POEMISH

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Jaalis are latticed or perforated screens that have been part of Indian and Islamic architecture for centuries. These design aspects serve an aesthetic purpose while providing privacy and filtering the light and air. Four primary features characterise jaali design: repetition, porosity, opacity, and form/modularity.

Repetition:

Repetition forms a visual rhythm and continuity. Most geometric jaali patterns come into existence from the repetition of basic modules placed on a matrix. The repeating components lead the viewer's eye within the boundary of a geometric composition and give an imaging experience that is fluid and engaging.

In Islamic architecture, it is called intentional repetition because it represents God and God's infinite qualities. The continuous patterns go outside the frame's limits, making it challenging to perceptually decipher where the designs on the frame end and start.



Figure 1: Design of an exhibit demonstrating repetition



Modularity:

Modules are tiny pieces that form a whole to form rigid geometrical rules that result in highly sophisticated patterns.

Traditionally constructed jaalis had apertures where each void (hole) was constricted and equalled nearly to the thickness of the material in a ratio of approximately 0.8 to 1.2.

The size of the void within the material and the constituent's thickness were notable concerning Jaali's efficiency for shading and supporting strength.





Figure 2: Image depicting modularity of the flavour of life pattern.

Porosity:

Porosity describes the proportion of space, deemed void or 'empty', within a jaali in relation to its solid component.

Porosity is defined as the ratio between the void volume and the material's overall volume. Regarding jaalis, their porosity has direct consequences on how well they work.

The voids are designed to be just right so that air can flow in and out, which architect Yatin Pandya calls 'passive ventilation'.

These openings also enable the Venturi effect, where air flowing through small openings accelerates and causes even gentle winds to be utilized, allowing air into the interiors of buildings. " In colours that overlap & blend Red bleeds into blue, & their boundaries mend Purple emerges in the twilight hue A Bridge between the old & new

> Jaalis essence in perforated art where every void groups its part Red's warmth & blue's cool kiss Merge to create an alchemical bliss "



Figure 3: Chromatic representation and exhibit for how people associate porosity with Jaali

Opacity:

Opacity blocks a certain amount of light that passes through the jaali patterns.

A jaali's opacity is based on the size, number, and arrangement of its perforations to solid areas. Remarkably, traditional jaali patterns differ by climate region - humid places like Kerala have lower overall opacity with larger holes, while drier regions like Gujarat and Rajasthan have higher opacity patterns. This change shows a responsive design to climate, as jaalis in hotter regions had to block more direct sunlight while still needing ventilation.

Jaali patterns provide a one-way visibility effect that keeps the interior private and visible at different light levels. The inside of a building with jaali windows can be seen through the jaali holes, but the outside remains unseen due to the light coming from outside. In Rajput and Islamic culture, this architecture beautifully solved the privacy issue.

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The brilliance of the jaali design is located at the nexus of the intricacies of its repetition, porosity, opacity, and form/modularity, as they bring forth glorious functional architectural elements of profound beauty and meaning " Opaque layers, translucent & bright Or mirrors reflecting glowing light Acrylics shimmering with a gentle grace Translucence dancing in delicate space Fiberglass & Cement so strong Each material tells a different song Wander through this crafted space Where opacity & light Embrace "



Figure 4: Change in opacity with the same pattern and different materials

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Figur	e 5: Change in the	e opacity from different viewing

Conclusion:

The brilliance of the jaali design is located at the nexus of the intricacies of its repetition, porosity, opacity, and form/modularity, as they bring forth glorious functional architectural elements of profound beauty and meaning.

Jaali's energy-saving properties have recently caught the attention of modern architects who are concerned with their power in passive climate control, privacy control, and space beautification.

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