A Method to Describe Arabic Digital Typography Design, from Traditional Arabic Calligraphy Resources: The Dome of the Rock's Calligraphy Case Study

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Abstract

The evolution of traditional Arabic calligraphy, a fundamental element of Islamic art, has been influenced by contemporary advancements and the digitization of fonts, resulting in a departure from its original essence. Traditional Arabic calligraphy necessitates the expertise of highly skilled calligraphers who are well-versed in its artistic and technical aspects. This study investigates the proportions of Arabic calligraphy and endeavours to employ the geometry used in Islamic art and architecture to fabricate digital Arabic typographic letters. This research aims to advance the development of digital Arabic typography via the utilization of octagonal geometric patterns, inspired by the Kufic script located in the inner octagon of the Dome of the Rock in Jerusalem. The primary objective concerns the employment of geometry to create digital Arabic typefaces which preserve the proportions of traditional letters while adapting them for various applications such as printed designs, paragraph texts, and titles across a diversity of computer programs. By adopting geometric analysis methods, this research investigates the congruence between the architectural geometry of the octagonal shape and the geometric structure inherent in traditional Arabic calligraphy. Additionally, this research intends to assess the feasibility of applying these proportions to construct digital Arabic typographic letters which are derived from the octagonal systemic geometry found in the Dome of the Rock in Jerusalem.

Relevance to Design Practice

This study utilizes the octagonal geometric pattern exhibited in the Dome of the Rock to combine traditional Arabic calligraphy with digital typography. By overcoming the challenges of digitalization, it preserves the essence of calligraphy and showcases the potential for authentic digital Arabic typefaces. The primary objective is to foster culturally relevant Arabic typography in various computer programs and advance calligraphy's evolution in the digital age.

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Introduction

Arabic calligraphy, a time-honoured art form deeply rooted in Arabic history and culture, maintains a significant place as an essential aesthetic element. It graces the monuments of Islamic civilization, embodying the words of Plato: "Calligraphy extends the senses and unveils the desires of the soul" (Ahmad, 2001). Acting as an unyielding pillar in visual communication, (Abu Hasna, 2021). Arabic calligraphy plays a vital role in the transmission and documentation of knowledge and science, therefore, its preservation and development in line with the demands of visual communication are imperative (Mohamed, 2013).

From its inception, Arabic letterpress printing has encountered numerous challenges including the accurate reproduction of handwritten Arabic script. Consequently, designs that adhered to the technical limitations of print technology failed to enthral audiences to the same extent as the exquisite forms of handwritten Arabic calligraphy. By its very nature, Arabic calligraphy exudes immense flexibility which is harnessed by calligraphers and artists to transform it into masterpieces. The spacing between Arabic letters follows precise coordination rules that govern design planning (Hisham, 2018; Kaoudja, Kherfi & Khaldi. 2021).

The advent of the technological revolution disrupted the domain of traditional Arabic calligraphy, which had long enjoyed its sanctity and esteemed status. The ubiquity of computers has made them an indispensable tool across various domains where Arabic calligraphy is employed; however, this modernisation positioned technology as the perceived adversary of Arabic calligraphy, with some fearing its extinction. Modern technical innovations have played a tangible role in diluting the essence of Arabic calligraphy, distancing it from its ancient classical character and presenting a new, contemporary image that may not be universally accepted (Mansour and Hassan, 2020). The artistry and creative expressions of Arabic calligraphy can only flourish under the guidance of skilled practitioners well-versed in the craft's intricacies, including letter shapes, lengths, and the principles of elongation and obliteration (Marzouki, 2016).

Companies and institutions have undertaken efforts to enhance and refine the techniques and tools used in digital Arabic calligraphy design to achieve greater accuracy and compatibility with the diverse range of contemporary digital devices. Traditional Arabic fonts encompass numerous forms and sub-lines which presents challenges when attempting to faithfully render them in digital typography. Technology's influence on digital Arabic calligraphy is manifested in two distinct ways: it provides new opportunities for creativity and artistic expression while simultaneously presenting technical impediments that demand greater effort to enhance and develop the tools and programs used. These advancements aid in adhering to the rules of Arabic calligraphy, striking a balance between aesthetics, readability, and clarity in reading (Hisham, 2018).

Therefore, this study addresses the development of digital Arabic fonts derived from traditional Arabic calligraphy while highlighting the potential threat digitization poses to its authenticity. Via the implementation of geometric principles (specifically the octagonal form), this study aims to create Arabic typographic fonts influenced by Kufic script. The research conducts a comprehensive review of contemporary literature concerning traditional Arabic calligraphy proportions and the geometric characteristics of Arabic letters.

It establishes the research methodology, drawing inspiration from the architectural features of the Dome of the Rock, and elucidates the process of generating guidelines for digital font

creation while emphasizing the utilization of geometry for octagonal shapes. Furthermore, the study meticulously outlines the process of designing digital Arabic letters inspired by Kufic script and showcases the integration of geometry into digital Arabic fonts.

Literature Review: The Rules of Traditional Arabic Calligraphy

The underlying concepts of Arabic calligraphy were explored by Muhammad Al-Rawandi in his book Rahat Al-Sudour wa Ayat Al-Surour (2005) which explores the process of deriving Arabic letters from the unit of the circle and its diameter.

In the chapter entitled Knowing the Calligraphy from the Circle and the Dots, he commences with the letter alif and concludes with the letter yaa. (Figure 1)
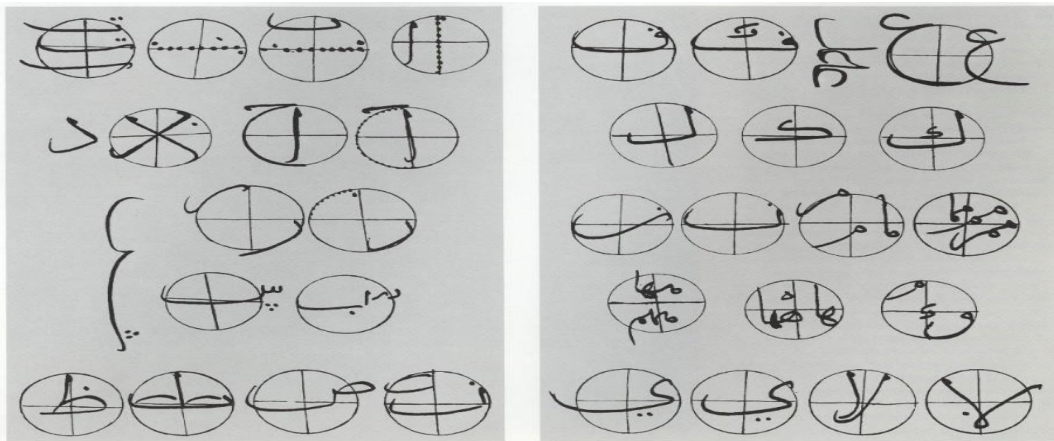

Figure 1: Diagram Demonstrating the Derivation of Cursive Arabic Letters from the Module of the Circle and Its Diameter Subdivided by Dots - From Rahat Al-Sudur Wa Ayat Al-surour (Necipoğlu,1996; Rafiq, 2017)

In a study entitled Mathematical Concepts in Arabic Calligraphy: The Proportions of the Alif conducted at the German University in Jordan, Yaghan (2020) presents mathematical expressions for the numerical proportions of the letter Alif - أ - and discusses its visual application when connecting letters to Alif. Drawing from Ibn Muqla's literature, the researcher derives all other letters from Alif and a circle with a diameter of a thousand while the lengths of the parts are determined by the straight lines employed in other letters and half and quarter circles mark the curved parts. Figure 2 illustrates several potential visual interpretations of the textual theory presented by Yaghan (2020).
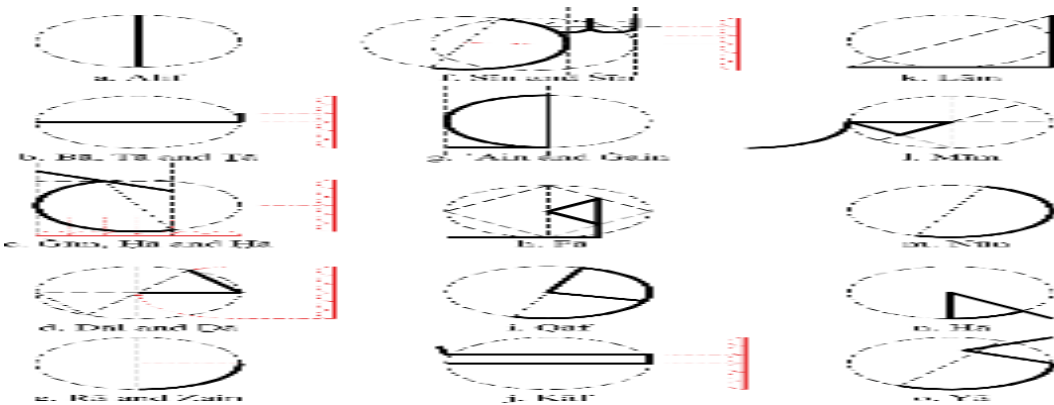
Figure 2: The Derivation of Arabic Letters from the Letter Alif and the Circle (Yaghan, 2020).

Arabic calligraphy is characterised by a foundation rooted in scientific principles. It begins with the measurement point, which functions as the basis for drawing, and progresses via the use of simple shapes such as the vertical form of the letter Alif and the horizontal shape of the letter Ba - ب, which act as design units (Al-Bahnasi, 1955). The point itself represents the essence of the letter, while linear formations incorporate

fundamental shapes such as squares, triangles, and circles. The circle, acting as a boundary, encompasses the point and signifies visual, moral, and acoustic balance (AbdulAziz, 2001; Hassan, 2001).

Arabic calligraphy scholars, from both a linguistic and artistic perspective, attribute an engineering and philosophical origin to the various forms of calligraphic letters and their depictions. They perceive these forms as being derived from two geometric lines without a third element: the straight line, which corresponds to the diameter of the circle, and the curved line, which corresponds to its circumference.

Calligraphers consider that the composition of Arabic letters and their depictions can be attributed to abstract geometric linear elements related to the character and nature of these two lines. They identified seven modes to describe these elements, assigning them specific terms that reflect the strength of Arabic calligraphy. These modes include Intisab - منتصب (upright or vertical line); Tasteeh - التسطيح (flat); Inkibab (monkab) - الانكباب ; Istelleqaa - الاستلقاء (lying down); Inhenah - الانحناء (curved); Istedarah - الاستدراة (round); and Taqwees - التقويس (arc) (Figure 3). These modes, when combined, create various letter shapes, either through a single line or a composite arrangement of two or more geometric lines. It is likely that these modes draw inspiration from the postures of the human body in motion and at rest (Al-Hanash, 2008).

عرقة	ب	Araqa a final part of a group of individual arabic letters written in a cup shape
مبسوط	سـ	Extended
منسطح	←	Horizontal line
منكب	\	Line descending diagonally to the left
منتصب	↑	Upright or vertical line
مقوس	∪	Curved line
مستلق	/	Line descending diagonally to the right
قائم	↑	Upright or vertical line

Figure 3: Modes of Arabic Letters and their Images (Alameddine, 2023).

Ibn Muqla, who established the geometrical proportion of Arabic calligraphy in early 900 CE, introduced the concept of the writing point (either a square or a specific-shaped dash created by moving the pen downwards) as a fundamental unit of measurement in line geometry (Vatankhah, 2021). As an example, the length of an *Alif* was determined to be eight points, with the circle's diameter representing the rounded shape of letters such as mournful and nun, which matched the length of the *Alif*. Shawqi (1992) and Al-Qalqashandi (1922) summarized

Muqla's teachings regarding the geometric shapes of Arabic letters by categorising them into three groups as follows:

In the first category are the letters that are written above the line and extend vertically: *Alif-أ, Ta - ط, Kaf - ك, and Lam - لا*.

- Alif- أ: It consists of a straight vertical line (*Montaseb*) maintaining an upright position and not inclined to lay down or prostrate.
- Ta'a - ط، ظ : It is formed by three lines (*Montaseb*) - one erect, one curved, and one flat.
- Kaf - ك : It is composed of four lines (*Monkab, Monsateh, Montaseb and Monsateh*) - one bent, one flat, one erect, and another flat.
- Lam - لا : It is made up of two straight and flat lines. (*Monsateh and Montaseb*)

In the second category, are letters that lie on the writing line and extend horizontally: *Ba'a- ب , Ta'a - ت, Dal - د, Dhal - ذ and Ha - هـ*.

- Ba'a - ب : It is formed by two straight and flat lines (*Monsateh and Montaseb*), with a ratio equal to that of the Alif.
- Dal - د، ذ: It consists of two lines (*Monkab, Monsateh*) - one bent and one flat, their combined length being equivalent to one thousand.
- Ha - ـهـ : It is composed of three lines (*Monkab, Montaseb and Moqawas*) - one bent, one erect, and one curved. To ensure its validity, it should be shaped as a square, where the two upper angles are equal to the two lower angles.

The third category consists of letters that extend to the bottom of the line of writing. These letters include Ha - ح , Jim - ج , kha - خ , Ra - ر , Zin - ز , Sin - س , Shin - ش , Qaf - ق , Fa ف , Sad- ص , Dha - ض , Ain - ع , Gin - غ , Mim - م , Noon - ن , Waw - و , and Yah - ي .

- The letters Ha - ح , Jim - ج , and kha are formed by two bent lines and a semicircle (Monkab). Its diameter is equal to the width of a thousand.
- Ra - ر , Zin - ز is a combination of a curved line (Moqawas), representing a quarter of a circle with a diameter of a thousand, and at its head is a symbol denoting a year.
- Sin - س , Shin- ش is composed of five lines arranged in an upright (Montaseb, Moqawas, Montaseb, Moqawas and Montaseb), curved, upright, curved, and upright manner.
- Sad- ص , Dha - ض is formed by three lines (Moqawas, Monsateh and Moqawas), curved, flat, and curved.
- Ain - ع , Gin - غ is a composite shape consisting of two curved and flat lines (Moqawas, Monsateh) one of which resembles a semicircle.
- Fa is a compound form made up of four lines that are bent, horizontal, vertical, and flat. (Monkab, Motasaleq, Monsateh and Moqawas) It can also be viewed as a right-angled triangle when connected to its second line.
- Qaf - ق , Fa- ف is composed of three lines: bent, horizontal, and curved. (Monkab, Motasaleq and Moqawas)
- Mim - م is a combination of four lines: bent, horizontal, flat, and curved. (Monkab, Motasaleq, Monsateh and Moqawas)
- Noon- ن is represented by a curved line (Moqawas) that resembles half of a circle and contains a symbol indicating a Sunna.
- The letter Waw- و is formed by three lines (Monkab, Motasaleq and Moqawas): horizontal,

bent, and curved.

- Yah- ي is a compound shape created by three lines (Monkab, Motasaleq and Moqawas): horizontal, bent, and curved.

Theoretical Background

The scrutiny of Arabic calligraphy presents numerous opportunities for the in-depth exploration of Islamic art and provides meaningful insights regarding the cultural and aesthetic components of Islamic civilisation. Geometric analysis has been central to developing an understanding of Islamic architectural heritage and is pivotal in decoding the aesthetic complexities of Arabic calligraphy. Innovative research conducted by Creswell (1924) provided a solid foundation for the analysis of Islamic architectural elements at the Dome of the Rock

and inspired further examination of the geometric patterns and designs prevalent in Islamic calligraphy. Although minbars and muqarnas have been the primary focus of the majority of geometric analyses, Islamic art incorporates numerous visual constituents, such as Arabic calligraphy and adornments, to which geometric scrutiny can be applied.

Meticulous analysis has been conducted regarding the geometric structure of Arabic writing which has unveiled the fastidious patterns employed by the scribes. The employment of geometric analysis methods is crucial to the study of Arabic calligraphy and the development of a profound understanding of Islamic art.

Research conducted by Polosin (1995) and George (2003; 2007; 2021) explored the geometric structures found in Quranic scripts and drew attention to the complex correlations between page layout, Arabic writing, and grids.

One study by Jarrar (2012) analysed Moroccan manuscripts via the employment of geometric analysis and identified a connection between page layout and Arabic writing which often centred around circular motifs. Jahameh (2018) utilised geometric analysis to scrutinize 151 folios from a variety of Islamic dynasties and ascertained the uniform application of square or hexagonal grids for the organisation of graphic elements which suggests the existence of a structured approach designed to aid manuscript writers. Additionally, Jahameh (2018) employed geometric analysis to ascertain the structure and anatomy of Arabic calligraphy. One study noted that a grid was utilised to set the layout and anatomy of the sample text of the Arabic writing on the tombstone and concluded that a design tool (consisting of a square grid and a hexagonal grid) was employed to structure Arabic calligraphy in manuscripts or on stone (Jahameh, 2023)

The geometric analysis of Arabic calligraphy elucidates the structural elegance of Islamic art and intensifies appreciation of the cultural and philosophical foundations underlying its creation. The splendour and vigour of the Islamic civilisation are emphasised by its supportive approach to a variety of art forms, including calligraphy, throughout history (Alshari & Hamid, 2021; Hashem, 2023; Attieh, 2020). The analysis of Arabic calligraphy found on historical artefacts will aid in the creation of digital typography and is an essential part of the process of

its integration into contemporary life (Bouabdallah, 2020)

There have been many recent studies into Arabic typography by researchers such as Elbardawil (2022), Abu-Shaqra (2020), and Al-Rifai (2020); however, most of recent studies in Arabic typography were not focused on an exploration of its geometry and structure from heritage resources and had less understanding in how to study the Arabic calligraphy to design and develop digital Arabic typography.

Methodology

The objective of this study is to create digital Arabic typography which maintains aesthetic appeal, clarity and readability whilst adhering to specific standards. When designing digital Arabic characters, it is crucial to consider the following important criteria, as explained by Mikhael (2017):

Function: The designer must comprehend the intended function of the font design, whether it is for typographical use in texts, titles, or display purposes.

Identity: Defining the desired character and sound of the typography is essential to fulfilling the intended purpose and effectively conveying the intended message.

Structure: Arabic calligraphy follows a specific structural path determined by the writing tool (even in non-linear designs) and the letters' forms are constructed around particular structural systems.

The creation of Arabic calligraphy should adhere to proper design principles, encompassing the balance of mass, space, harmony within the design components, quality of implementation, and correct programming (Salah, Hassan, Siraj, Muhammad & Eid, 2017; Chahine, 2012) Additionally, it is vital to consider the user's cultural design preferences when directing the line. Several conditions need to be considered when shaping the letters including:

- Legibility: Ensuring ease of recognition of individual letters and words.
- Readability: Facilitating the comprehension of the text which is influenced by visual properties such as the spacing between words and letters.
- Appropriateness: Designing letters that are suitable for the intended reader and align with the intended message.
- Reproducibility: Constructing letters that can be accurately produced and reproduced while remaining adaptable to computerized processes.

The Latin typographic font typically relies on five vertical reference points known as Guidelines: the baseline, x-height, ascender, descender, and caps-height. In contrast, digital Arabic calligraphy embraces a more flexible approach, employing a greater number of invisible anchor lines to aid designers in shaping and visually defining their designs (Zoghbi, 2015; Abu-Shaqra, (2020); Janbi, 2016). (Figures 4 and 5) illustrate the following elements:

1. The X-height represents the height of the letter, also known as the "sky." For instance, the teeth of the letter "Ba" or the letter "Sin" can be considered part of the X-height. The design of the letter can incorporate multiple heights, depending on the desired aesthetic.
2. The Ascender extends above the baseline and encompasses the upper portions of letter shapes, as seen in letters like "Alif" and "Lam."
3. The Descender includes the lower parts of letter shapes, found in letters such as "Jim," "Ghin," "Sad," "Noon," and "Sin."

4. The Baseline serves as the foundation for invisible calligraphic forms and encompasses all letters. It is a crucial reference point for shaping the letterforms.
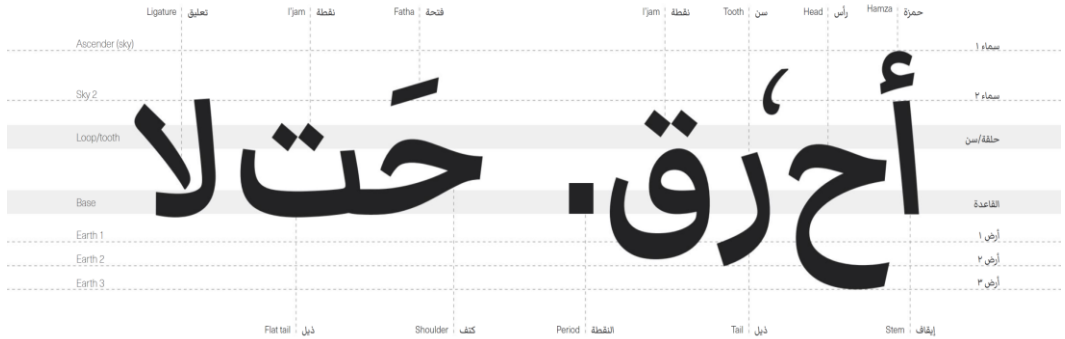

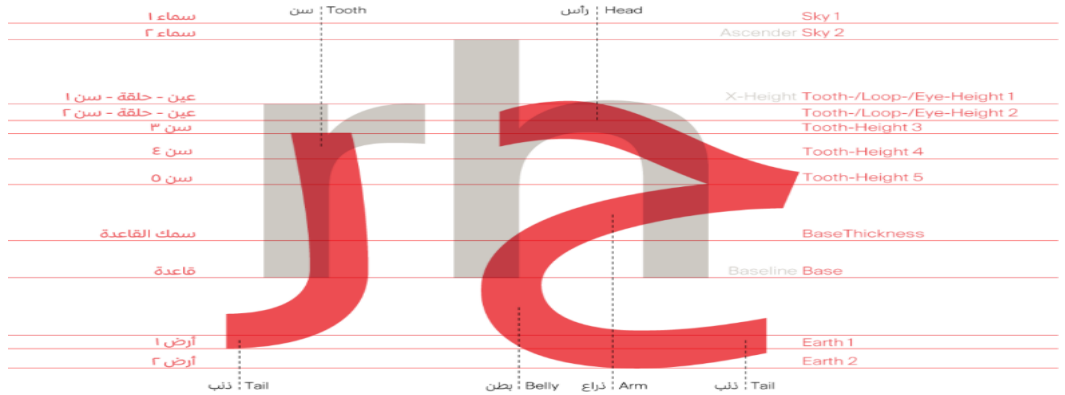**Figure 4:** Guidelines in Typographical Arabic Calligraphy (Al-Radaideh, 2020).

Figure 5: Guidelines in Typographical Arabic Calligraphy (Zoghbi, 2015).

Case Study

As the foundation for the creation of a digital typographical font, this study elected to use the simple Kufic font renowned for its historical significance as one of the most ancient Arabic fonts.

Prominent examples of its use include the inscriptions found on the Nilometer in Cairo, the Tuluni Mosque, and tombstones in Kufa, Egypt, as well as its prevalent use in codifying Qur'anic manuscripts (Al-Jubouri, 1999; Khokar & Nawaz, 2018). Additionally, it was employed to write the memorial text contained in the mosaic inscriptions of the Dome of the Rock in Jerusalem, which dates back to the Umayyad era during the reign of Caliph Abd al-Malik ibn Marwan, who oversaw its construction and completion in the year 72 AH (Al-Aref, 2005; Gonen, 2003).

The Dome of the Rock is renowned for its octagonal layout which is based on geometric foundations derived from the intersection of two equal squares (Al-Aref, 1955). The structure features a dome situated on a slightly elevated drum and contains sixteen windows. Noteworthy interior decorations include vibrantly coloured mosaics and a 240-metre-long Arabic inscription that graces the upper parts of the inner octagonal arches and is considered to be an early example of written text (Berchem & Du Pascoe, 1994).

For this study, the researcher selected the memorial text within the inner octagon of the Dome of the Rock as a case study (Figure 6) along with the calligraphy alphabet (Figure 7). Dr. Ibrahim Jumea's book (A Study of the Development of Kufic Writings on Stones in Egypt in the First Five Centuries of Hijrah) was employed to extract the letters of the alphabet and their forms from the mosaic inscriptions within the inner octagon (Figure 8).

Figure 6: Part of the Memorial Text in the Mosaic Inscriptions in the Inner Octagon of the Dome of the Rock (Photograph by Aya Amin, 2022).

Figure 7: A Selection of the Letters of the Alphabet Written in Simple Kufic Script in the Memorial Text in the Mosaic Inscriptions in the Inner Octagon of the Dome of the Rock (Authors).

Figure 8: The Alphabet of Simple Kufic Letters Extracted from Mosaic Inscriptions in the Internal Octagon of the Dome of the Rock in Al-Aqsa Mosque (Jumah. 1969).

Analysis

The research process involved a detailed examination of geometric patterns via the addition of anchor lines based on the octagonal geometric pattern found in the architectural design of the Dome of the Rock (Burckhardt, 2009; Al-Jazzar, 2011; Singer, 2008; and Islam & Al-Hamad, 2007) as depicted in Figure 9.

By extrapolating from the octagonal geometric pattern and its variations, concentric lines were meticulously crafted to serve as a foundation for constructing and designing Arabic numeral letters (Figure 10). The authors observed a distinct connection between the geometrical design of the Dome of the Rock and the memorial text inscribed within it: both exhibited a harmonious blend of geometric construction and the original line. This revelation was made possible by aligning the inferred anchor lines with the eight-grid configuration of the original memorial text in the construction of the Dome of the Rock (illustrated in Figure 11).

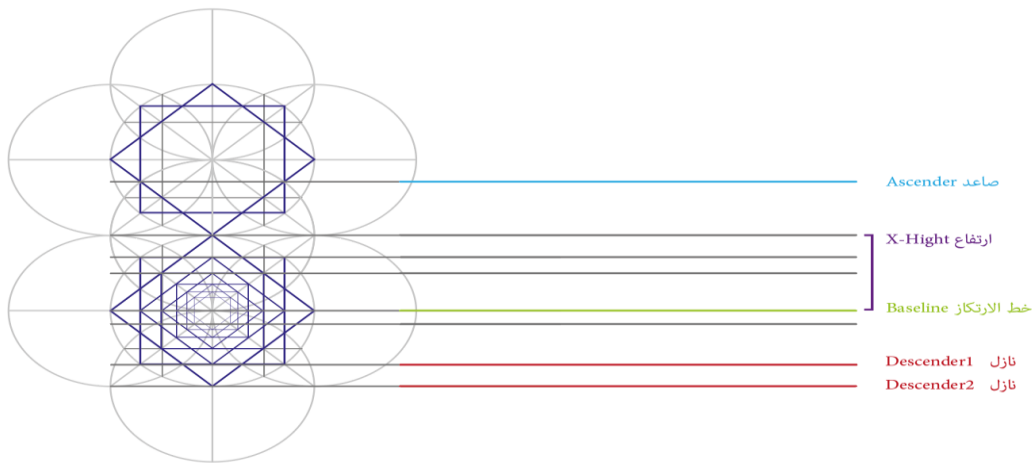**Figure 9:** The Octagon in the Dome of the Rock Building Plan (Authors).

Figure 10: The Guidelines on Which the Authors Relied to Design the Shape of the Arabic Letter (Authors).
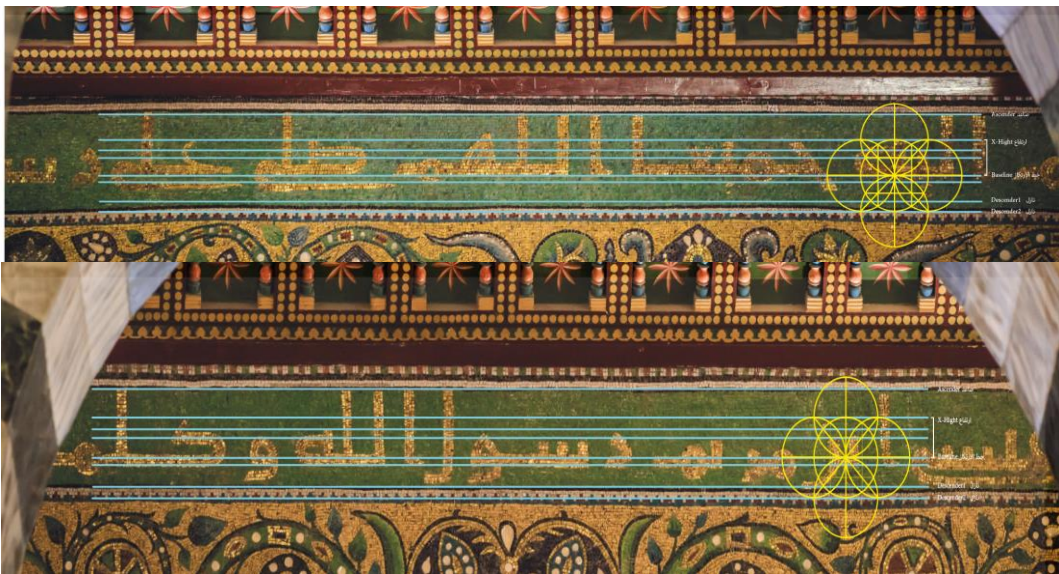

Figure 11: Matching the Guidelines Deduced from the Octagonal Grid with the Original Memorial Text in the Construction of the Dome of the Rock (Authors) (Photograph by Aya Amin, 2022).

Per the given guidelines, the researcher devised the form of the Arabic letter, employing an octagonal geometric pattern and pivot lines. The researcher carefully considered its compatibility with digital font specifications, focusing on factors such as weight, readability, and the clarity of lines in assorted designs. The characters were categorised into three main groups:

The First Category comprises letters that are written above the writing line and extend vertically, including *Alif-*أ *, Ta -* ط *, Kaf -* ك *, and Lam -* ل. (Figure 12) illustrates the alphabet design for this group, utilizing anchor lines and the octagonal geometric pattern.
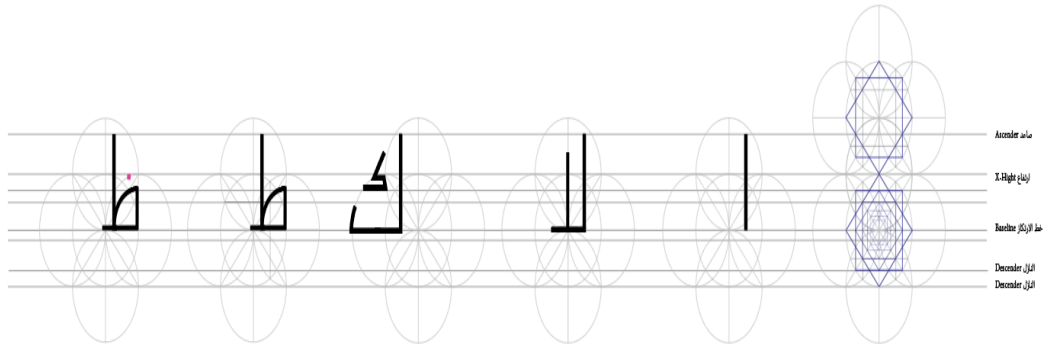
Figure 12: Designing the Alphabet for the First Category (Alif-أ , Ta - ط , Kaf - ك , and Lam- لا) Based on the Octagonal Geometric Pattern (Authors).

The Second Category consists of letters that lie on the writing line and extend horizontally, such as Ba'a- ب , Ta'a - ت , Dal - د , Dhal - ذ and Ha- هــ . (Figure 13) showcases the alphabet design for this group, incorporating anchor lines and the octagonal geometric pattern.
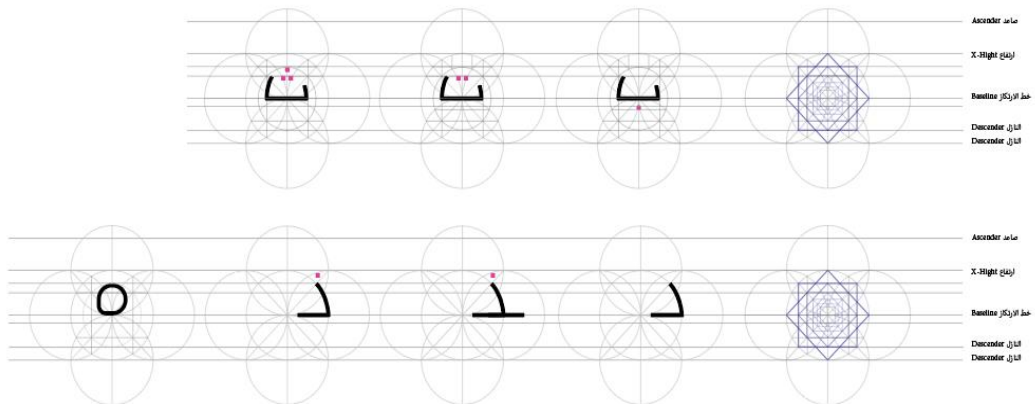

Figure 13: Designing the Alphabet for the second category (Ba'a- ب , Ta'a - ت , Dal - د , Dhal - ذ and Ha- هـ .) Based on the Octagon Geometric Pattern (Authors).

The Third Category encompasses letters that extend below the writing line, such as Ha - ح , Jim - ج , kha - خ , Ra - ر , Zin - ز , Sin - س , Shin - ش , Qaf - ق , Fa - ف , Sad- ص , Dha - ض , Ain - ع , Gin - غ , Mim - م , Noon - ن , Waw - و , and Yah - ي . (Figure 14) displays the alphabet design for this group, utilizing anchor lines and the octagonal geometric pattern.
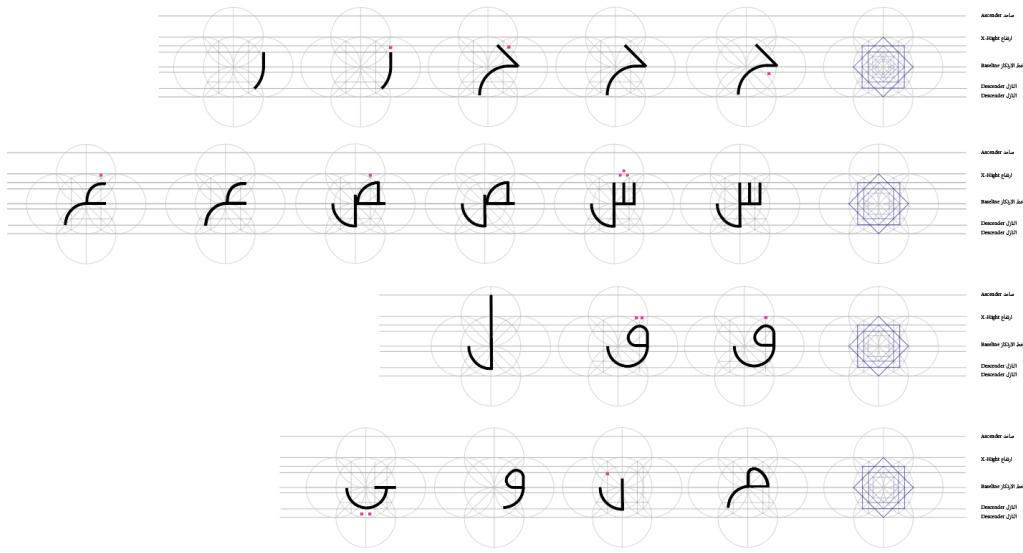
Figure 14: Designing the Alphabet for the Third Category (as Ha - ح , Jim - ج , kha - خ , Ra - ر , Zin ز , Sin - س , Shin - ش , Qaf - ق , Fa - ف , Sad- ص , Dha - ض , Ain - ع , Gin - غ , Mim - م , Noon - ن , Waw- و , and Yah - ي .) Based on the Octagon Geometric Pattern (Authors).

Discussion

Traditional Arabic calligraphy is renowned for its beauty and significance in Islamic art and has evolved alongside technological advancements and the advent of digital fonts. However, this evolution has resulted in a departure from the original essence of Arabic calligraphy which has historically required highly skilled calligraphers, who possess great artistic and technical expertise, for its creation. To address this shift, this study aims to investigate the potential of incorporating geometry, particularly the octagonal geometric pattern, into the design of digital Arabic typographic letters. By drawing inspiration from the Kufic script found in the inner octagon of the Dome of the Rock in Jerusalem, this research explores the compatibility between architectural geometry and traditional Arabic calligraphy design.

Proportions of Arabic Calligraphy and Geometry

The study examines the proportions and structural elements of Arabic calligraphy which have been refined over centuries. By integrating the geometric structure of the octagon, the research seeks to create a harmonious relationship between traditional calligraphy and architectural patterns. The objective is to identify anchor lines derived from the octagonal system that can be utilised in the construction of digital Arabic typographic letters. These anchor lines provide a framework for maintaining the authentic proportions of traditional letters while adapting them to suit the requirements of printed designs, paragraph texts, and titles across various computer programs.

Utilizing Geometry

The primary objective of this research is to employ geometry in the design of digital Arabic typefaces via a combination of the geometric principles of the octagonal shape and the inherent

aesthetics of traditional Arabic calligraphy. This study intends to create a visual synergy that preserves the essence of the script while meeting

contemporary typographic demands, an approach which not only enhances the visual appeal of Arabic typefaces but ensures their compatibility with modern printing techniques and digital platforms.

Implications and Applications

The findings of this research have several potential implications for the field of Arabic typography and calligraphy. By integrating geometry, the study offers an alternative approach to the design of Arabic typefaces that goes beyond the constraints of traditional calligraphy techniques and provides new opportunities for creativity and innovation while maintaining a strong connection to the rich heritage of Arabic script. Additionally, the adaptation of traditional letter proportions to digital environments addresses the growing need for aesthetically pleasing and functional Arabic typography in numerous computer programs.

Conclusion

In conclusion, this research project aimed to address the gap between traditional Arabic calligraphy and modern digital typography by exploring the use of octagonal geometric patterns inspired by the Kufic script found in the Dome of the Rock in Jerusalem. The study recognized the challenges faced by traditional Arabic calligraphy in the face of digitalization and sought to preserve the essence of this art form while adapting it to the requirements of digital design.

By investigating the proportions of Arabic calligraphy and examining the compatibility between the architectural geometry of the octagonal shape and the geometric structure of traditional Arabic calligraphy, this research demonstrated the potential for implementing these proportions in the construction of digital Arabic typographic letters. These guidelines, derived from the octagonal system, provide a framework for design geometry and the creation of digital Arabic typefaces that maintain the essence and authenticity of traditional letters.

The primary objective of this study was to develop digital Arabic typefaces that could be utilized in various computer programs for printed designs, paragraph texts, and titles. By incorporating the proportions of traditional letters and adapting them to suit contemporary forms and usage, this research enables designers and typographers to create visually appealing and culturally relevant Arabic typography in the digital realm.

Overall, this research has contributed to the preservation and evolution of Arabic calligraphy by combining the principles of traditional design with the possibilities offered by modern technology. It has created new opportunities for creative expression while ensuring that the art of Arabic calligraphy maintains its cultural and historical significance and endures in the digital age.

Acknowledgement

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