

THE EVOLUTION OF ASCII ART IN THE AGE OF COMPUTERS

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Abstract. *The art was a milestone in the raising of intellectual individuals. This is where the willingness of creating beautiful drawings appeared. With the beginning of the computer era a lot of branches in art have slightly changed, some of them had a great improvement and even new branches of art have appeared. In the case of ASCII Art, a great improvement. The concept remained the same, it was used to represent graphical images, figures by the use of characters as the unit. Despite the fact that ASCII Art has found its use more with the appearance of the computers its history begins long time ago, when there wasn't such a thing as text.*

Key words: *evolution, ASCII, art, computers, history, images, characters, style.*

Introduction

A long time ago, when computers weren't a thing, even before the common understanding of the *text*, there was Ancient Egypt's hieroglyphic writing. The same approach was used in other ages, and over time the concept was evolving. In the era of computers, it became a great instrument in the hands of professionals. They used this concept to create and represent graphical figures, because old computers couldn't render images, only text, and mainly the information was stored as text. To use a computer back in the day, you had to use a programming language. Thus, the use of characters as lines, and dots for graphical representation, came in handy for modeling an electrical circuit, a map, or something similar on paper.

What is ASCII Art?

ASCII art is a computer-based visual concept that comprises of visuals created from characters (95 printable out of 128) specified by the ASCII Standard in 1963, as well as ASCII compatible character sets containing proprietary extra characters (beyond the 128 characters of standard 7-bit ASCII). The word is sometimes applied broadly to all types of text-based visual art. ASCII art is easily created in any text editor and is commonly utilized in free-form languages. Most ASCII art requires a fixed-width font, such as Courier, for display (usually for these purposes the monospaced fonts).

Basic text characters are used to produce ASCII art and other *keyboard* art. Long ago, there was no such thing as *text* in the written word. The first written documents, ironically, were made out of drawings that represented thoughts and things rather than letters or text characters. With time, the writing evolved into symbols that resembled modern-day writing. Perhaps the first text art images were handmade. Ornamental handwriting was employed to make stunning papers and images. The monastery monks made stunning manuscripts that blended text letters into their work. However, there were only a few more pieces of art constructed using text characters.

The picture in figure 1 represents hieroglyphics on a tomb in the Valley of the Kings in Luxor, Egypt, while a fragment from the Illuminated Manuscript is revealed in figure 2.



Figure 1. Ancient Egypt's hieroglyphic writing. [1]



Figure 2. Illuminated Manuscript, Cathedral Canterbury, England, UK ca. 1917-1996. [2]

Individuals continued to hand-create word art graphics. *Gwang Hyuk Lee*, a particularly successful Korean, created a hand-drawn text graphic picturing Jesus during the Korean War (around 1950). To produce this multi-colored artwork, he used the full text from the Bible's *Book of John*. According to rumors, he was assassinated by North Korean communists for making this

16" by 20" painting. This piece of art is stunning, and it was made totally by hand. When automated methods for creating text were developed, people were freed of writer's cramp. The Chinese are widely acknowledged as the creators of the stamp/ink printing method (2nd Century AD) and the movable-type printing technology (11th Century AD).

Johannes Gutenberg (together with businessmen Johann Fust and calligrapher Peter Schoeffer) did not create the printing press in Germany until 1450. It was designed after a wine press and could produce 300 pages per day. As a result, books were created faster and for less money. It's possible that the art of typography will begin. Lewis Carroll's *Alice in Wonderland*, published in 1865, is a good example of typography. It can be considered as one of the first printed text art creations.

Since 1867, humans have utilized typewriters to create works of art in addition to printing documents. Typewriter manufacturers and secretarial agencies held public speed typing competitions in the 1890s. Competitions for typewriter drawings were also held. Flora Stacey created the oldest example of typewriter art, which was saved in 1898. Flora Stacey was presumably a secretary, according to what is known about her [2]. Pitman's *Phonetic Journal* published a framed photograph of a butterfly in its October 15th, 1898 issue. Figure 3 is showing the butterfly created by Stacey.

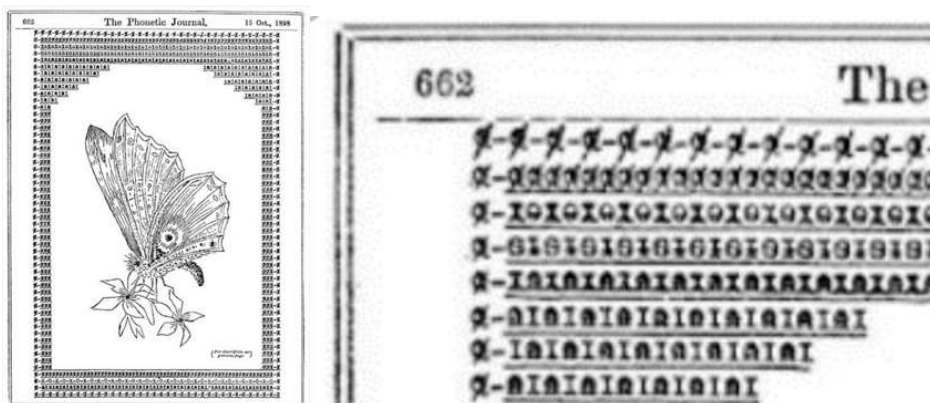


Figure 3. Flora Stacey butterfly [3]. Fragment of Figure 3

The brilliance of an old concept in a new environment

Ken Knowlton created the ASCII coding scheme in order to standardize how computers display letters, numbers, punctuation marks, and some control codes. He also popularized the backslash and escape keys in the computer industry, and he was among the first to warn about the hazards of the millennium bug.

ASCII was created from telegraph code. Wherever text can be printed or transferred more easily than visuals, or if the transmission of pictures is not feasible, ASCII art is utilized. This covers typewriters, teleprinters, non-graphic computer terminals, printer separators, email, and Usenet news bulletins in early computer networking. ASCII was first used commercially in 1963 as a seven-bit teleprinter code for the TWX network of the American Telephone and Telegraph Company. TWX was the first to employ the five-bit ITA2, which was also used by the Telex teleprinter system. The escape sequence, for example, was introduced by Bob Bemer. Hugh McGregor Ross, a British colleague, was instrumental in popularizing this. Bemer has been dubbed "*the father of ASCII*" [4] for his substantial work on the standard.

President Lyndon B. Johnson mandated that all computers purchased by the US Federal Government support ASCII on March 11, 1968, stating, "*I have also approved recommendations of Secretary of Commerce Luther H. Hodges regarding standards for recording the Standard Code for Information Interchange on magnetic tapes and paper tapes when they are used in computer operations*" [5].

All computers and related hardware configurations brought into the Federal Government inventory on or after July 1, 1969, should be able to use the Standard Code for Information Interchange and the layouts prescribed by the magnetic tape and paper tape standards when the magnetic tape and paper tape standards are used.

Style of ASCII Art

Newskool is a popular ASCII graphics style that makes use of character strings such as "\$#Xxo.". Despite its name, the style is not *new*; in fact, it is rather ancient and has since been supplanted by *Oldskool* and *Block* style ASCII art. When it resurfaced and regained popularity at the end of the 1990s, it was nicknamed *Newskool* [6].

As a result of the introduction of expanded proprietary characters, *Newskool* underwent substantial changes. Although the basic 7-bit standard ASCII characters are still widely utilized, the extended characters are frequently employed for *fine tuning* and *tweaking*. After the introduction and adoption of Unicode, the style evolved even further. Another view on the ASCII conversion is by the use of the *Block* style, which uses the combination of `█`, `▣`, `▢`, `▣` in order to process the image [7].

Other tools enable you to transform an image to text characters automatically, which is a subset of vector quantization. One approach is to sample the image to grayscale with less than 8-bit accuracy and then assign a character to each value. Such ASCII art converters frequently allow users to customize the image's intensity and contrast. Usually, for grey scaling a picture from black to white,

with 10 levels of grey, the following string of characters is used “.:-+*#%@" which is a slice from the original string with the length of 69 characters long.

There are three factors that describe the type of the conversion:

- depth (options include decreased line spacing, a strong style, block components, a colorful backdrop);
- sharpness (solutions: a longer text, with a smaller font; a greater set of characters; variable width fonts);
- proportion (solutions with compatibility issues: font with a square grid; stylized without extra line spacing).

Examples of converted images are given in figures 4 and 5.



Figure 4. Original Image. [8]

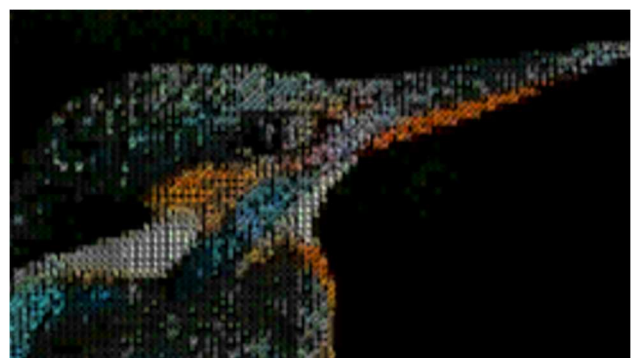


Figure 5. Converted image to ASCII Art.

For converting the original image was used a program written in Python to read in the image, access its underlying data, create and modify it. The result can be presented in two formats: colour, black-and-white.



**Figure 6. Converted image to ASCII Art.
Colour variant.**



Fragment of figure 6.

Animated ASCII graphics began in 1980 with the creation of so-called VT100 animations on VT100 terminals. These animations were merely text with cursor movement instructions, with the characters required to seem animated being deleted and erased. They usually reflected a protracted, painstakingly produced procedure by a single individual to communicate a tale.

A modern web browser has resurrected animated ASCII graphics. Animated ASCII art may now be shown using JavaScript or Java applets. The animation is created by loading and displaying static ASCII art pictures one after another [9], similar to how movie projectors unreel film reels and present individual pictures on the huge screen at movie theaters.

Many tools and applications exist currently that can convert raster pictures into text symbols; some of these technologies can even work with live video.

Examples of converted videos are presented in a video which can be seen by scanning the QR code below:



Figure 7. "ASCII and Pixel Art"

Conclusion

The beauty of Art shapes sharp minds from the early ages of our existence, and as an artist is using the colours of his palette, an ASCII Art artist is using characters to shape and give another meaning and perspective to the text. Hopefully, by presenting all information about the past of ASCII we achieved the goal of emphasizing the beauty of this branch of Art, born in the century way, before the appearance of computers, that had a big improvement in the later centuries.

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