

# Intelligent Building

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# SRS Consulting Engineers

A Forward Thinking Resilient Building Design Company

**Established in 1997**

**Energy Efficient Design**

Low/No Energy Environment to Reduce Carbon Emission

**Sustainable Design**

Green Environment to Conserve Natural Resources

**Intelligent Design**

Connected Environment to Facilitate Occupants Independence

**Bio-Regenerative Design**

Net-Positive Environment to Enhance Occupants Wellbeing

# What is Intelligent Building?

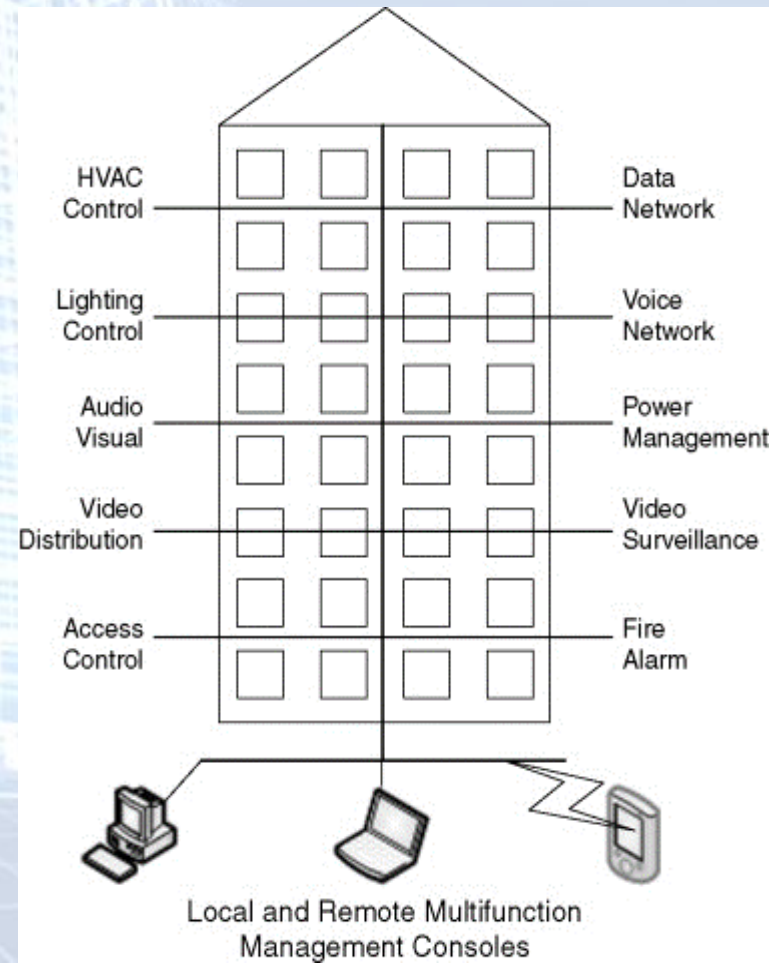
- “Intelligent Building” has been in use since early 1980s.



# What is Intelligent Building?

- “One which provides a **productive and cost-effective** environment through **optimization** of four basic elements: structure, systems, services and management, and the **interrelationship between them.**”

~ Intelligent Buildings Institute



# What is Intelligent Building?

- “Creates an environment which maximizes the effectiveness of the **building’s occupants** while at the same time enabling **efficient management of resources** with minimum life-time costs of hardware and facilities,”  
~ European Intelligent Buildings Group



# What is Intelligent Building?

- “The overlaying of an IP network, connecting all the building services monitoring, analyzing and controlling the building **without the intervention of humans.**”
  - ~ Report by Memoori on Building Internet of Things (BIoT)



# What is Intelligent Building?

- “Smart building is a **human-centric** concept. A facility that **helps its occupants** achieve their goals of productivity, health, comfort, and wellbeing.”  
~ Deloitte Insights



# Pros and Cons of Intelligent Building

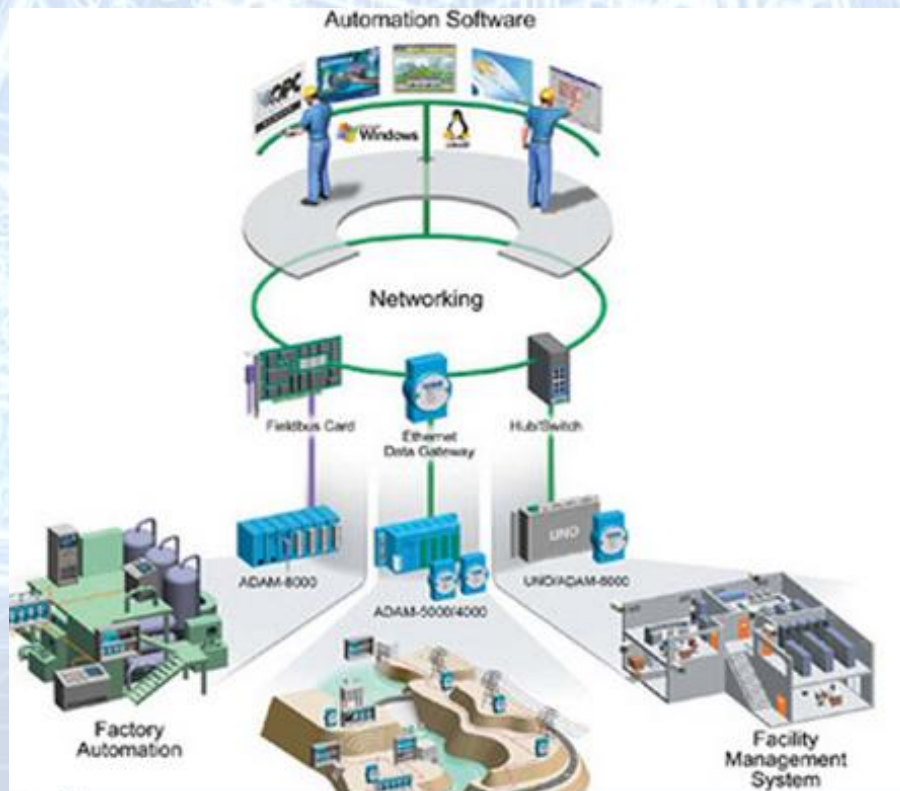
- Designed to learn the behaviour of the occupants and operation patterns of each individual system. It reduces the cost of owning and operating the building by **reducing redundancy and waste.**





# Pros and Cons of Intelligent Building

- Keep track and empirically learn the maintenance cycles of equipment and notify building management when there is a critical issue that workers must address. This save maintenance cost and create a safer environment.



# Pros and Cons of Intelligent Building

- **Maximizes the convenience and comfort of the occupant.** For instance, there is no need to switch off the lights manually when the occupants are not in need of it and the temperature of a room is monitored by a smart thermostat. This heightens the **quality of life** of the occupant greatly as there is no need to worry about the state of the environment he/she lives in.



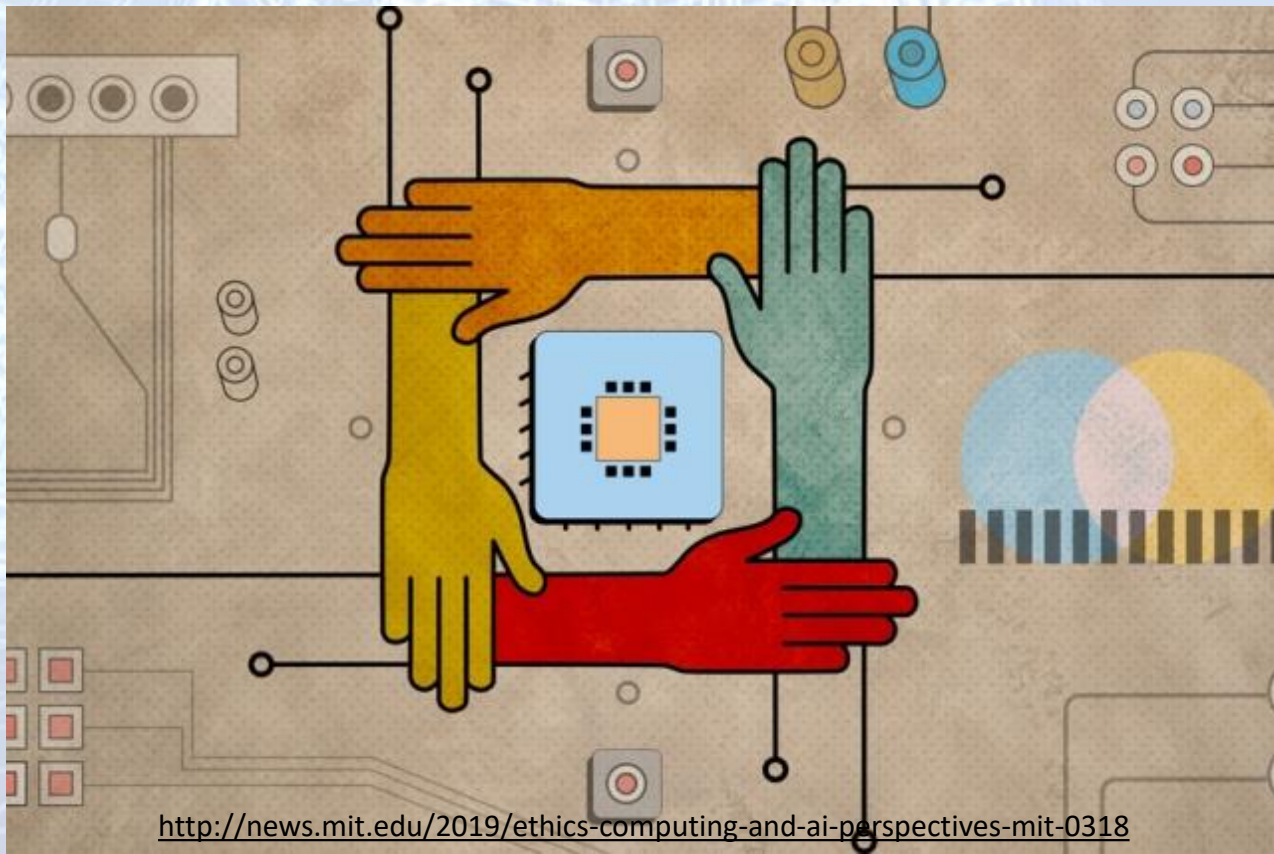
# Pros and Cons of Intelligent Building

- Cyber Security - Cyber-terrorist could infiltrate company's data causing **failure to company's critical systems**. The outcome of a successful hacker can range from fooling around with the lights to annoy the occupants to **stealing critical information** from the company.



# Pros and Cons of Intelligent Building

- Intelligent building control algorithm brings together all management in the company whom may have **different cultures and views**. It may create **ethical conflicts** which compromise building operations.



# Pros and Cons of Intelligent Building

- One of the most controversial aspects around intelligent building design is **privacy ownership**. The intelligent building technologies which stored users' behavioural patterns poses a privacy concern, and has intrinsic risks of causing **lawsuit**.



# Intelligent Building Design Considerations

- A tendency to think that **smarter means more technology**. In this approach the intelligent buildings are designed for the **engineers and IT professionals**.



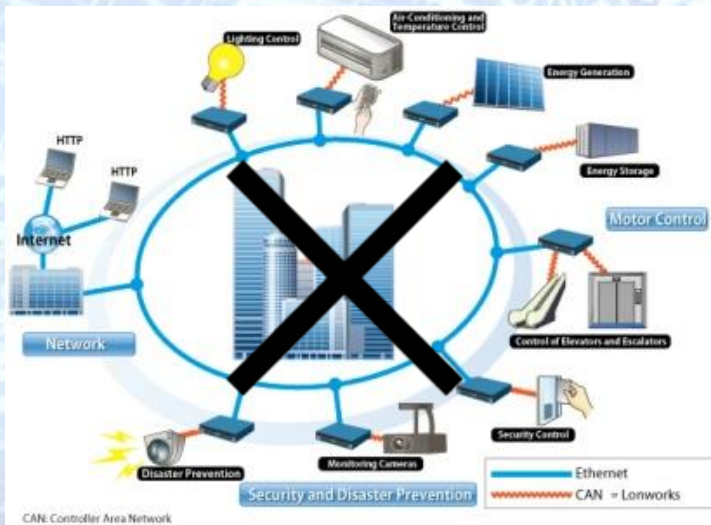
# Intelligent Building Design Considerations

- “The first thing we ask is; what do we want people to feel... delight, surprise, love, connection?”  
~ Apple’s design philosophy



# Intelligent Building Design Considerations

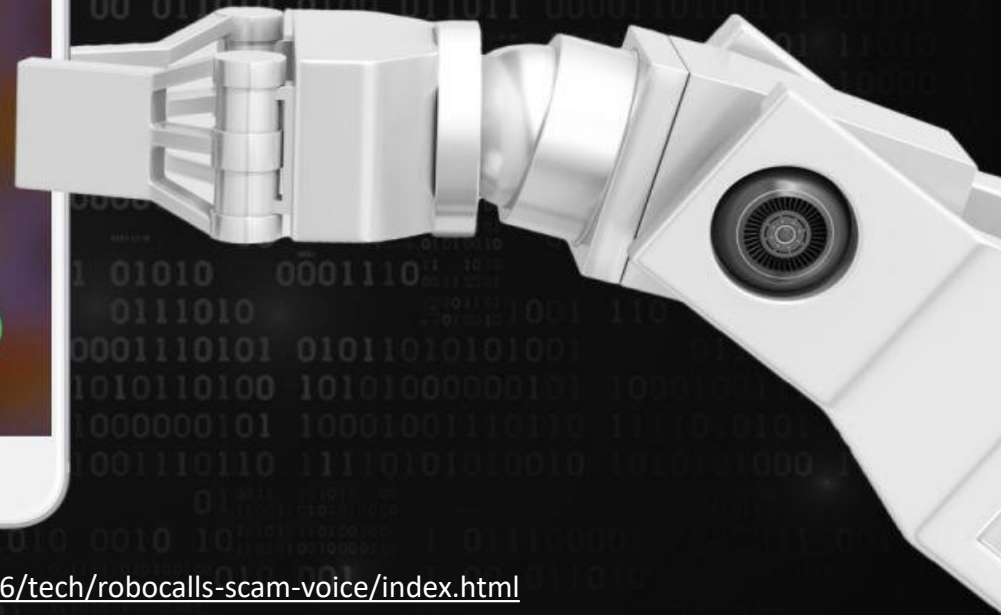
- Give up the quest of **flooding** any and every intelligent building with new tech, and instead focus on designing **human centric buildings**.





# Intelligent Building Design Considerations

- Understanding that **technology** is simply a means to an end, rather than an end unto itself.



# Human-centric Intelligent Building Characteristics

- The building “follows” occupants



# Human-centric Intelligent Building Characteristics

- The building provides occupants with choices



# Human-centric Intelligent Building Characteristics

- The building **communicates** with occupants spontaneously



# Human-centric Intelligent Building Characteristics

- The building **assists** occupants with the daily tasks



# Human-centric Intelligent Building Characteristics

- The building uses resources **efficiently and effectively**



# Human-Centric Intelligent Building Design for the Developmental Challenges

- **Design for Convenience**
  - Require less physical strength
  - Require less physical movement
  - Deliver productive work



# Human-Centric Intelligent Building Design for the Developmental Challenges

- Design for Safety

Fire

Security

Continuous Communication





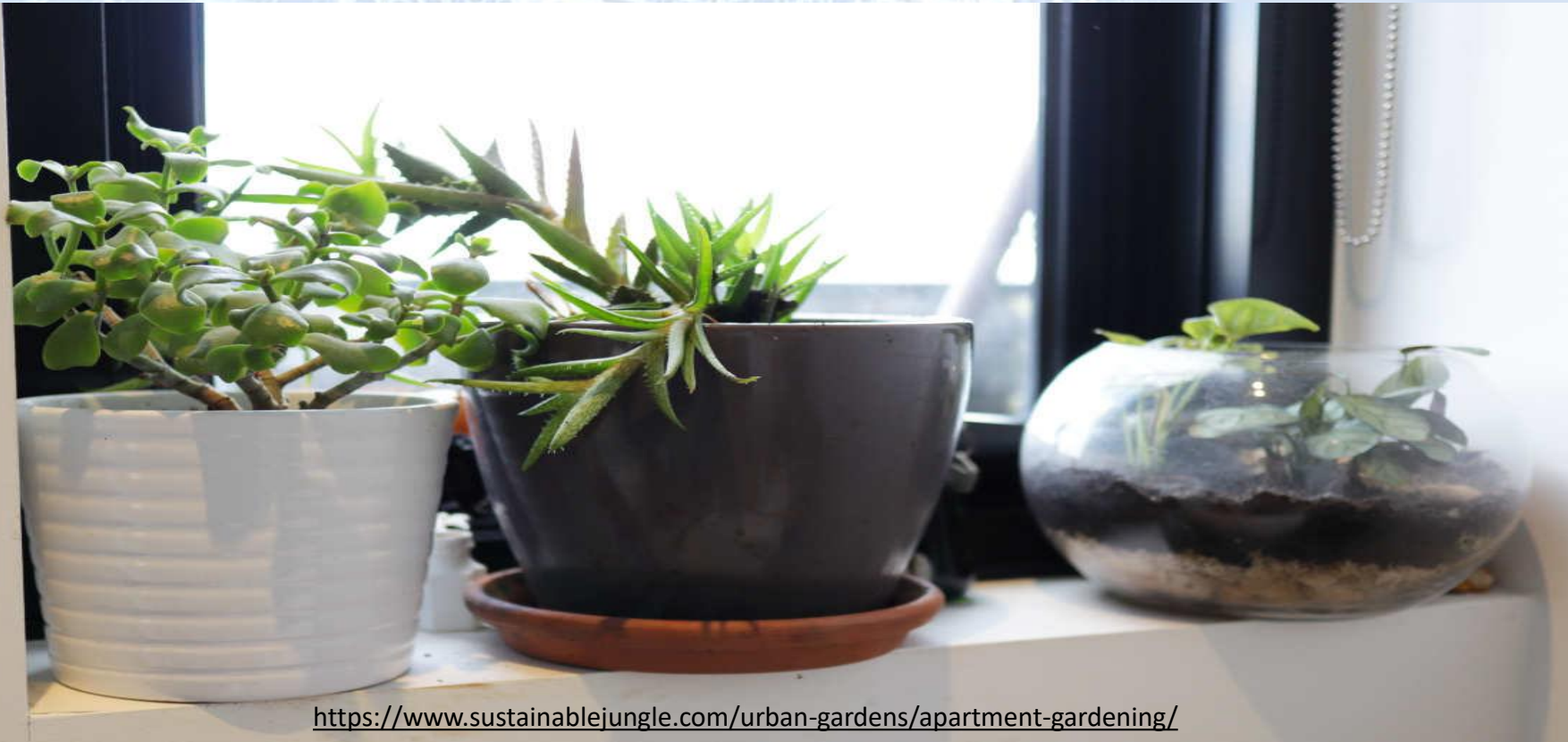
# Human-Centric Intelligent Building Design for the Developmental Challenges

- **Health**

Thermally Comfortable

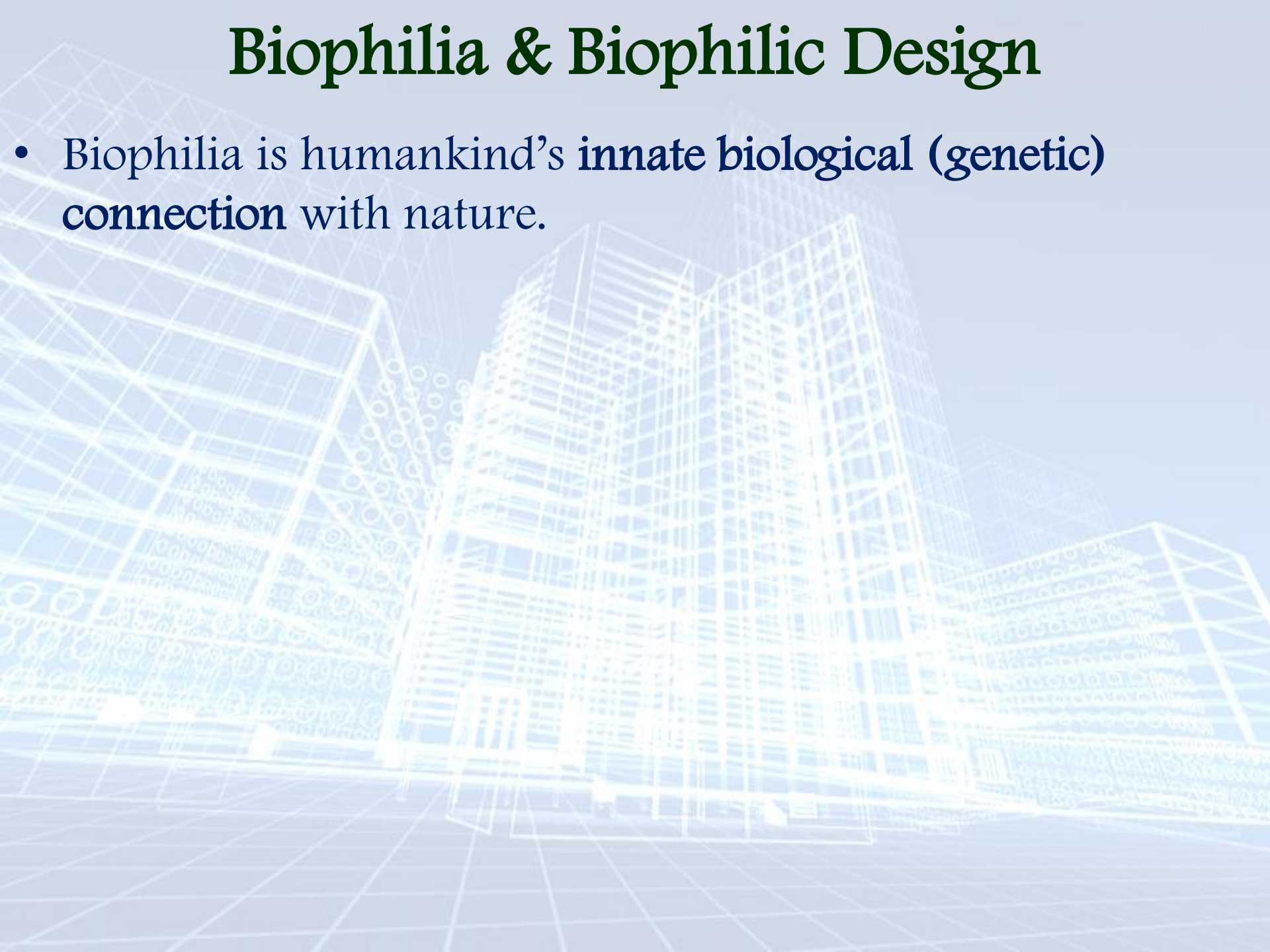
Relief Stress

Good Air Quality



# Biophilia & Biophilic Design

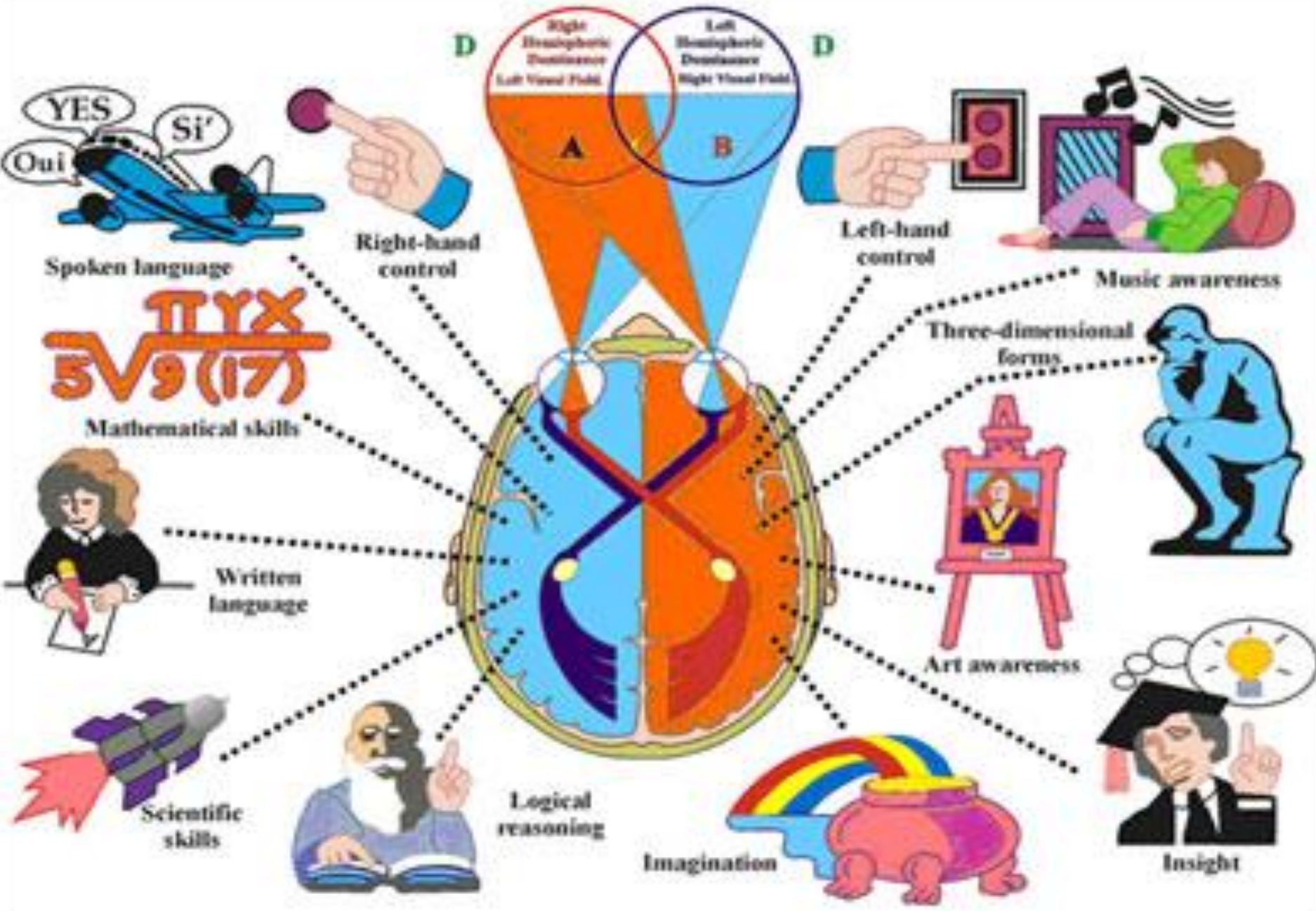
- Biophilia is humankind's **innate biological (genetic) connection** with nature.





# Biophilia & Biophilic Design

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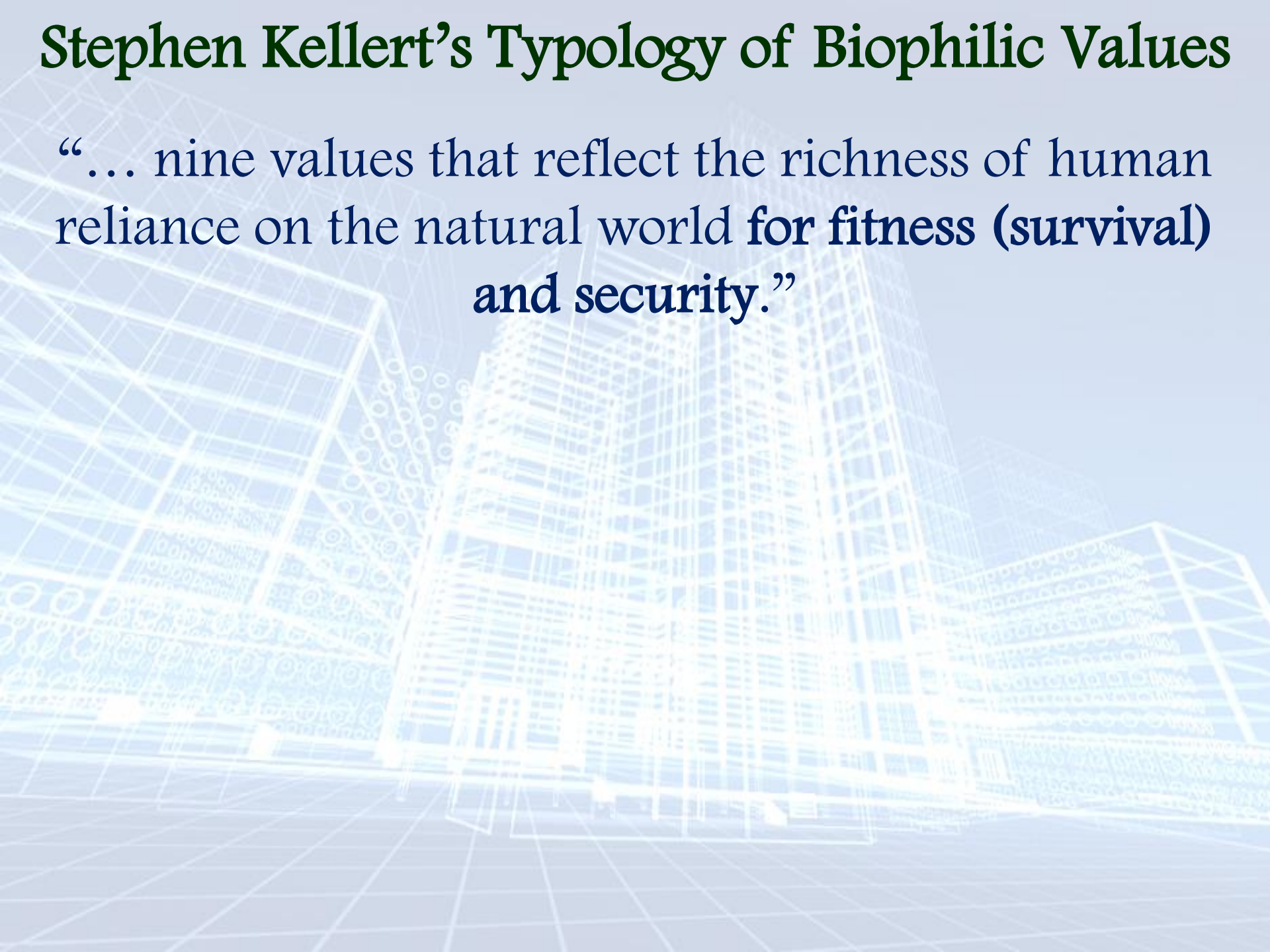
# Biophilia & Biophilic Design

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- Evolved from within the fields of biology and psychology, and been adapted to the fields relate back to the desire for a (re)connection with nature and natural systems.
- Biophilic design is providing people opportunities to live and work in **healthy** places and spaces with **less stress** and greater overall health and **well-being**.



# Stephen Kellert's Typology of Biophilic Values

“... nine values that reflect the richness of human reliance on the natural world for **fitness (survival) and security.**”





# Human-Centric Intelligent Building Design for the Developmental Challenges

- **Design for Affordability**
  - Feasible Equipment Cost
  - Less Utility Cost
  - Less Maintenance Cost



# Human-Centric Intelligent Building Design Goals

For the occupants to live independently,

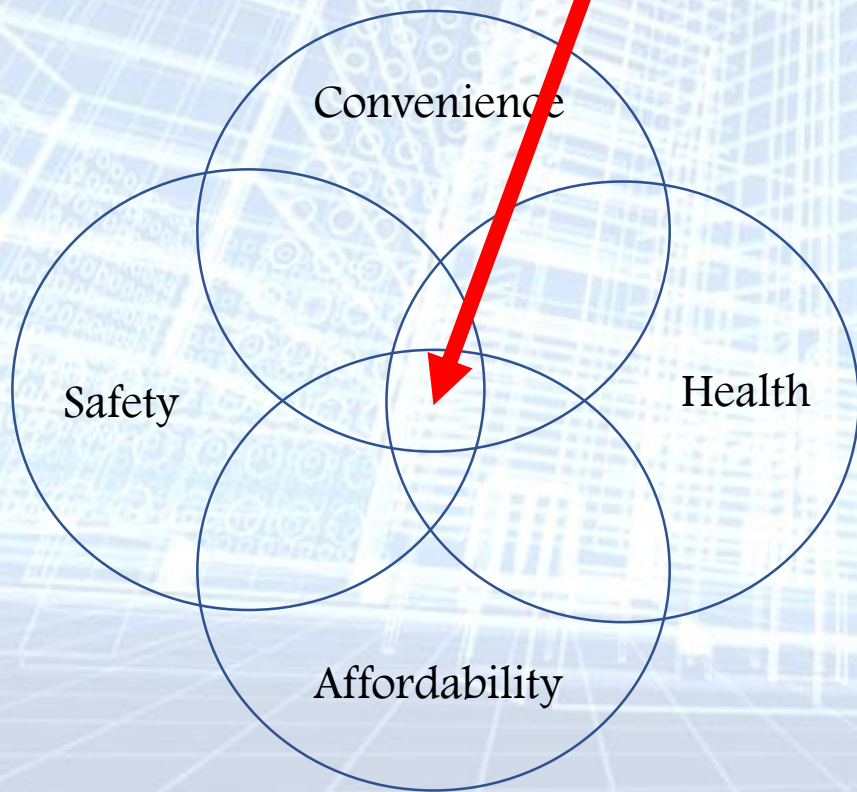
the intelligent building design can focus on

**Convenience**

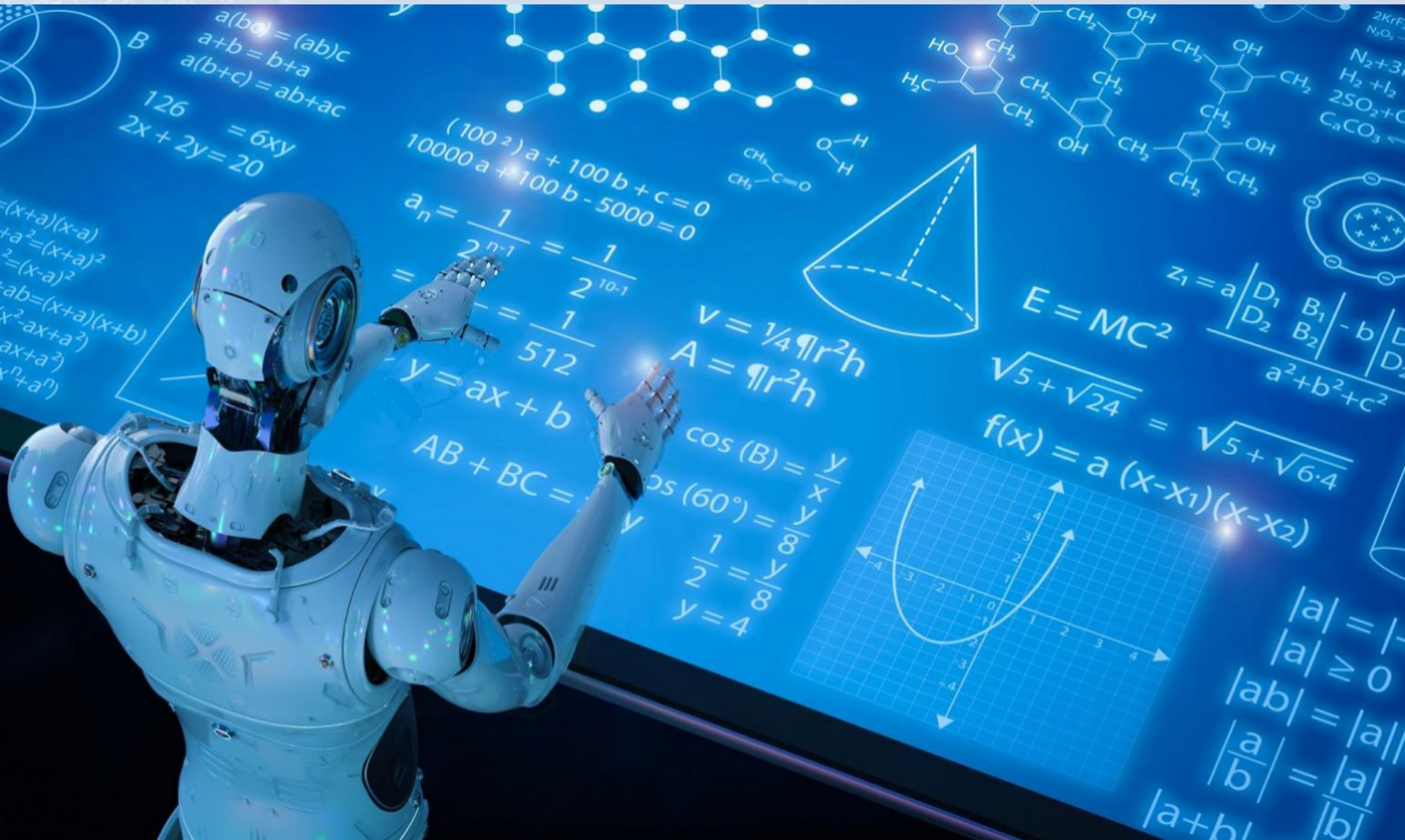
**Affordability**

**Safety**

**Health**



# Intelligent Building and AI



# Intelligent Building and AI

Competing or Cooperating?  
Who is the boss?



# Intelligent Building and Climate Adaptation



# Intelligent Building and Climate Adaptation

Flooding is a major concern.

Where is the equipment and server room?



# Intelligent Building and Nature



# Intelligent Building and Nature

Nature provides the best building design model

Nature is the best teacher





# Intelligent Building

**Thank You**

**Q&A**

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