

War pact network model: A generative model of networks that shrink

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Many real systems can be described by a set of interacting entities forming a complex network. To some surprise, these have been shown to share a number of structural properties regardless of their type or origin. It is thus of vital importance to design simple and intuitive models that can explain their intrinsic structure and dynamics. These can for instance be used to study networks analytically or to construct networks not observed in real life. Most models proposed in the literature are of two types. A model can be either static, where edges are added between a fixed set of nodes according to some predefined rule, or evolving, where the number of nodes or edges is increasing over time. However, some real networks do not grow but shrink, meaning that the number of nodes or edges is decreasing over time. We here propose a simple model of shrinking networks called the war pact model. We show that networks generated in such way exhibit common structural properties of real networks. Furthermore, compared to classical models, these more closely resemble international trade, correlates of war, Bitcoin transactions and other networks. Network shrinking may therefore represent a reasonable explanation of the evolution of some networks and greater emphasis should be put on such models in the future.