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Research on the application and visual effect of parabolic aesthetics in architectural decorative arts

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Abstract In order to explore the role of parabolic aesthetics in enhancing the visual effect of buildings, the samples of plates and parts needed in the visual design of buildings integrating parabolic aesthetics are imported into the program through Object ARX in AutoCAD software, and the drawing tools are used to complete the perfect integration of parabolic aesthetics and buildings. Eight buildings were randomly selected as research subjects and their visual effects were analyzed. Using AutoCAD software to incorporate parabola into these 8 buildings, it was found that 6 buildings had a visual color grade of A, and the remaining 2 buildings had a visual color grade of B. This shows that the architectural decorative art incorporating parabolic aesthetics can achieve the user's needs and standards for architectural visual effects, and provide a new way of thinking for the promotion of sustainable architectural development.

Index Terms parabola, AutoCAD software, architectural sustainable development, architectural decorative art

I. Introduction

Architectural decorative art refers to the integration of artistic elements into architectural structures, through materials, colors, shapes and other techniques, aiming to enhance the beauty and artistic value of buildings. Architectural decorative arts have a long history and rich tradition all over the world, including wall decoration, ceiling design, floor pavement and interior furniture, etc. Its role is not only to beautify the building, but also to show the culture, express the idea and shape the image [1]-[4]. Through skillful decorative art techniques, buildings can present different styles and atmospheres, so that people can feel the enjoyment of beauty both inside and outside the building, and parabola, as an aesthetic form of architectural decorative art, is widely used in the field of architectural decoration [5]-[8].

Architecture is a comprehensive discipline integrating art, science and engineering, and geometric aesthetics is a crucial aspect in architecture. Geometric aesthetics is not only reflected in the appearance and form of the building, but also in the structure, function and spatial layout of the building, and parabola is an important branch of geometric aesthetics [9]-[12]. Parabola, a wonderful geometric curve, which has an important position in mathematics, is also a very important design element in architecture, which has an indispensable role in the form, structure and layout of buildings [13]-[16]. Through the use and exploration of geometric principles such as shape, proportion, symmetry, and quantitative relationship, parabola makes buildings show the beauty, harmony and order in space. The use of parabola in architecture not only reflects the architect's grasp of space and creativity, but also highlights the harmonious symbiosis between the building and the surrounding environment [17]-[20].

The use of AutoCAD software to complete the architectural decoration and parabolic combination, not only to improve the architects a lot of labor and material resources, while making the architectural design works more in line with the current user's aesthetic standards. This paper starts from the definition of parabola, and illustrates the application of parabola in the art of architectural decoration in the form of actual cases. Based on the perspective of visual elements, through AutoCAD software design of architectural space structure visual design, realize the parabolic aesthetics and architectural decoration combined. The designed architectural image is imported into WINDOWS drawing software, and the color picker in the toolbar of the drawing software picks up the color of the image, and the color toolbar can be edited to obtain the RGB value of the architectural visual color that integrates the parabolic aesthetics, and analyze the architectural chromatic effect by combining with the RGB value. Setting the simulation parameters of Honeybee software and the effective lighting UDI level, using Honeybee simulation software and dynamic lighting index UDI, to jointly explore the role of parabolic aesthetics on the architectural light perception effect enhancement. Comprehensive TOBII-T60XL eye-tracking meter and scale test to discuss the effect of architectural form perception.

II. Application of parabolic aesthetics in architecture and visual research

II. A. Definition of parabola and its applications

II. A. 1) Definition of parabola

A hyperbolic paraboloid, also known as a saddle surface, is formed by constructing a parabola in the xOz-coordinate plane with an opening upward and a parabola in the yOz-coordinate plane with an opening downward (where the tops of the two parabolas coincide at a single point), and then letting the first parabola slide up the other, creating a saddle surface [21]-[23]. Hyperbolic paraboloid surfaces have an important feature, they are straight curved surfaces and can be viewed as consisting of two sets of straight lines. At any point on a hyperbolic paraboloid, there are two straight lines on the surface passing through that point. This feature is particularly important, which allows the construction of hyperbolic paraboloidal shells by using vertical materials to build the structure, which greatly reduces the cost of construction.

II. A. 2) Examples of the use of parabolas in architecture

When you live in the city and walk on the busy street, you will see all kinds of buildings, which are in many different forms. As we all know, a building is a kind of space for people to live and use, such as a house, bridge, factory, gymnasium, kiln, water tower, temple and so on, which is built by people with materials such as clay, brick, tile, stone, wood (in recent times, steel, profiles) and so on. The composition and artistic image of architecture are closely related to mathematics. Today, we will combine the mathematical knowledge we have learned and its mathematical culture with the three elements of architectural composition - architectural function, architectural technology and architectural artistic image - and talk about how architects use parabolic aesthetics to creatively change architectural styles and shape the world.

The Yongjong Bridge and Namhae Bridge in South Korea and the Golden Gate Bridge in the United States are all suspension bridges connected by ropes and cables, and the curves produced by the dangling ropes are parabolas. Canton Tower, or Guangzhou TV Tower, has a cute and graphic name “Little Barbarian Waist” on the Internet. Its architectural shape is a typical monolithic hyperboloid, also known as straight surface. Each busbar of the monolithic hyperbolic surface is straight, in layman's terms, although it looks like the outside of the Canton Tower is a smooth curve, thin in the middle and wide at both ends, in fact, every column used in the building is straight from the bottom to the top, so the Canton Tower is a bunch of straight columns built diagonally, and it can be seen that every main steel girder is straight. The application of hyperbolic curves can also be seen everywhere in engineering buildings. Most of the cooling structures used in large power plants are hyperbolic cooling towers. This works well and is cheaper. Hyperbolic towers are the most economical choice for building cooling towers, first of all, according to the structure of the cooling tower can be seen, the design of the narrowing in the middle makes it possible to have a larger area of air intake under the same area of drenching, which helps to increase the air volume, in fact, this curved surface is inwardly curved. The reason for the economy of hyperbolic surface is not because of the most economical material, but because of its construction method, hyperbolic surface is a straight grain surface, is composed of a straight line through a continuous movement, which is its most important geometric properties, so the rebar does not need to be bent in the construction, i.e., that is, it is parallel to the space diagonal to a straight line can be built, the construction is in fact very convenient. From an aesthetic point of view, the shape of such a building naturally narrows from the bottom up to form a stable and atmospheric image, while the top gradually enlarges to form a double-curved architectural shape, and the London 2012 Olympic Velodrome became an iconic building with its unique double-curved roof design. This strategic roof design not only allows for sufficient natural light to reduce lighting energy consumption, but also allows for good natural ventilation, and the rainwater collected can be used for other purposes, which can be said to be a win-win situation in terms of aesthetics and functionality.

II. B. Architectural Visual Design Model

With the common use of parabola in the decorative art of architecture, the requirements for the visualization of the spatial structure of its environment continue to increase. The parabola gives the building visual dynamics, which is a complementary relationship, this kind of relationship involves a variety of design elements, people, space and the environment for contact and conversion, showing a kind of intermingling with the environment, intercommunication with people, static combined with the concept of dynamic architecture. Based on the perspective of visual elements, the design of architectural space structure visualization through AutoCAD software design provides new ideas for the integration of parabolic aesthetics architectural visual design.

II. B. 1) Visual elements

Vision has three elements, namely, form, light and color. Among them, form is a kind of perception, which is a simple generalization of the basic form, while the embodiment of light and color is mainly based on the effect of light and dark and color. As the life source of architecture, parabolic aesthetics is responsible for the mission of causing visual

effects, and the architectural design that lacks the reasonable application of parabola cannot even talk about the artistic effects shown by various types of forms, colors, textures and other elements. Of course, the parabola in the building does not exist in the space in an isolated form, it can not avoid combining with materials, colors and geometric forms in the building structure to produce strong artistic tension. Through the rich visual language produced by the condensation of parabola and various design elements, the designer is able to continuously convey and express the strong emotions he wants to express to the users of the building, which makes the expressive power of the building more acute and profound, and thus produces an impact on the users' mental state and psychological feelings. The use of parabola in architectural design has been very different since ancient times, and the successful application of parabola in different buildings, its rich language can play a role in increasing the level of space, decorating the environment, rendering the atmosphere, as well as conveying the culture and aesthetics of various countries. For example, the sloping, soothing roof parabola, so that the building's light surface is no longer vertical, floating eaves make the huge arch components deep in the shadows, hidden in small alleys and deep alleys in the gate, set up a deep layout, relatively closed space, so that private gardens present a relaxed and slow, calm and open-minded style. Influenced by the flexible culture, people's aesthetic interest tends to be more subtle and euphemistic, the beauty of the deep flavor.

II. B. 2) AutoCAD software

AutoCAD software Object ARX, is a secondary development package for AutoCAD, using C++ as the basic development language, in object-oriented programming with polymorphism, encapsulation, inheritance and other characteristics, able to run a large-scale program development tasks, support for complex mathematical calculations, which can improve the efficiency and convenience of the software.Object ARX is Object ARX is a dynamic link library, through the entry function acrx Entry Point () using the message passing way to realize the transfer of information with AutoCAD software. ObjectARX based on the secondary development of AutoCAD software, is to build the relevant classes, adding algorithms optimized data, variables and functions, at the same time, in the acrx Entry Point () function, the command response function definition, to achieve the purpose of storage and encapsulation.

II. B. 3) Development process

The panels and parts needed in the visual design of the building integrating parabolic aesthetics are taken as the design objects of AutoCAD software. The secondary development of AutoCAD software based on Object ARX and the data transfer process are shown in Figure 1.The secondary development process of AutoCAD software is to input the parameters of the material data such as plates or parts into the program, use the relevant genetic algorithms to calculate them, and then carry out the sampling operation of the results to get an optimized sampling data, and then carry out the image conversion of the data, and then output the data in the AutoCAD drawing window in the process of continuously calculating and transferring. The data is then converted into an image and finally output in the AutoCAD drawing window, where the data is continuously calculated and passed on to produce the final result.

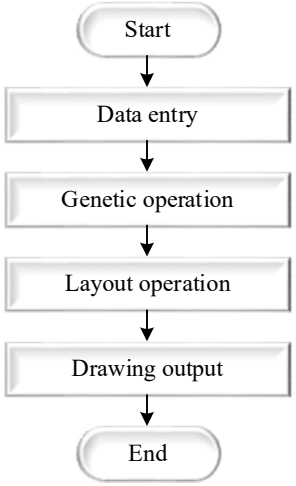


Figure 1: Development and data transfer process

II. B. 4) Design and realization

(1) Data acquisition

Figure 2 shows the structure of the data acquisition schematic, data acquisition interface provided by ObjectARX, the use of aced Init Get () function will be implemented to control the properties of the input data processing, set it to non-zero, and then use the data acquisition function aced Get Int () to receive the keyboard input of the integer, set it to non-null, and at the same time use the data acquisition function aced Get Real () to receive keyboard input of real numbers, set it to non-negative. In the case of ensuring that the input data is set up properly, it is also necessary to ensure that the data has an automatic check function to detect the correctness of the data entered to ensure that it meets the reasonable and legal provisions. Taking the plates and parts used in the integration of parabolic aesthetics in architectural visual design as an example, if the length and width of the actual plate are smaller than the length and width of the input parts, the sampling algorithm will determine that it is an error input, and request to input again or stop the program to avoid serious consequences.

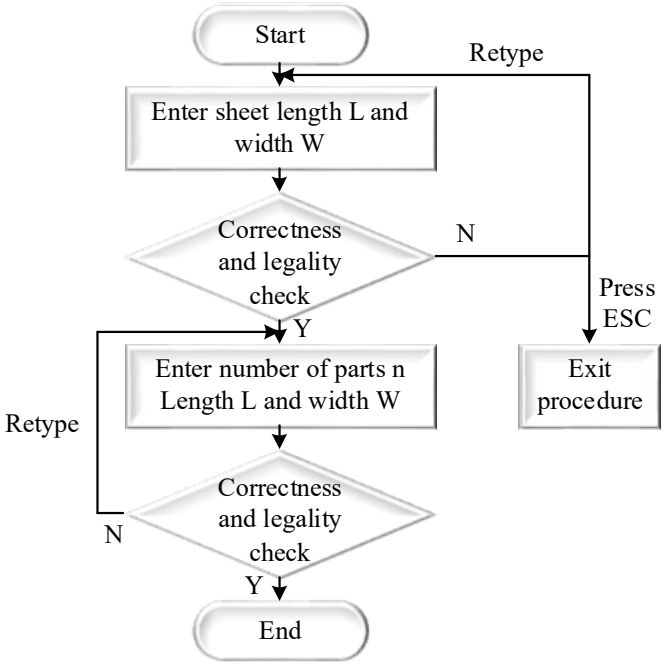


Figure 2: Data acquisition structure diagram

(2) Converting and plotting the sampling data to graphs

Figure 3 shows the drawing process, after the data input and genetic algorithm processing, the optimized nesting data, these nesting data contain intelligent building space structure vision needs to be used in the size of the plate and parts, dosage and the corresponding coordinate values, these data are converted to images, this process is the process of AutoCAD software automatically draw. AutoCAD software in the drawing of graphics, graphics as a database, the database contains many tables, tables have related records or indexes other tables. AutoCAD software to draw a new map, the database table is mainly: layer table, block table, line table and dimensions of the style table about 9 symbols related to the table, AutoCAD software to complete the drawing of the need to be realized through these tables. In the use of AutoCAD software to draw the actual drawing, the first to create graphics and entities, on the basis of the current database, to read the way to open the block table, and then open the block table record, the implementation of the write operation, close the block table or the above steps in the creation of the entity added to the block table record, the block table record and the entity object is closed in turn, to complete the drawing.

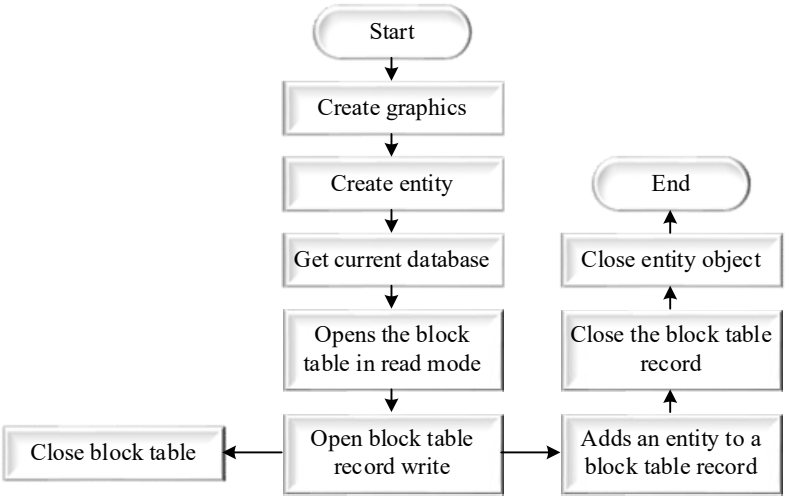


Figure 3: Drawing flow

III. Analysis of the visual effect of buildings incorporating parabolic aesthetics

III. A. Analysis of architectural color effects

III. A. 1) RGB value statistics

This subsection selected eight buildings as an example, specifically for the arch bridge, culvert, tunnel, arch windows and doors, overpasses, attic, palace, pagoda, altar of heaven, the use of the above architectural visual design model, the realization of parabolic aesthetics elements and architectural fusion, will be designed into the architectural image of the building comes with WINDOWS drawing software, using the drawing software toolbar color picker to pick up the image can be the color, editing color Toolbar can get the integration of parabolic aesthetics of architectural visual color RGB values. The obtained colors and values include the 2 main tones of the main architectural decoration. Integration of parabolic aesthetics of architectural visual color RGB value statistics as shown in Table 1 Although the drawing software can get the color block of RGB color values, the use of not quite convenient, Colors Lite color recognition software can be set to automatically copy the RGB color values to paste into the Excel worksheet is more convenient, and it is important to reduce the chances of error. As can be seen from the table, the Temple of Heaven building (the top of the Temple of Heaven is designed to resemble the parabolic shape of the superposition of the combination) as an example to start the results of the analysis, R, G, B values were 226, 86, 39, mainly vermilion, vermilion symbolizes dignity, power, good luck, often used in ancient royal buildings.

Table 1: Visual color RGB value statistics

Type	R	G	B
Conformal bridge tunnel	101	90	37
Culvert	181	164	83
Supply doors and Windows	251	253	210
Overpass	237	232	211
Attic	245	220	41
The palace	233	163	33
Pagoda	250	116	16
Temple of Heaven	226	66	63

III. A. 2) Calculating RGB color difference

Currently RGB color difference calculation RGB color difference, RGB weighted color difference and RGB angular distance color difference, this paper adopts any 2 color blocks of RGB color RGB component difference squared sum and then square equidistant color difference. Any 2 color block RGB spatial distance on the color difference evaluation is not very meaningful, for convenience the RGB color difference calculation results divided by the black and white color difference results of the spatial distance multiplied by 100% to get the RGB color difference percentage, referred to as the color difference percentage. Percentage of color difference is the result of the calculation of the decimal into a percentage of the expression, the percentage of color difference and color difference can be mixed. Any color block relative to the primary color or primary color two calculated color difference

percentage is a single point of color difference, other color blocks relative to the primary color or primary and secondary color difference of the average value is called the mean color difference. The mean color difference is less than 22%, and the primary and secondary color differences are both less than 22% for category A. The mean color difference is less than 22%, and only one of the primary color difference and secondary color difference is less than 22% is class B. (3) The mean color difference is between 22% and 25%, and only one of the primary and secondary color differences is greater than 22% for Category C. The mean color difference is between 22% and 25%, and both the primary and secondary color differences are greater than 22% for Category D. A mean color difference greater than 25%, with only 1 of the primary and secondary color differences greater than 25% is classified as Category E. If the mean color difference is greater than 25% and both the primary and secondary color differences are greater than 25%, it is classified as F. The results of building color difference analysis of parabolic aesthetics are shown in Table 2. It can be seen that among the eight building visual designs, only the visual color difference grade of the overpass and the Temple of Heaven is B, and the visual color difference grade of the remaining six buildings is A. This indicates that the use of AutoCAD software to incorporate the parabola into these eight buildings has an excellent color performance, and it can satisfy the user's needs for the architectural visual effect.

Table 2: Analysis results of architectural color difference of parabolic aesthetics

Type	Principal chromatic aberration/%	Subchromatic aberration/%	Mean color difference/%	Evaluation and grading
Conformal bridge tunnel	20.64	21.09	21.17	A
Culvert	19.46	19.76	20.51	A
Supply doors and Windows	18.1	21.51	15.36	A
Overpass	24.57	20.52	17.87	B
Attic	15.08	15.37	17.57	A
The palace	20.15	21.39	16.33	A
Pagoda	16.01	19.79	16.64	A
Temple of Heaven	23.79	20.92	21.41	B

III. B. Simulation analysis of architectural light perception effect

The research object is the same as above, the parabolic aesthetics features are introduced into the architectural samples through AutoCAD software, followed by the use of Honeybee software and the dynamic lighting indicator UDI, to jointly explore the role of parabolic aesthetics on the enhancement of architectural light perception effect. The details of the analysis are as follows:

III. B. 1) Indicators for evaluating the effect of light perception

Effective daylighting (UDI), the percentage of time in the selected working plane of a building's interior that can satisfy the building's effective daylighting during the year's operating hours. UDI is one of the more comprehensive and comprehensively defined indicators in the current dynamic natural daylighting evaluation criteria, and has a high degree of accuracy. Effective daylighting (UDI) not only meets the minimum lighting standards during the operating hours of the building as a threshold, but also takes into account the more common phenomenon of over-brightness in the operation of the building throughout the year, and discards the over-brightness of the lighting illuminance interval. The value of effective daylighting is no longer just an open interval greater than a certain threshold, but a closed interval value. Therefore, the effective light degree (UDI) is the current dynamic lighting evaluation system, the definition and evaluation of factors more comprehensive indicators. 700lx-1000lx range of illuminance is considered “useful”, that is, the light effect of moderate, light illuminance 700-1300lx is considered to be excellent light effect. Lighting illuminance less than 700lx is considered insufficient. Lighting levels greater than 1300lx will cause visual and thermal discomfort, i.e. they are considered to be excessive.

III. B. 2) Setting of simulation parameters

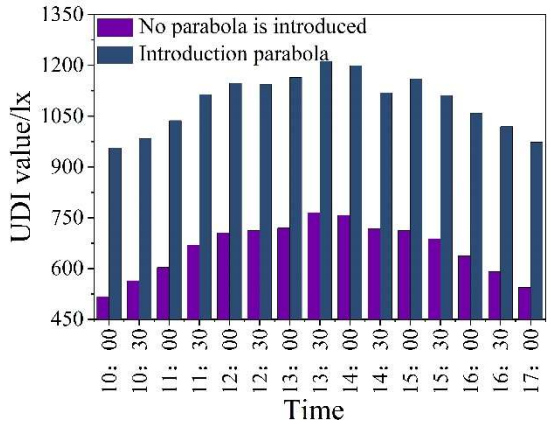
The simulation parameters of Honeybee software are set as shown in Table 3, taking into account the actual research situation and the simulation parameter settings of other researchers, this simulation study calls the Schedule module of Honeybee software, and sets the available time of the natural lighting of the research sample as 10:00AM-17:00PM every day.The other main parameters include visualization, analysis, and simulation accuracy, which mainly consider the effective lighting. The other main parameters include the range of values of the analytical map, simulation accuracy, density and height of measurement points, which mainly consider the effective light intensity.

Table 3: Honeybee software main parameter setting

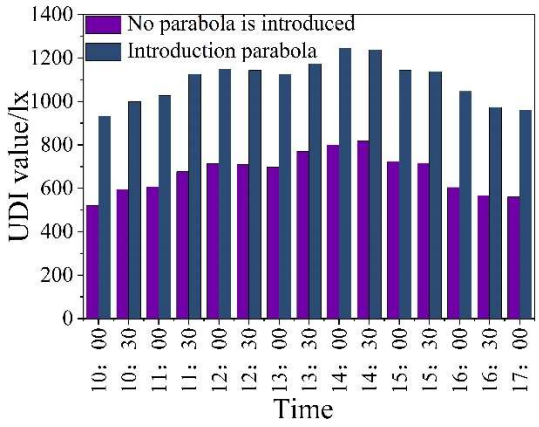
Arithmetic module	Parameter name	Parameter setting
Schedule	Simulation period	10:00AM-17:00PM
Legend Parameters	Simulated pseudo-color minimum	0
	Simulated pseudo-color maximum value ·	100
Radiance Parameter	Sampling point grid	Medium
	Simulation type	Annual
Generate Point Grid	Sampling point grid	0.45m*0.45m
	Sampling point height	0.88m
Annual Daylight	Computing engine	Radiance
	UDI value	500-1500lx
	UDI low Specifies the value	<500lx
	UDI up Specifies the value	>1500lx

III. B. 3) Analysis of results

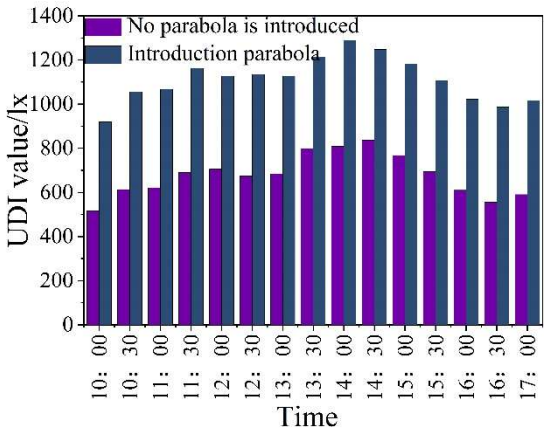
After the simulation parameters of Honeybee software were set, the simulation analysis of the light perception effect of the eight building samples was started, and the effective luminance of the unintegrated parabola of the building was calculated first, and the effective luminance of the integrated parabola of the building was calculated again, and the comparative analysis of the effective luminance results is shown in Fig. 4, in which (a) ~ (h) correspond to the eight building samples, the horizontal axis is the simulation time point set by Honeybee software, and the vertical axis is the effective luminance (UDI). The horizontal axis is the simulation time point set by Honeybee software, and the vertical axis is the effective light intensity (UDI). It can be seen that in the time period of 10:00AM-17:00PM, the effective light intensity (UDI) shows a parabolic trend, with an increasing trend from morning to noon and a decreasing trend from noon to afternoon, which is in full compliance with the real-life situation and indicates that the simulation analysis of Honeybee software is highly credible. 8 building samples without parabolic effective light intensity ranging from 400 to 600lx. , which, according to the above definition of effective luminance (UDI), indicates that the building samples have insufficient light perception effect. Using AutoCAD software to digitally introduce parabolic aesthetic features into the architectural samples, the effective light intensity (UDI) of each architectural sample was increased from the range of 400~600lx to 700~1300lx, i.e., parabolic aesthetics has a facilitating effect in architectural photoreceptor effect.



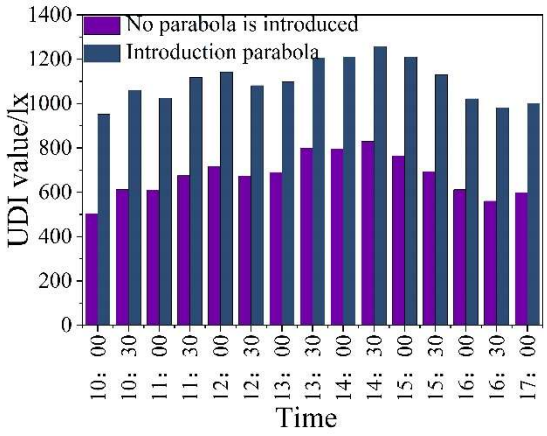
(a)Conformal bridge tunnel



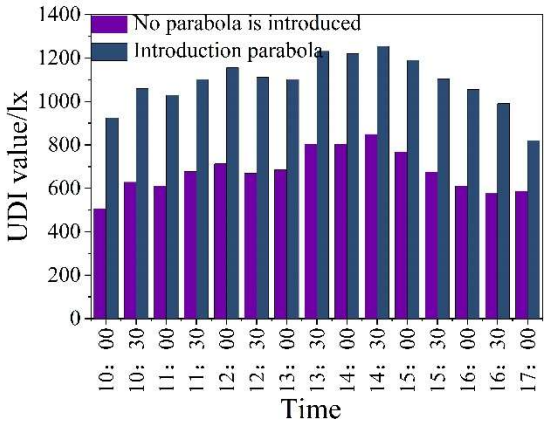
(b)Culvert



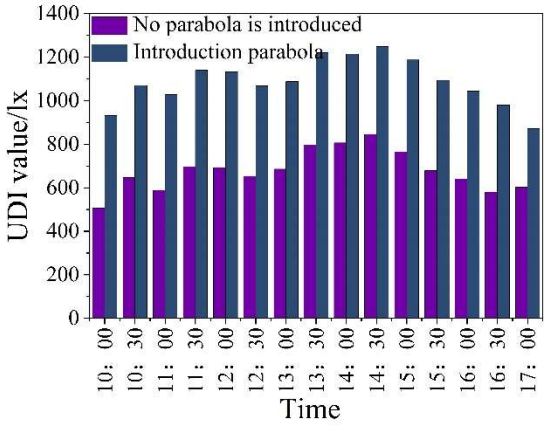
(c)Supply doors and Windows



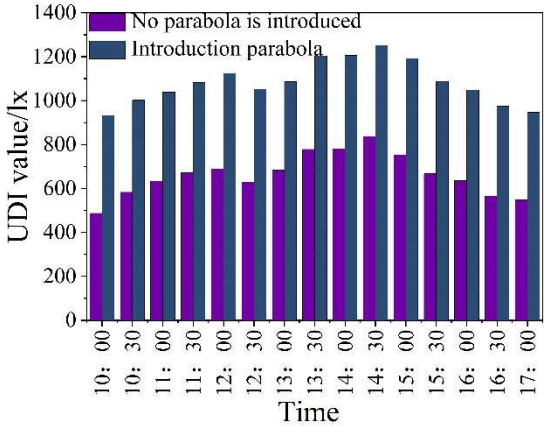
(d)Overpass



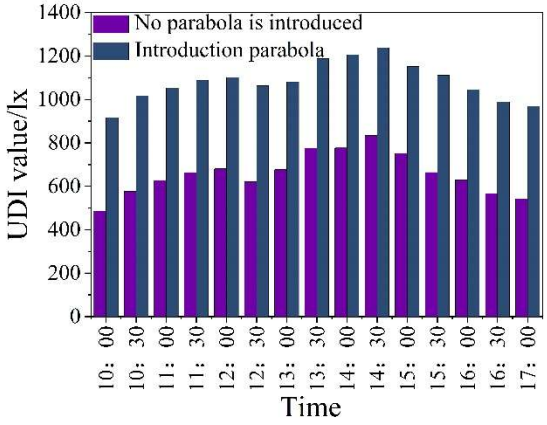
(e)Attic



(f)The palace



(g)Pagoda



(h)Temple of Heaven

Figure 4: Comparative analysis of effective daylighting results

III. C. Analysis of Architectural Morphological Effects

III. C. 1) Acquisition of data on morphological effects

From the previous section, it can be seen that form perception is a kind of sensory perception, which is a simple generalization of the basic form of the building, and the process of obtaining its perceptual quantity can be divided into three steps. The first step is to use AutoCAD software to convert the architectural design drawings integrating parabolic aesthetics into the file format compatible with the TOBII-T60XL eye-tracking device, and the second step is to invite 60 professionals to experience the building integrating parabolic aesthetics by wearing the TOBII-T60XL eye-tracking device. The third step is to conduct a scale test on the users after the experience, in which excellent, good, moderate, average, and poor correspond to scores of 5, 4, 3, 2, and 1 respectively, so as to realize the acquisition of data on the effect of shape perception.

III. C. 2) Data analysis

The data obtained above are saved in Excel files, and then the evaluation and analysis of the architectural form effect is carried out. The evaluation results of the architectural form effect incorporating parabolic aesthetic features are shown in Table 4, in which X1~X8 are shaped bridge holes, culverts, tunnels, arched windows and doors, overpasses, attics, palaces, pagodas, and the Temple of Heaven, respectively. The mean and standard deviation of the shape effect of the bridge, culvert, tunnel, arched windows and doors, overpass, attic, palace, pagoda, and the Temple of Heaven are 3.80±0.23, 3.93±0.27, 3.90±0.29, 3.95±0.28, 4.08±0.37, 4.05±0.25, 3.98±0.31, 3.77±0.29, respectively, and all of the eight architectural samples have a mean value of shape effect greater than 3.80±0.23. The mean value of form effect is greater than 3, expressing that the modern architecture integrating parabolic aesthetic features has good form effect and accelerates the development of modern architectural decorative arts.

Table 4: Analysis of the effect of architectural form perception

N	X1	X2	X3	X4	X5	X6	X7	X8	N	X1	X2	X3	X4	X5	X6	X7	X8
1	4	3	3	4	4	3	3	4	31	4	4	4	5	3	4	4	3
2	4	5	3	4	4	3	3	3	32	4	4	5	4	4	4	5	3
3	4	4	5	4	4	5	4	4	33	4	3	4	5	3	3	5	4
4	4	4	4	4	4	3	3	3	34	3	4	4	5	5	3	5	4
5	3	5	3	4	4	4	3	4	35	5	4	5	5	5	4	4	3
6	3	5	3	4	3	4	3	3	36	5	4	5	3	4	5	3	3
7	3	5	5	4	4	4	3	4	37	4	4	5	4	5	4	4	4
8	4	4	5	3	4	4	4	5	38	4	4	3	5	3	4	3	3
9	4	4	5	3	5	4	5	4	39	5	5	3	4	5	4	4	3
10	3	3	5	4	4	4	5	3	40	4	4	4	5	4	5	3	4
11	5	4	3	4	3	5	4	5	41	3	3	5	4	3	3	3	3
12	3	4	3	3	4	5	5	4	42	3	5	4	4	4	3	4	3
13	3	3	4	3	4	4	4	4	43	4	4	5	3	5	4	4	3
14	5	4	3	5	4	3	4	4	44	5	4	4	4	4	4	5	4
15	5	4	5	4	4	5	5	4	45	3	4	4	3	5	4	4	4
16	4	5	3	5	4	4	4	4	46	4	4	3	4	4	4	4	5
17	3	5	4	4	4	3	4	3	47	4	4	4	4	5	5	4	4
18	4	5	3	3	3	4	4	4	48	4	4	5	3	5	5	4	3
19	4	3	4	4	4	4	4	4	49	5	4	3	4	3	4	4	4
20	3	4	4	4	3	4	4	4	50	4	4	5	5	4	5	4	4
21	3	3	5	4	4	5	3	4	51	4	3	3	3	3	3	4	5
22	3	4	4	5	5	4	3	4	52	4	5	5	3	5	5	5	5
23	3	3	5	4	4	4	4	3	53	4	4	4	3	3	5	5	3
24	3	3	3	4	5	4	3	4	54	3	5	4	3	4	4	5	4
25	4	3	3	4	5	4	4	4	55	3	4	3	4	5	4	4	3
26	4	5	3	5	4	3	5	3	56	4	4	3	4	5	3	3	4
27	3	4	5	5	4	5	4	4	57	3	3	4	3	4	4	3	5
28	4	3	3	3	3	4	4	5	58	5	3	3	3	4	4	4	4
29	5	4	3	4	4	4	5	3	59	4	4	4	4	5	4	5	3
30	3	3	3	5	5	5	4	5	60	3	3	3	4	4	5	4	3

IV. Conclusion

In this paper, the parabolic aesthetic features are perfectly integrated into architectural decorative arts with the help of AutoCAD software, and the arch bridge, culvert, tunnel, arched windows and doors, overpass, attic, palace, pagoda, and altar of heaven are selected as the research samples, and the visual effect of the architectural samples integrated with parabolic aesthetics is analyzed based on the perspective of the visual three elements. The effective luminance of the traditional building samples is between 400~600lx, and after the introduction of parabolic aesthetics on the basis of the traditional building samples, the effective luminance is increased to 700~1300lx, which indicates that the parabolic aesthetics features have a facilitating effect on the architectural light perception effect. The mean value of the morphological effect of each building sample is greater than 3, which concludes that the morphological effect of buildings incorporating parabolic aesthetic features can meet the requirements of the construction industry and help the sustainable development of buildings.

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