Lifelines: A Series of Artworks that Invite Contemplation on the Human Condition

David A. Reimann

Department of Mathematics and Computer Science, Albion College, Albion, MI, USA;
dreimann@albion.edu

Abstract

A series of abstract artworks inviting contemplation on the human condition is presented. Each artwork was created using curves with lengths drawn at random from a data set of ages at the time of death in the US during the year 2007. The connection between these pieces and the data set creates a space for deeper reflection on the human condition. The title and accompanying text for each piece reveal to the audience a deeper meaning and serve as a further point of engagement. This approach of linking a data set to art can is general enough to be used with other data sets.

Introduction

Life, death, and the human condition have been explored in art and literature throughout recorded history [1]. The significance of death is evident in the archeological record, which shows the first human burials tens of thousands of years ago [3, p. 3]. Religions and cultures of the world provide creation stories and explanations on what happens after our deaths. Some of the great advances in science have provided reasonable theories on how life began and evolved on Earth, yet much remains unknown. The meaning and purpose of our individual and collective lives still remains a mystery.

Nevertheless there are clear facts. We are born, we live our lives for some amount of time, then we die. The timing of our death is unknown, but can be predicted based on statistical data. For example, the US government's National Center for Health Statistics collects data on the age at time of death. The data for 2007 [2] is given in Figure 1. There were 2,423,511 US deaths recorded in 2007 with the average age at death being 72.3 years. The oldest person to die in 2007 was 117 years old. A graph of the data, such as seen in Figure 1, can be helpful in understanding the distribution of deaths by age. It also provides an invitation to contemplate the human condition.

Data visualization techniques can help one see relationships in data that a simple data graph alone does not provide. For example, Figure 2 shows a visualization of four statistical distributions (uniform, normal, bimodal, and gamma). These figures show plots of circles with sizes sampled from each corresponding distribution. While subtle, there are clear differences that can be seen in each figure. For example, the gamma

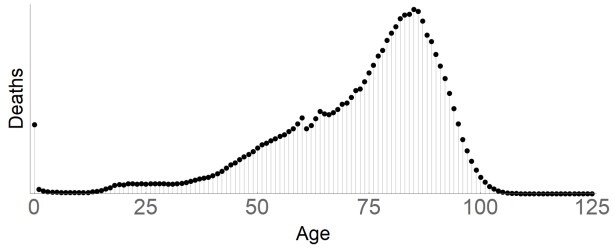
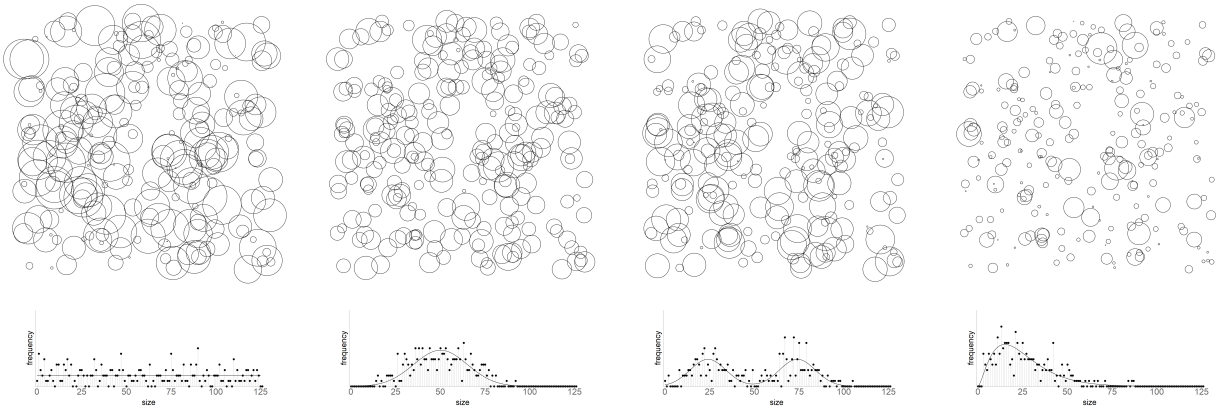


Figure 1: *Deaths by single years of age, United States, 2007.*



(a) *uniform* **(b)** *normal* **(c)** *bimodal* **(d)** *gamma*

Figure 2: *Circles randomly placed within a square region with radii sampled (250 variates) from indicated random distributions. The corresponding histograms (points) and distributions (solid lines) of circle radius values is plotted below each figure.*

distribution used in Figure 2d is positively skewed and has a small expected value, resulting in a greater number of smaller circles than the other distributions.

Artworks

This paper shows a series of nine digital artworks that are rule-based geometric compositions made using the data from Figure 1. Each piece is created from a random set of curves, referred to as *lifelines*, whose lengths were all simply drawn at random from the data set. This sampling process is similar to a Monte Carlo simulation and methods for resampling statistics. Thus the lengths in these collections of lifelines depicted matches the statistical distribution of ages at the time of death in the United States in 2007. The number of lifelines used in each piece was chosen for artistic purposes and is provided for completeness.

The connection between these pieces and the data set creates a space for deeper reflection on the human condition. Each piece is intentionally abstract enough to allow multiple interpretations. The title and accompanying text for each piece reveal to the audience a deeper meaning and serve as a further point of engagement and invite additional reflection.

Origins of Lifelines, Figure 3a, consists of 2025 lifelines, each in the shape of a nearly complete circular arc, with a gap preserving the lifeline's endpoints. Each lifeline is randomly placed and evokes a bacteria colony. The viewer is invited to reflect on the question "What is the origin of life?" This artwork is similar in construction to the images of random circles in Figure 2.

Seeds of Lifelines, Figure 3b, consists of 625 lifelines that represent flagella on the millions of spermatozoa present near the moment of conception. A small ellipse at one end of each flagellum helps define a head that is then placed in a phyllotactic arrangement, similar to the placement of seeds found on some flower heads. The viewer is invited to reflect on the questions "To what extent does our genetic material predetermine the length of our lives? What portion is chance?" and "Why do some find conception easy, perhaps even unwanted, and others desperately struggle to reproduce?"

Sea of Lifelines, Figure 3c, consists of 1115 lifelines. The pattern of individual lifelines is evocative of moonlit wave crests, our individual lives merely liminal ripples on the vast sea of humanity. The viewer is invited to reflect on the questions "Is my life significant?" and "Where is my life taking me?".

Fabric of Lifelines, Figure 3d, consists of 2226 lifelines. The intersecting grid pattern of individual lifelines represent how our lives interweave with others in the fragile of web of humanity. The viewer is invited to reflect on the questions "Who supports me?", "How do I support others?", and "What happens to someone when their support network fails?"

Packing of Lifelines, Figure 3e, consists of 2025 lifelines in the shape of a nearly complete circular arcs. Each lifeline is placed in a 45×45 grid. Empty spaces are due to the lifelines of length 0 associated with infant mortality. The viewer is invited to reflect on population density and ponder the question "How much life can our planet support?"

Game of Lifelines, Figure 3f, consists of 2323 roughly linear lifelines and placed to evoke a 8×8 game board. The viewer is invited to reflect on the question "Is life just a game with enigmatic rules, strategies, and objectives?"

Circle of Lifelines, Figure 3g, consists of 500 roughly linear lifelines randomly placed along a circle. Intersections of individual lifelines represent how our lives are often entwined with others; some with many interactions and others exist in relative isolation. The viewer is invited to reflect on the question "In what ways is my life a part of the continuum of humanity?" Note this artwork uses a larger scaling of lifelines than the other artworks in this series; it was originally created as cover art for the June 2018 issue of *Mathematics Magazine* and was the first piece created in this series.

Thorns of Lifelines, Figure 3h, consists of 1000 linear lifelines placed along vertical lines topped with a curve that represents a thorn. The viewer is invited to reflect on the question "How many thorns do I present to others?"

Chaos of Lifelines, Figure 3i, consists of 2200 roughly linear lifelines placed at random. The viewer is invited to reflect on the question "To what extent does randomness and chaos rule our lives?"

Discussion

A series of abstract artworks inviting contemplation on the human condition was presented. Each artwork was created by sampling a real data set of death ages in the US during the year 2007. The age at time of death, D, was used to create a curve of length D called a lifeline. The curves used ranged from nearly circular arcs to roughly linear paths. In each artwork, the lifelines were placed to evoke a theme related to the underlying data set. The imagery was enhanced by the corresponding titles and accompanying text.

The connection between the data set and the constructed imagery intensified the meaning of the individual artworks. Having a series of these works invites a meditation from multiple perspectives on the overall theme.

The approach presented in this paper has the potential to be generalized to other phenomena. Values sampled from other data sets could be used to create simple visual elements parameterized by the data in some meaningful way and combined to create artworks related to the theme of the data set. The artworks presented here used curves that were nearly circular and roughly linear. Certainly other curves could have been used, such as spirals, ellipses, or straight lines. The use of other figurative elements is also possible.

References

[1] J. Ebenstein. *Death: A Graveside Companion*. Thames and Hudson, 2017.

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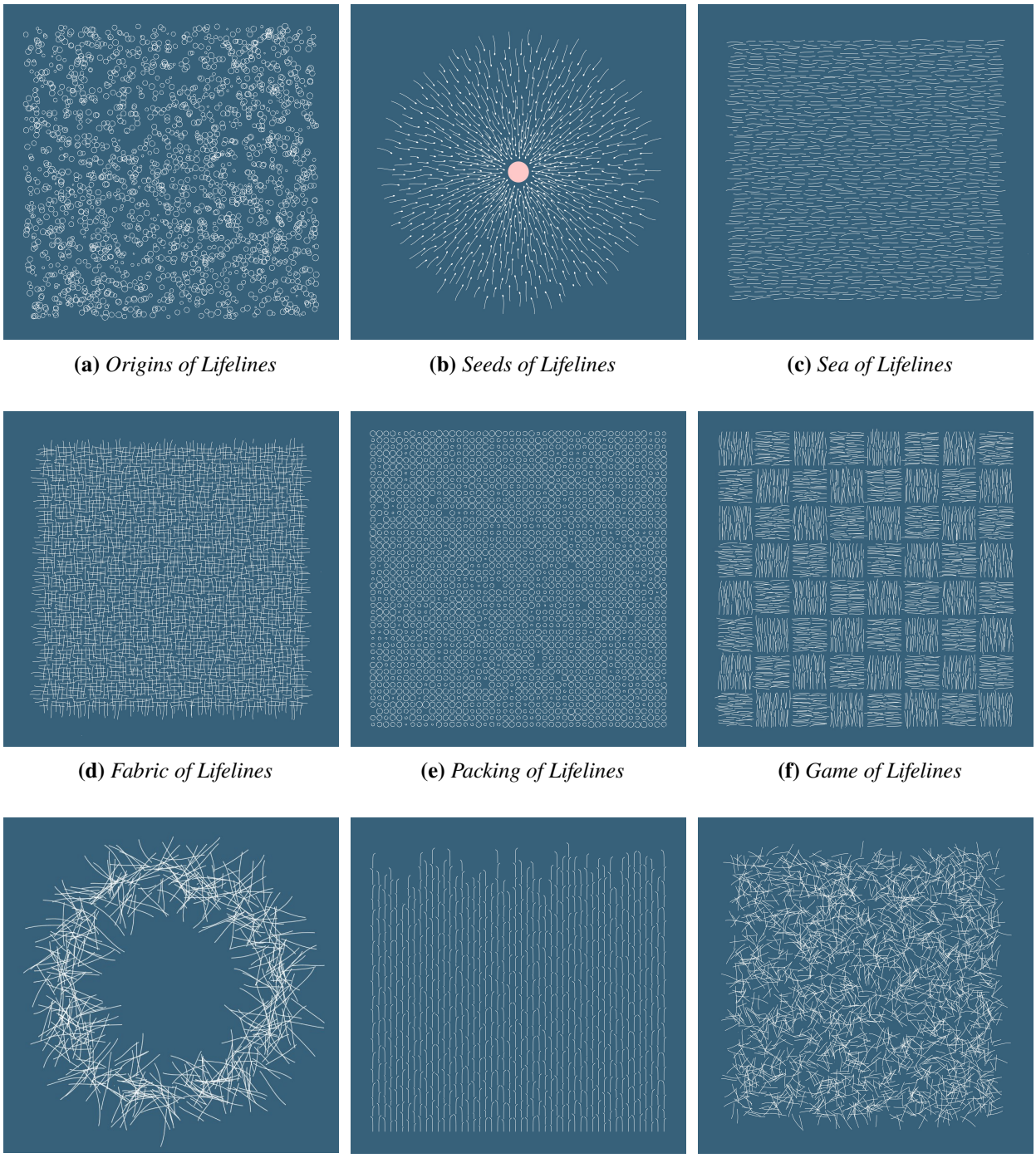

(a) *Origins of Lifelines* **(b)** *Seeds of Lifelines* **(c)** *Sea of Lifelines*

(d) *Fabric of Lifelines* **(e)** *Packing of Lifelines* **(f)** *Game of Lifelines*

(g) *Circle of Lifelines* **(h)** *Thorns of Lifelines* **(i)** *Chaos of Lifelines*

Figure 3: *Nine digital artworks from the Lifelines series. Each image is made from curves that have lengths randomly sampled from the data shown in Figure 1. The aggregate placement of the curves in each artwork provides a visual meditation on aspects of the human condition. See text for descriptions and contemplative questions the viewer might consider.*