

Abstract

In this paper we characterize a paradigm shift in modern western painting art in early 1900s, in terms of increasing number and heterogeneity of artists, and of change in concepts developed in the paintings works leading avant-garde movement. Data analysis methods will be applied in order to made this and discussion will lead to see how the paradigm shifts in socio-cultural evolution can be described in terms of change of the components of frequency, heterogeneity and energy of the system.

Background



Figure 1: Evolution of art in europe between 1850 to 1930

- Avant-Garde movements are studied in a qualitative way. See [3, 10] Also, the society, the increasing of technique and the war, influenced the world and in particular, the art [7, 8, 11].
- Evolution of complexity can be explained in terms of number of components and heterogeneity of system. [2, 1].
- Transitions in biological evolution can be explained in these terms too! [9]
- Furthermore, transitions are a quickly lapse between different paradigms and this idea of evolution can be extended to other areas [6, 5]
- Critical variables can explain some transitions in evolution or change in sociality [12, 4]. Can be extended this idea of evolution of paradigms in western modern art (paintings)?

Methods

- Data analysis: $N = 145$ artists, $m = 28$ art movements. Time-unit: midlife artist year and decades of time studied (*c.*1850 – *c.*1930).
- Moving average models on increasing art movements and specialties in the transition.
- Normalized Shannon diversity ($N^{-1} \exp(-\sum p_i \ln p_i)$) of art movements.

References

- [1] Arthur, B (1994). On the evolution of complexity. Complexity: Metaphors, Models, and Reality, Cowan, GA (ed), pp. 65–81, Addison-Wesley, Reading, MA.
- [2] Bonner, J (1988). The Evolution of Complexity by Means of Natural Selection, Princeton University Press, Princeton, NJ
- [3] Breton, A. (1924). Manifestoes of Surrealism.
- [4] Davison, I. a. (2008). 14000 on BP on being alone: the isolation of Tasmania. Turning points in Australian history. Sydney: UNSW Press.
- [5] Gersick, C. (1991). Revolutionary Change Theories: A Multilevel Exploration of the Punctuated Equilibrium Paradigm. The Academy of Management Review, 16(1), 10-36
- [6] Gould, S., Eldredge, N. (1977). Punctuated Equilibria: The Tempo and Mode of Evolution Reconsidered. Paleobiology, Vol. 3, No. 2 (Spring, 1977), pp. 115-151
- [7] Hobsbawm, E. (1975). The Age of Capital: 1848-1875. Lawrence Hill and Co. ISBN 0-88208-082
- [8] Hobsbawm, E. (1987). The Age of Empire: 1875-1914. Weidenfeld & Nicolson (First Edition)
- [9] Maynard Smith, J., Szathmáry, E. (1995). The major evolutionary transitions. Nature, 374, 227-232.
- [10] Micheli, M. d. (2006). Las vanguardias artísticas del siglo XX. Alianza Forma, 135-137.
- [11] Mumford, L. (1952). Art and Technics. Columbia University Press.
- [12] Oliver, P. M. (1985). A Theory of the Critical Mass . I . Interdependence , Group Heterogeneity, and the Production of Collective Action. American Journal of Sociology, 91(3), 522-556.
- [13] Waddington, CH (1969). Paradigm for an evolutionary process. In Towards a Theoretical Biology, Waddington, CH (ed), Vol. 2, pp. 106–128, Aldine, Chicago, IL

Results

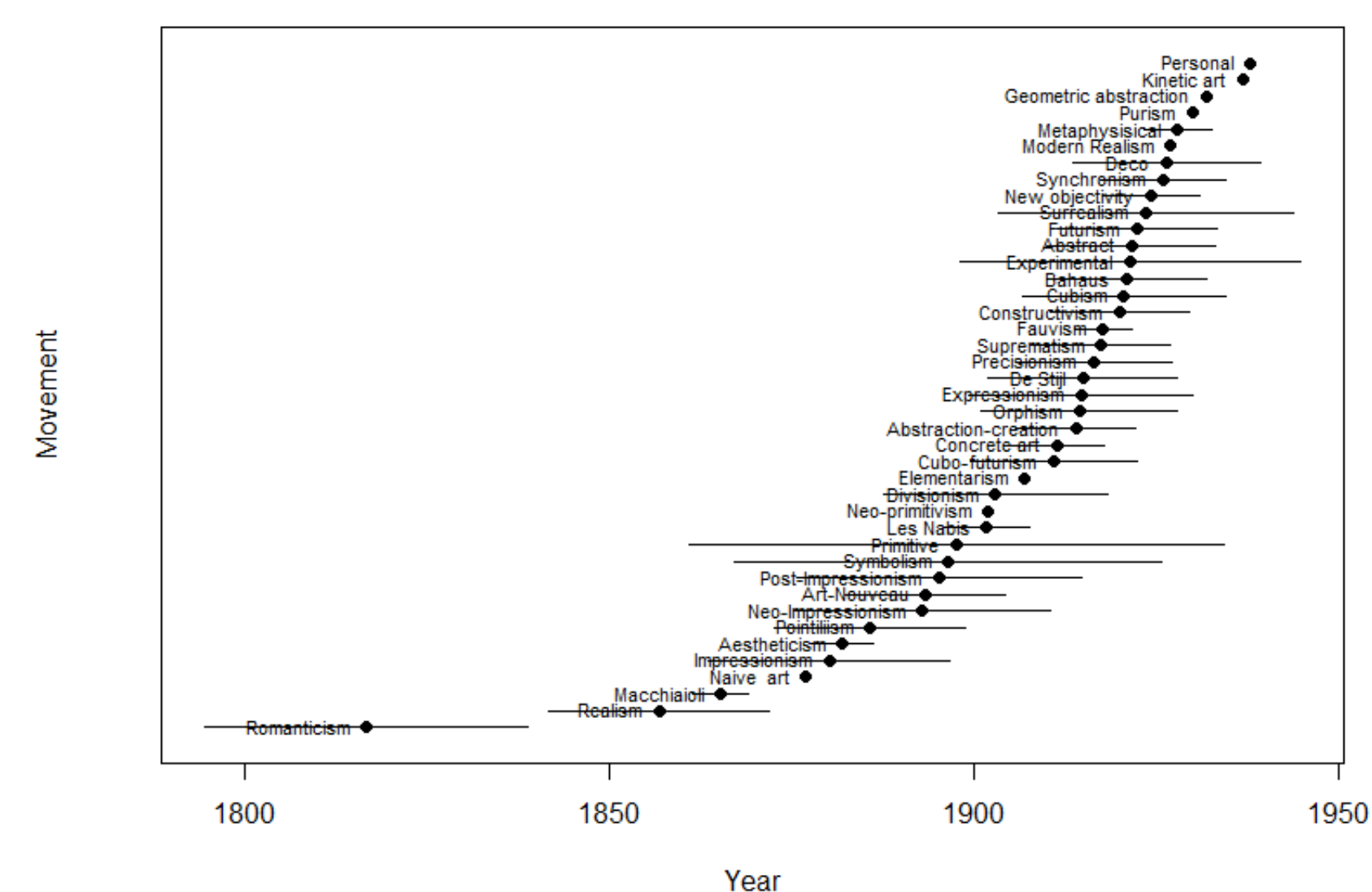


Figure 2: Art movements according time. Points indicate midlife of artists belonging these movements and lines represents standard desviations

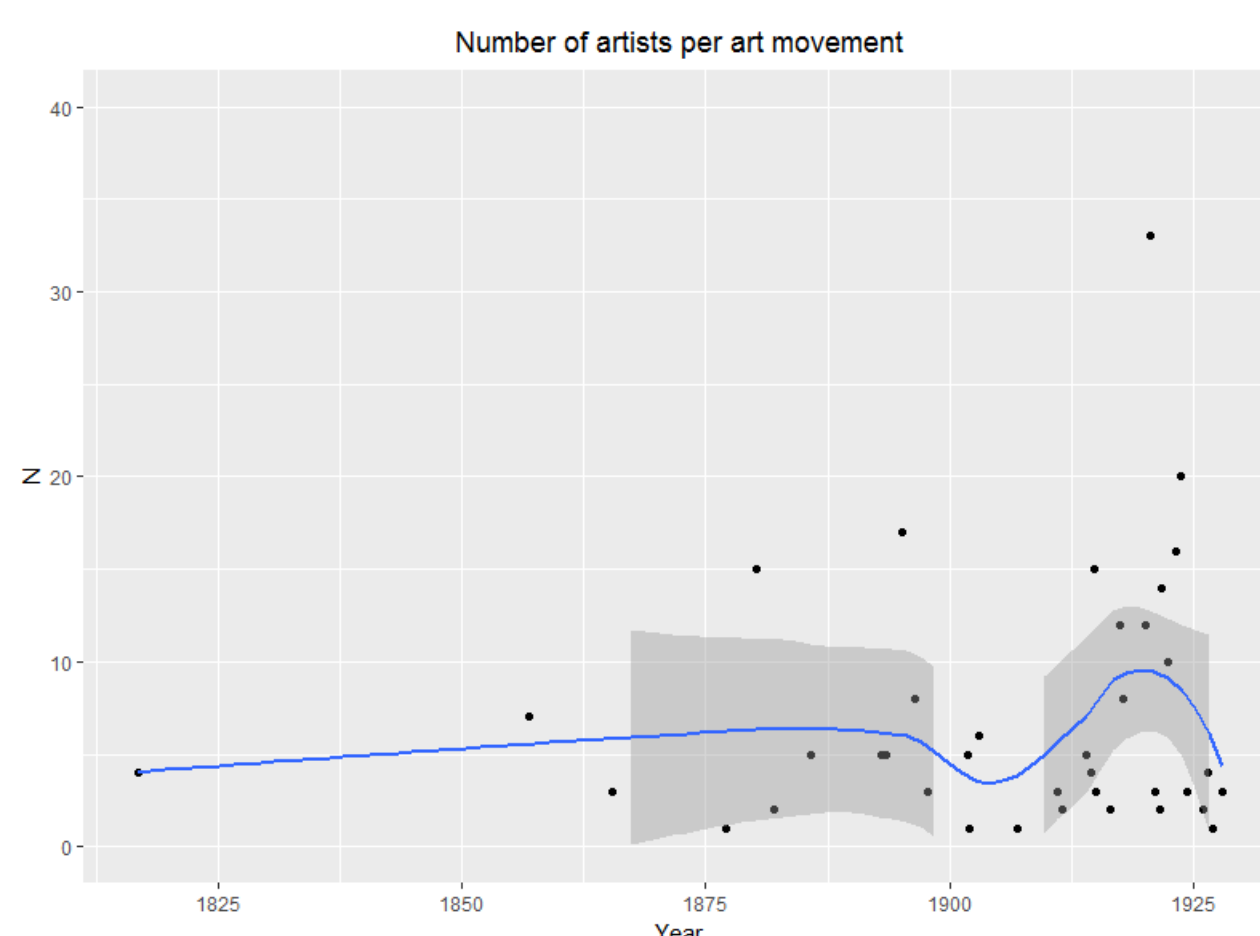


Figure 3: Number of artists per movement according time. Solid line is moving average tendence.

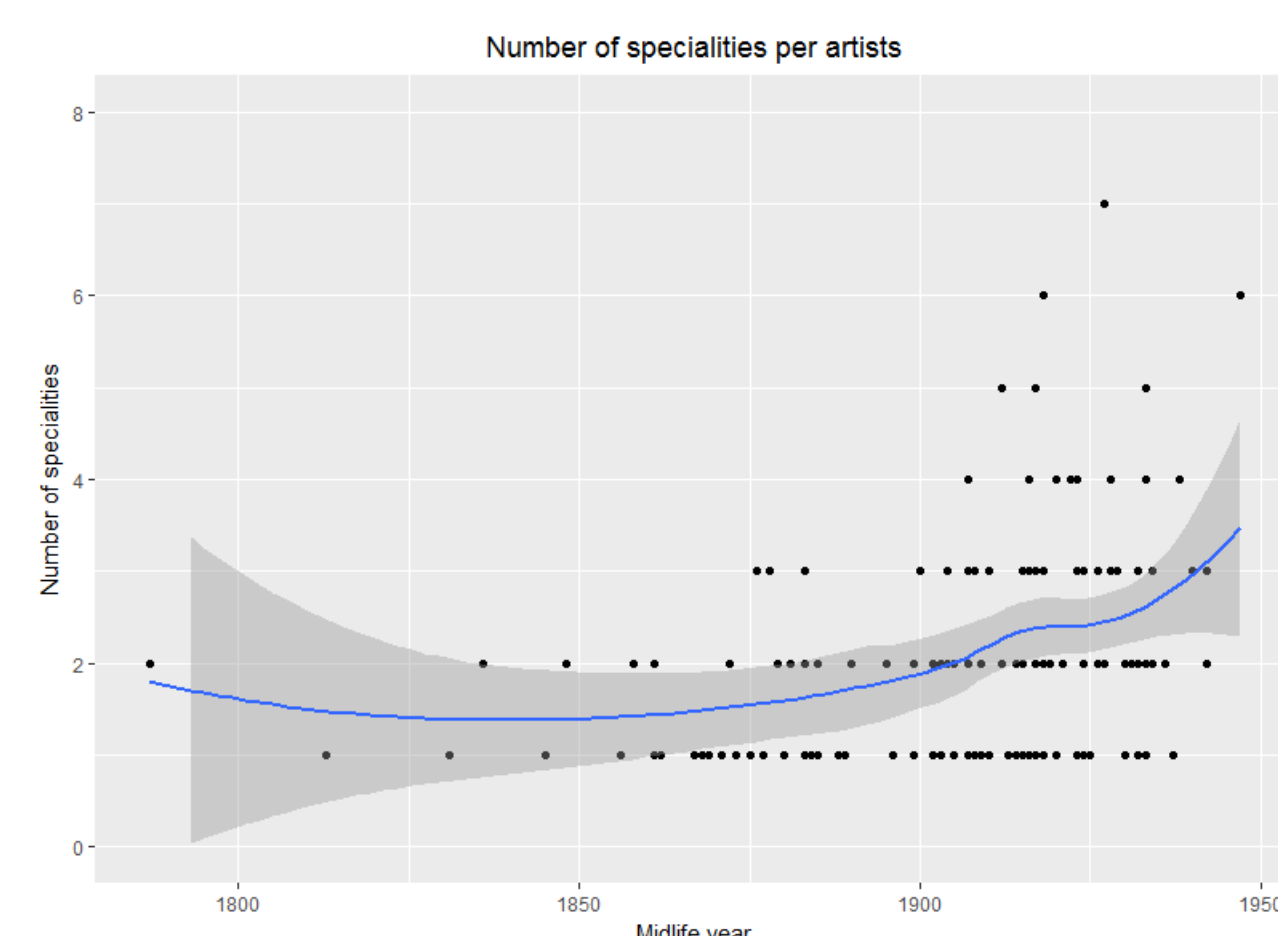


Figure 4: Number of art specialties per artists according time, in which x-axis represent midlife of artists. Solid line is moving average tendence.

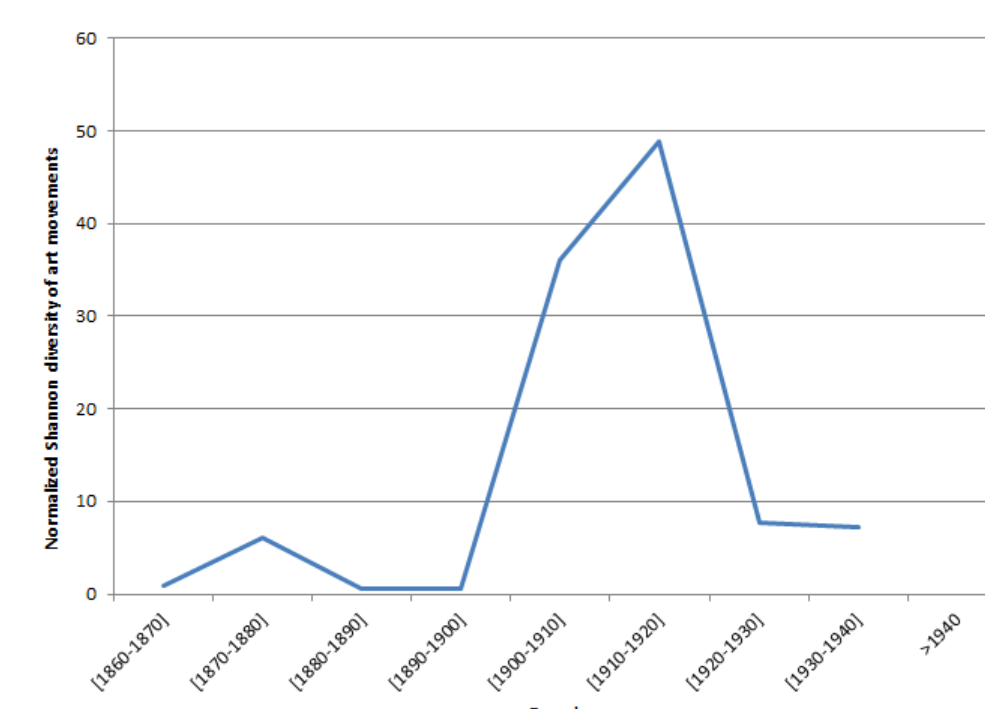


Figure 5: Normalized Shannon diversity of art movements per decade.

Discussion & what's next

- Generate more data, expected $N = 10.000$ paintings. This process is under construction.
- Incorporate other regions and the fluxes between them.
- Incorporate other art pivots or a more general perspective of art.

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