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Re: Inquiry for a potential Perspectives piece in Science

Dear Editor,

We would like to inquire about an opportunity of submitting a short essay as a Perspective in Science.

The theme of this essay discusses the similarities and contrasts between biological and technological systems in terms of their evolution. It is widely received that biological evolution works as a tinkerer. While manmade systems like software and circuits are thought to change according to the plan of rationale designers, the distinction is not clear-cut. There are plenty of examples showing that many of man's great innovations are the result of trial and error, and all technological systems are subjected to selection such as user requirements. The linkages between the two kinds of evolutionary processes are of interests to both biologists and engineers. We published an article a few years ago (Yan et al. PNAS 2010) on a case study, the comparison of the transcriptional regulatory network of *E. coli* and the call graph of the Linux operating system. Such an interface has recently gained more and more attention; see for instance, Wagner et al. J. R. Soc. Interface, vol. 11, p. 20131190, 2014.

To provide more details of our piece, we attach a potential figure on different evolutionary patterns in biological networks versus technological networks. The left shows the protein-protein interactions network in human, whereas the right is the R package dependency network specifying the proper function of a package (node) depends on (edge) the installation of another. Central nodes in a PPI network are under strong selective constraints (slow rate of evolution), whereas central nodes in the R package dependency network evolve faster. The simple discrepancy is actually related to the tradeoffs in the context of optimizing different design objectives. We will fresh out the implications of in our piece.

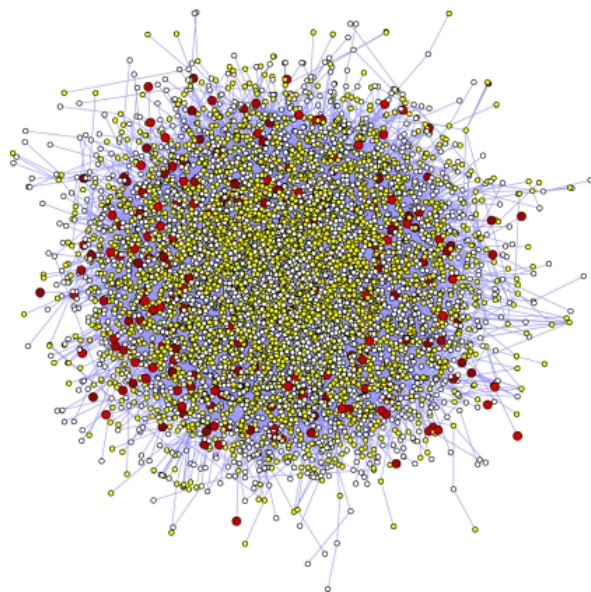
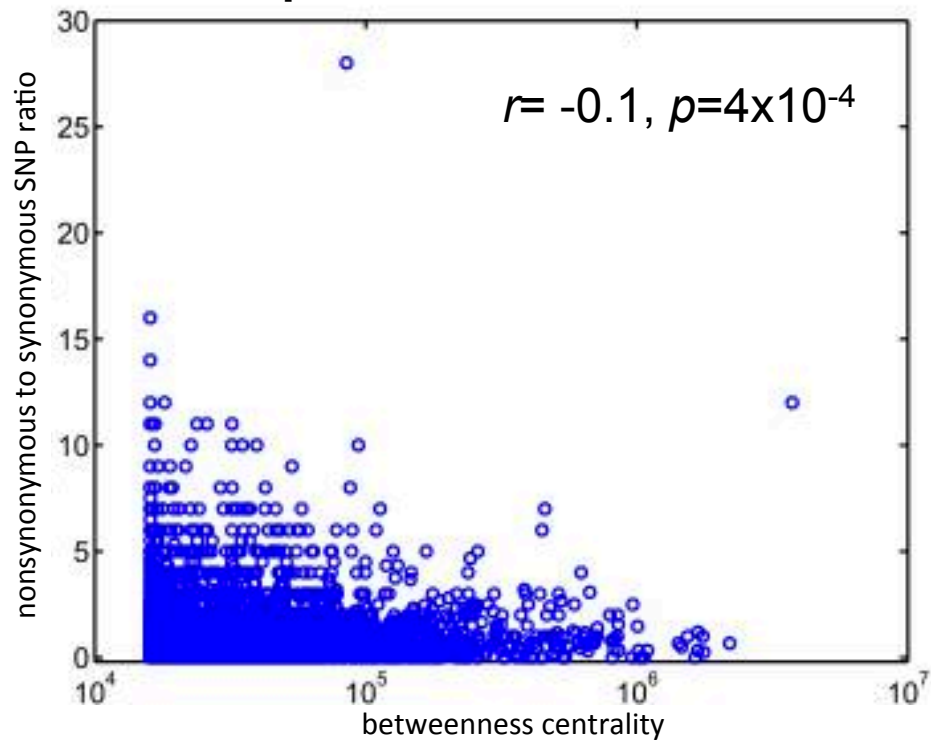
The worldview of Darwin has penetrated to many aspects of our culture, as well as different scientific disciplines. We believe a Perspective on this exciting area will be of interest to many readers of Science. We are looking forward to hearing from you.

Yours faithfully,

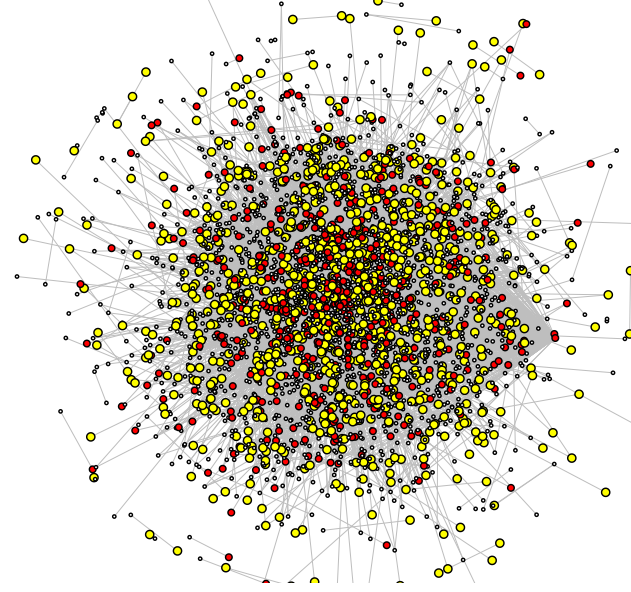
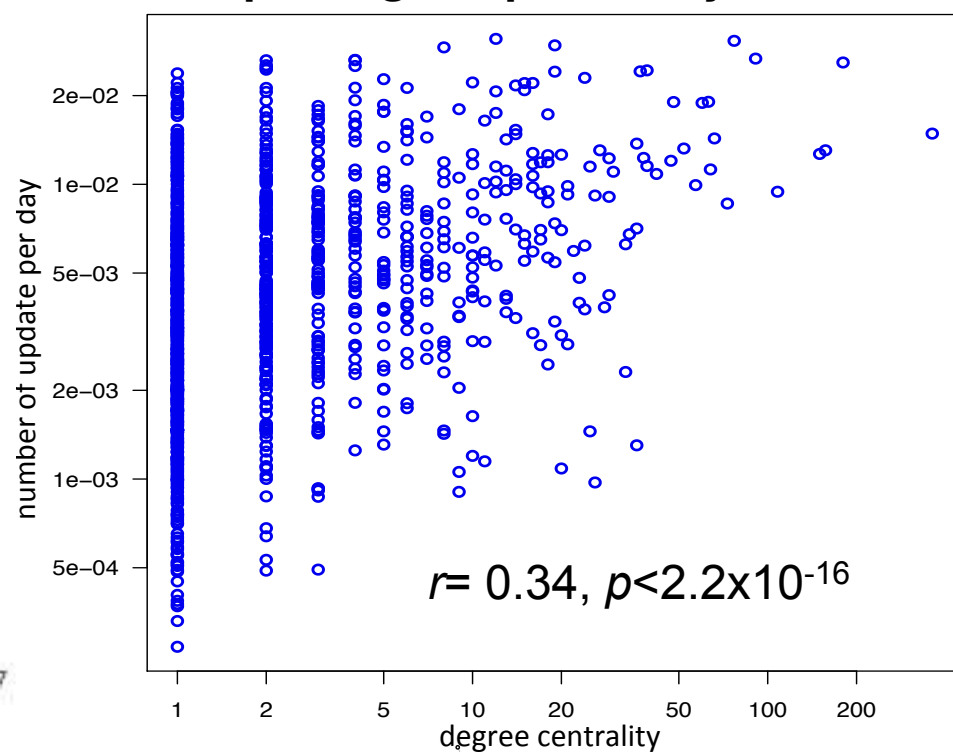
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## Protein-protein interaction network



## R package dependency network



evolving protein

- Fast
- Slow
- Medial

updating package