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## Visualizing Jonathan Edwards

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**Abstract:** This article begins by introducing Jonathan Edwards, the eighteenth century American philosopher theologian from Northampton, Massachusetts. Edwards believed that the world of nature had communicative properties, full of types and symbols, and indeed, was a kind of language of God. This article posits that Edwards' typological language of nature, encapsulated in his notebook "Images of Divine Things" and throughout his written corpus, can be explored through the lens of Digital Humanities and network analysis using Processing and Python programming languages. Next, the article summarizes recent Edwards-focused DH projects by Kenneth Minkema, Michał Choiński, and Michael Keller. The article then recounts the history and development of the *Visual Edwards* project and how it expands exploration of the 26 volume Yale letterpress edition of *The Works of Jonathan Edwards*. Features of the *Visual Edwards* software are introduced briefly, as well as print publications flowing from the project.

**Keywords:** Jonathan Edwards, typology, nature, theology, network analysis, Processing programming language, Python programming language, Digital Humanities, Visual Edwards software, Visual Edwards Library

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Jonathan Edwards (1703–1758) was a colonial Congregational minister and theologian in Northampton, Massachusetts who is most famous for his leadership in the religious revivals of Colonial America commonly known as the First Great Awakening. Though he is mainly remembered for sermons such as "Sinners in the Hands of an Angry God," Edwards produced a mountainous range of theological discourses, miscellanies, and treatises on topics such as religious experience, free will, redemption history, ethics, and original sin. Along with his writings on theological themes, Edwards fully engaged the Enlightenment and the challenges of deism. One of Edwards's most fascinating productions from this engagement is his notebook of types and emblems, "Images of Divine Things" (Edwards et al. 1993, 48–142).

Edwards, the eighteenth century American philosopher theologian, believed that God created the world for human reflection and contemplation, "to instruct intelligent beings in things pertaining to himself." ("Images," no. 57) In a sermon on Matthew 13:23, "Profitable Hearers of the Word," Edwards notes that the reason Scripture often teaches through allegories, parables, and types is

that we might have some exercise for our understandings to find out the truth contained in them. Our understandings were given us to be used, and above all to be exercised, in divine things. Therefore God teaches us in such a way that we shall have some exercise of meditation and study. God gives us the gold, but he gives it to us in a mine that we might dig for it and get in a way of our own industry...and that makes it precious...This is not only God's method in Scripture, but his method in nature also. The works of God are hard to be understood, that they might be "sought out of all them that have pleasure in them" (Psalms 111:2) (Edwards and Kenneth P. Minkema 246–47).

Edwards and many others have observed that Christ connects spiritual truths to things commonly seen and experienced in nature and everyday life—He infuses a divine luminescence into ordinary things and activities. In the spiritual autobiography *Surprised by Joy*, C.S. Lewis described his own spiritual awakening in a similar way—as a bright shadow “transforming all common things and yet itself unchanged. Or, more accurately, I saw the common things drawn into the bright shadow” (Lewis 100). Lewis described the experience as a baptism of his imagination. A spiritual baptism of the imagination that awakens the heart to “shadows of divine things” is exactly what Jonathan Edwards offers twenty-first century believers.

Edwards believes that it should come as no surprise that God takes delight in using the created order to teach humans spiritual things, “representing divine things by his works” (“Images,” no. 57). God has made the world in such a way that it rhymes with Scripture. This truth was widely accepted in Puritan spirituality (Hambrick-Stowe 163–64). This essay briefly proposes the continued relevance of exploring Edwards’ emblematic world that rhymes with Scripture and how a researcher might approach this challenge from a Digital Humanities perspective.

### Edwards the Creative

Edwards was a theologian who was aware of his own singularity and creative vision:

I expect by very ridicule and contempt to be called a man of a very fruitful brain and copious fancy, but they are welcome to it. I am not ashamed to own that I believe that the whole universe, heaven and earth, air and seas, and the divine constitution and history of the holy Scriptures, be full of images of divine things, as full as a language is of words; and that the multitude of those things that I have mentioned are but a very small part of what is really intended to be signified and typified by these things: but that there is room for persons to be learning more and more of this language and seeing more of that which is declared in it to the end of the world without discovering all (Edwards, et al. 152).

Edwards’ reading reveals extensive interdisciplinary interests and pursuits (Edwards and Thuesen 17). Under the heading “Books to be enquired for,” he lists several broad subject areas (nos. 229–39), including “the best Geography,” “the best history of the world,” “the best exposition of the Apoca[lypse]” (the book of Revelation), “[those] Which are the most usefull & necessary of the Fathers,” “the best Chronology,” “the best historical Dictionary of the Nature of Bayle’s Dictionary,” “the best that treats of the Cabbalistical learning of the Jews,” (Edwards and Thuesen 17) as well as interests in science and mathematics (Edwards and Thuesen 93–96). The final entry in the “Catalogue” included a treatise on geometry by a French Jesuit — “For Edwards, every mathematical theorem or scientific discovery revealed God’ providential design” (Edwards and Thuesen 94). Were he in the 21st century, Edwards could be categorized as an interdisciplinary creative—a creative Evangelical theologian.

Eighteenth century Edwards’ “best of” list was quite ambitious. But what would a 21st century Edwards add to his “best of” list in a digital world? Best software, computer languages, PC or Mac, iOS or Android, etc.? Not one to retreat, Edwards the

interdisciplinary would almost certainly embrace the Digital Humanities. Broadly speaking, Digital Humanities is an academic field concerned with the application of computational tools and methods to traditional humanities disciplines such as literature, history, and philosophy. Many of these tools enable management and analysis of large textual projects, such as his “Miscellanies” and other notebooks.

### A World of Connections

The strategies and goals of Edwards, especially in his world view and creation theology, align with the strategies and goals of Digital Humanities: the discovery of context, connection, harmony, symmetry, communication, and networks of meaning. In his notebook “Images of Divine Things,” entry nos. 8 and 59 reveal Edwards clearly describing a network of correspondences in the system of the created order.

Again, it is apparent and allowed that there is a great and remarkable analogy in God’s works. There is a wonderful resemblance in the effects which God produces, and consentaneity in his manner of working in one thing and another, throughout all nature. It is very observable in the visible world. Therefore ‘tis allowed that God does purposely make and order one thing to be in an agreeableness and harmony with another. And if so, why should not we suppose that he makes the inferior in imitation of the superior, the material of the spiritual, on purpose to have a resemblance and shadow of them? We see that even in the material world God makes one part of it strangely to agree with another; and why is it not reasonable to suppose he makes the whole as a shadow of the spiritual world (“Images,” no.8)

If there be such an admirable analogy observed by the Creator in his works throughout the whole system of the natural world, so that one thing seems to be made in imitation of another, and especially the less perfect to be made in imitation of the more perfect, so that the less perfect is as it were a figure or image of the more perfect— so beasts are made in imitation of men, plants are [a] kind of types of animals, minerals are in many things in imitation of plants why is it not rational to suppose that the corporeal and visible world should be designedly made and constituted in analogy to the more spiritual, noble and real world? ‘Tis certainly agreeable to what is apparently the method of God’s working (“Images,” no. 59).

Entries like these, combined with his intricate indexes and tables, reveal that Edwards was working on a solution to a very large network problem. Jonathan Edwards, were he a 21st century creative, would tackle such a problem with the very best tools available—programmatically solutions for complex network analysis—tools that would allow one to recognize, construct, visualize, analyze, and interpret. Edwards, with his perception of the language of God in creation, would be drawn to computer languages like Python and Processing to work through the symbolic network and visualize semiotic structures in a compelling way. It is quite easy to imagine a present/future Edwards doing this type of work (Eco 217–18).<sup>1</sup>

1 Eco notes that Descartes contemplated the possibility of solving linguistic problems in an algebraic fashion. This mathematical approach is similar to a programmatic solution to 21st century

## Edwards' Curious Little Book

Edwards kept a notebook...“Images of Divine Things.” Though “Images of Divine Things” is what Edwards finally decided to name the notebook, he had considered other titles—“Shadows of Divine Things,” “The Book of Nature and Providences,” and “The Language and Lessons of Nature.” (Edwards et al. 34–35) “Images” was a long term project of Edwards, beginning early in his pastorate at Northampton around September or October of 1728 and ending shortly before he assumed the presidency of Princeton in 1758 (Edwards et al. 39, 46).

“Images of Divine Things” contains 212 entries followed by another series of 45 brief entries entitled “Scriptures” which list particular creatures and what they represent. Each of the 45 entries are accompanied by a reference to the scriptural foundation for the association. Following the “Scriptures” series is a “Subject Index” of the creatures featured in “Images” which, in turn, is followed by a “Scripture Index” of the Scripture passages cited in the notebook.

At first appearance, “Images of Divine Things” seems to be a quaint collection—212 entries of things that Edwards observes in both nature and common experience which he thinks might enliven and enforce his sermon points. Yet a closer reading of his writings reveals his true design: a systematic study which has as its central thesis that all of visible creation is designed by God to “represent spiritual things.” (Edwards and Thomas A. Schafer 434)

In “Images,” Edwards manifests his recognition of a deep relationship between nature and Scripture. The tables and indexes of both Scriptures and subjects which he appends to the notebook reveal his systematic thought. This small notebook is a portal to a world of theological complexity which cannot be charted or mapped with simple tree diagrams and one-to-one correspondences. The complex connections between doctrine, Scripture, nature, and each entry cannot be captured on pen and paper. It is simply too much data. Hence the need for a new approach, not only a complex network solution to Edwards’ “Images,” but to his broader work as well.

Extracting scriptural doctrine from nature, as Edwards desired to do, is no small feat. A helpful strategy for examining the theological content of his notebook “Images of Divine Things” is to reorganize and summarize Edwards’ 212 entries according to theological categories—Revelation, God the Creator and Father, God the Son, God the Holy Spirit, Humanity, Church, and Last Things, along with respective subcategories. This arrangement of Edwards’ “Images” according to creational categories and theological themes places his key doctrinal points and doctrinal precision in the clearest light (Edwards and Wilson H. Kimmach 45).<sup>2</sup> Rearranging Edwards notebook is an artful endeavor that, fortunately, does not compromise its integrity and remains in tune with Edwards’ creative precision.

### A Visual Approach

The entire Edwardsean corpus, not only his “Images” notebook, brims with creative genius. The quality of his thought calls for an approach that attempts to answer his

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Edwards would have used to tackle the complex network problem in his “Images” notebook.

2 Wilson Kimmach notes the doctrinal precision of Edwards’ “Images”.

genius as a creative Evangelical theologian. This approach would extend beyond his emblematic world view to the whole printed corpus. A universe of complexity and wonder exists in the visualized interrelations of his miscellanies, sermons, treatises, various notebooks, and letters.

A rationale for a visual approach to Edwards might be helped by a brief history of typography. Edwards' works were initially printed with press technology not far removed from Gutenberg's of the fifteenth century, which used individual letters cast from lead. Developments in the nineteenth century witnessed the advent of automated typesetting machines. The latter twentieth century gave rise to personal computers and the Internet which began to displace paper with screens and hypertext. Following this digital revolution, digital fonts were born. Type was no longer produced through physical means. Instead, mathematical descriptions defined each character's outline. Today is a day of typographic experimentation—digital typefaces are sophisticated software and old physical limitations no longer apply. Fonts can now contain advanced algorithms which automatically change size and shape depending on their context and even respond to the rhythm and tempo in which they are typed (Reas and Fry 149).

The advances which precipitated the revolution in typography are now occurring, in a similar way, in our ability to read and understand large bodies of text. The digital age enabled the creation of fonts with unlimited scalability and flexibility. The unlimited computational attributes of a small individual letter or point of punctuation also extends to a large corpus...including the writings of Edwards. A *Visual Edwards* project grants a new view of America's theologian. *Visual Edwards* is, as it were, an advanced computational material which can be stretched, bent, and zoomed to direct the scholar to areas of interest. As a cartographic tool, it grants the reader a new visual access to Edwards in his own words. The computer is both an artistic tool and canvas. If it can be imagined, it can be created. It is a medium uniquely suited to visually explore the thought of Jonathan Edwards'.

### Why Visualize Edwards?

There are a number of benefits to visualizing Edwards. First, visualizations can reduce the cognitive load of the researcher—a greater amount of information can be communicated in a detailed graph more quickly than having to scan through thousands of lines of Edwards' text. Yet, at the same time, the visual maps direct the user to read Edwards. These maps reveal the presence of unseen seismic structures in Edwards' writings and direct the user where to, as it were, "drill for oil" or "mine for gold." This is especially helpful for new students of Edwards who desire direct contact with his writings.

Second, visualizations of Edwards' writings are beautiful confluences of theology, technology, and art. The colors and connections guide the eye, and in a blink the reader can assess the content. This can be described as "Edwards at a glance." New contexts and details are revealed in visualizations which are both aesthetic and accurate.

Visualizing Edwards is not entirely new. Wilson Kimnach's conceptual diagram in volume 10 of *The Works of Jonathan Edwards* illustrates the intertextuality of Edwards' notebooks and sermons, reflecting the formidable intellectual and spiritual effort Edwards famously exerted in his study for up to 13 hours a day (Edwards and

Wilson H. Kinnach 90). The complex and aesthetically profound nature of Edwards' writings beg for a visual exegesis that is exhaustive, vibrant, and tactile. The interrelated character of Edwards' thought births a desire to visualize the beautiful complexity within his writings.

The marriage of Edwards studies and Digital Humanities can be credited largely to the Jonathan Edwards Center at Yale University. Under the direction of Kenneth P. Minkema, *The Works of Jonathan Edwards Online* was created. Though the Yale letterpress series of Edwards' works numbers an impressive 26 volumes, *The Works of Jonathan Edwards Online* adds another 47 volumes of primary texts comprised of sermons, notebooks, essays, letters, and more. "*The Works of Jonathan Edwards Online* is a digital learning environment for research, education, and publication that presents all of Edwards's writings in a critical edition, along with helpful editorial materials to allow the reader to examine Edwards's thoughts in incredibly powerful, useful ways."<sup>3</sup> *The Works of Jonathan Edwards Online* has been hailed as an unrivaled digital resource and singular monument to America's Theologian. The digital research environment provides the possibility of researching Edwards in new ways and inspires experimentation with new tools.

The research of Michał Choiński and Michael Keller are two notable instances of scholarship utilizing the new tools of Digital Humanities to research questions that were out of reach in a pre-digital age. Choiński's decade long study of the language of colonial revivalism issued in his book, *The Rhetoric of Revival* examines the powerful impact of the Great Awakening preachers upon their hearers (Choiński 2016). With a digital tools Choiński and his fellow colleague, Jan Rybicki, pursued this figurative complexity of Edwards' vast sermon corpus, and also analysed with stylometry the author/editor relationship between Edwards and his literary agent, Thomas Foxcroft.<sup>4</sup> In his doctoral research, Micheal Keller demonstrated through quantitative data analysis the development of Edwards' rhetorical principles in his sermon corpus. Keller revealed Edwards' use of logic, emotion, with an emphasis on imagery to make Scripture experiential and excite his hearers toward a religious experience (Keller 2018).

*Visual Edwards* adds to these studies of Edwards' corpus by enabling a creative exploration of the letterpress edition of *The Works of Jonathan Edwards*. The project aims to assist students and scholars in their study of Edwards. The project's goal is cartographic in nature. A *Visual Edwards* provides a distant or meta-reading which displays shapes, contours, and conjunctions within his writings, while, at the same time, providing the reader with immediate reference to his text with exact page locations in volumes 1–26 of the Yale edition of his *Works*. The aim of the *Visual Edwards* is to visually unlock Edwards' writings, map intricate connections in his thought through an interface navigable by touchscreen, mouse, and keyboard. Users are able to create beautiful and accurate visualizations of Edwards to enhance their research interests.

3 <https://dhlab.yale.edu/projects/edwards.html>

4 <https://computationalstylistics.github.io/projects/edwards/>

## Screenshot of *Visual Edwards* viewer displaying a network graph of theological connections in Edwards' notebook "Images of Divine Things"

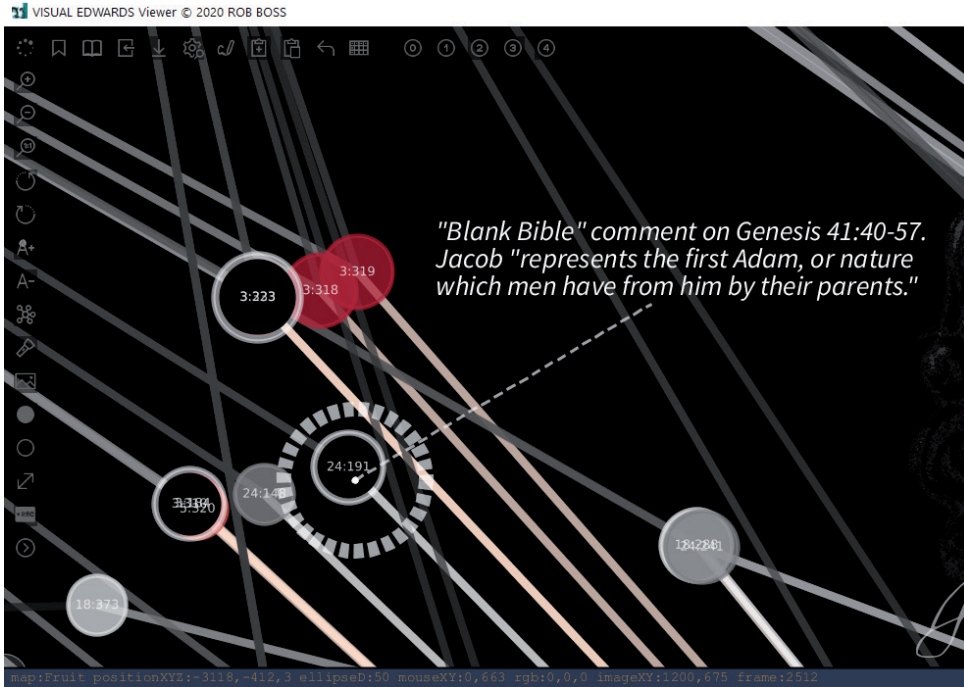


### Project History

The *Visual Edwards* project was conceived as an idea sometime in 2007 as I was contemplating the possibility of visualizing the natural typology of Jonathan Edwards, specifically his notebook "Images of Divine Things." After experimenting with various strategies in an attempt to outline the connections in his typology, I found that a simple hierarchical outline or tree map was incapable of capturing the complexity of his system. Progress was made once I started thinking of his "Images" notebook as a complex network of data. The task before me at that point was to create structured data which could be queried in such a way to produce theological visualizations which reflected the connections in Edwards' natural typology. After this was accomplished, a fellow Edwardsean, Mark Hamilton, challenged me to create a similar system to visualize the connections in Edwards' "Miscellanies." I was able to envision and build a new data structure that would enable one to visualize the web of connections in the "Miscellanies." Eventually, the data structure was modified and extended to include all of *The Works of Jonathan Edwards*, volumes 1–26 print edition.

By the time I had satisfactorily completed the foundational dataset for the *Visual Edwards* project, there was no easy way to share it with others. The next phase of the project moved beyond the creation of static visualizations to the development of software which would be able to manipulate the images. The first step involved creating a viewer written in the Processing programming language. This viewer enabled the user to load visualizations with document images, zoom and pan, record motion, attach notes, create slides and PDF files, create sticky note diagrams, and more. Creation of the viewer was a big step towards making *Visual Edwards* available to others who might be interested.

Screenshot of *Visual Edwards* viewer zoomed in on a visualization with an annotation

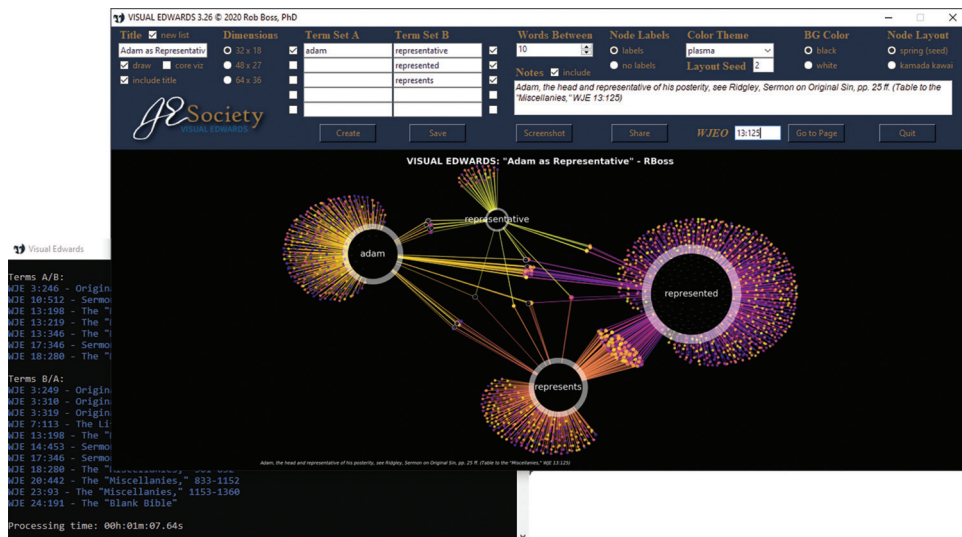


There were still limitations and challenges: chiefly, the software was a primarily viewer; it did not directly manipulate the dataset or create the visualizations. Data creation and manipulation was accomplished through the use of external software. There was a technical gulf between the creation and viewing of *Visual Edwards*. This was less than satisfactory because that placed me in the position of sole creator of visualizations. The ideal situation would be one where the users could construct their own queries and create their own visualizations. This technical gulf was bridged with graph building software I developed in the Python language. With a push-button-easy interface, the *Visual Edwards* builder software enables the user to create a visualization based on query terms, simple phraseology parameters, select highlight points, visual layout and color scheme, and more. The visualizations can then be easily edited with external bitmap or vector editors, or imported directly into the viewer with a simple button click.

The *Visual Edwards* builder and viewer work together to enable users to create an unlimited number of visualizations based upon the Yale letterpress edition of Edwards' works. New shapes and contours of Edwards' writings are brought into view. The *Visual Edwards* software enables users to explore Edwards in a new way, at the page and phrase level, and exports files in a variety of formats suitable for presentation, video production, and more.



## Screenshot of *Visual Edwards* builder displaying network visualization of “Adam as Representative”



The *Visual Edwards Library* is an online resource with a growing number of visualizations created with *Visual Edwards* software. Users of the Windows software have the option of instantly publishing their maps of *The Works of Jonathan Edwards*, volumes 1-26 in the online *Library*. Each downloadable PDF file is accompanied by a text transcript of the terms and settings used to generate the visualization. Highlighted reference nodes in the visualizations identify locations of phrases or terms in close proximity to each other. The term lists are combined into a matrix which locates both forward and reverse occurrences of Edwards’ words in all combinations.

The *Visual Edwards* project is not only digital, but print also. In December of 2018, an international body of Edwards scholars contributed to *The Miscellanies Companion*, the first print publication of the *Visual Edwards* project.<sup>5</sup> The essays in this initial volume canvas a wide range of topics contained in Edwards’ “Miscellanies,” including Trinitarianism, Millennialism, Reason and Revelation, Evangelism, Happiness, Salvation, and more. The foreword to this volume was contributed by Douglas A. Sweeney, noted Edwards scholar and editor of volume 23 of Yale’s *The Works of Jonathan Edwards*. Work on *The Miscellanies Companion, Volume 2* is underway with a foreword by Kenneth P. Minkema, Executive Director of the Jonathan Edwards Center at Yale University.<sup>6</sup>

### Theology, Technology, and Art

Visual Edwards is an active project developing at the intersection of technology, theology, and art—a foray into the media-driven, tech environment of the twenty-

5 <https://www.jesociety.org/the-miscellanies-companion/>

6 <https://www.jesociety.org/call-for-papers-the-miscellanies-companion-volume-2/>

first century. Edwards' sophisticated and image-rich theology is a perfect match for today's digital culture. Visualizing Jonathan Edwards is a Himalayan task, seemingly without end. To echo Edwards' sentiment in "Types," "there is room for persons to be learning more and more...to the end of the world without discovering all" (Edwards et al. 1993, 152).

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