The concept of nature', p19). Whitehead called process of abstraction the process by which cognitive beings infer the existence of objects from regularities of events. The Whiteheadian process of abstraction precedes the distinction between the subject and the object. It is not intellectual but instinctive and immediate: objects are abstracted but do not require judgment nor intellectual synthesis. We design algorithms for artificial agents to perform Whiteheadian abstraction. In addressing this issue, we investigate the components (sensorimotor schemes, hierarchical sequence learning, spatial memory, ontologies) that need to be implemented to realize this process. This led us to create agents capable of rudimentary self-programming (an important feature for achieving constitutive autonomy) through "sedimentation of habitudes". I will present demos that show that these agents exhibit some level of intelligence and self-motivation in their behaviors.

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