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A SHORT TOUR OF THE MODERN TECHNOLOGIES IN ARCHITECTURAL WORLD

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Abstract— **Modern techniques of Architecture are used as a metaphor. Technology is the study of technique, the word itself clarifies the point of attraction of the manuscript. This manuscript will take to the short tour of our modern days techniques, these are used to flourish the architectural world. Now, let us put some focus on what are such modern technologies. The techniques which put a maximum effort for architectural benefits are: Business Architecture, Computer Architecture, Cognitive Architecture, System Architecture. Now, coming on the three recent techniques in architecture, which are developing and creating new structures to strengthen and to support the architectural designs, these new technologies are grooming well in advanced, these technologies are: BIM (Building Information Modeling), VR (Virtual Reality), 3D Printing.**

So, let us study the methods of these new techniques. 1) BIM (Business Information Modeling) – This process is supported by various tools, technologies to represent the physical and functional characteristics of a place. 2) VR (Virtual Reality) – This process helps to explore the conceptual model virtually. 3) 3D Printing – This process changes the physical model from a range of colors and materials based on a CAD model. Now, coming to the uses of these technologies, Building Information Modeling (BIM) can be used for infrastructure designs, detailed information of a building can be modeled by using this process. Also to notify you that, BIM can be replaced by Artificial Intelligence (AI) helps a company to solve the performance gap by using the right tools. Next is Virtual Reality (VR), it can be used anywhere, like, Education training purpose, in video games, and in business world, it helps to communicate with people or client virtually, and VR cannot be replaced, by advanced methods it can be transform into a most helpful technology. 3D printing machines can be used in repairing items, household use, medical supplies such as for complex surgeries. Though, the materials are in limited amount, but cannot be replaced with any other technology in future.

Keywords: Computer-generated information, 3D Models, Virtual world, Parametric design, Smart Industrial Robot, CAD design, Direct modeling.

I. INTRODUCTION

Architecture is the process of making an imaginary structure into a reality form by construction, planning and designing processes. The field of architecture has divided out including ship design to interior decorations as well.

Different types of architecture includes:

1. **Landscape Architecture:** It mainly involves an investigation of ecology and soil conditions. It covers a green infrastructure planning where one can made landmark. For example: Park.
2. **Interior Architecture:** Interior itself denotes an area covered with boundaries and also which can be redesigned when needed, it deals with inner space of any plan. For example: Kitchen.
3. **Naval Architecture:** It involves marine vehicle structural designs and also includes the proper guidance of the safety regulations of the marine vehicle. For example: Ship.
4. **Urban Design:** It deals with the structural designs of cities, towns. Planning of public spaces and streets and making it more attractive. For example: Street wall painting.

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II. RESEARCH CONTEXT

Now, let us start to grab some innovative ideas and change our views.

A. Benefits of Implementing Technology:

Technology has always helped us to think more creatively. One can easily change their views by different visualization. Suppose, when we draw a normal house, we take it in a simple form, but, when we change that specific house into a 3D design, from this we get a chance to change our idea, we get the knowledge of creativity and gain some interest on that topic. Technology is time consuming and reduces the cost of the project. And clients can easily change the areas, and can give their own ideas before starting construction. Building Information Modeling (BIM) helps architects and engineers to specify plans before cutting and welding takes place.

B. The Internet of Things:

It is a new trend driving across the constructional area, we always get this facilities before owning a home. For example – Door bell, sensors, personal assistants like Alexa (it helps to reduce workload). Sensor helps to collect various data to check the temperature, energy usage, for implementing the new technologies at a different level. As we know that, CO2 gas mainly occurs from house buildings. And this effects the environment a lot. So, by making our buildings greener is must and it is the most important point.[9] Consumption of energy is very low in IoT system, it automatically works on power consumption areas.

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C. Virtual Reality:

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VR is mainly used to display video games, short films to show a virtually attracted architectural experience. Immersive technologies create distinct experiences by merging the physical world with a digital or simulated reality. Augmented reality (AR) and Virtual reality (VR) are two principle types of immersive technologies. These technologies share many of the same qualities. However, AR blends computer-generated information onto the user's real environment, while VR uses computer-generated information to provide a full sense of immersion.

AR relies on processors, a display, sensors and input devices to create an experience.

VR systems use head-mounted displays and input devices to provide a sense of immersion. Head-mounted display covers the user's field of view to display computer-generated content.

Input devices such as joysticks, tracking balls, controller balls and data gloves allow the user to interact with the virtual environment.
One can easily magnify all the structural designs such as floors, ceilings, and the entire building designs of a project via putting a headset. It also helps to put some new ideas from the project members to the clients, taking both side decisions before starting a project.

D. 3D Printing:

Instead of using a model, that is created by physical labor. We can technically use 3D printer and AutoCAD program to display a project to the clients, and similarly we can use varieties of color range and can easily change the materials as per the choices of the clients. All we have to do is to gain a proper knowledge of programming. Not for all, the programming is mainly necessary for the architects, from their technical point of view, a client can easily experience a tour three dimensionally.

III. **RESULT**

A. Artificial Intelligence:

It is at the cutting edge of the digital revolution. Reduced operating costs, increased revenue, and optimized customer experience is three of the main benefits of artificial intelligence for business today.
AI tools are changing the entire way of the companies work, and communicate with consumers.
It's an exciting stage of the digital revolution, with an opportunity for early adopters to leverage AI to achieve a competitive advantage.

Benefits of AI:
Today's consumer landscape is more crowded than ever before. To achieve the business goals, one needs to leverage the right tools. More and more companies are investing in AI to achieve their strategic business objectives.

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Advantages of AI are:
From the above advantages, we can conclude that, we are still in the early stages of the digital revolution. With AI technologies continually improving, the performance gap between the companies with AI technologies and those without is only going to get bigger.

- **Personalized customer experience.**
- **Boost efficiency and productivity with automation.**
- **AI – Powered chat bots and customer communications.**
- **To uncover business in sight for making smarter decisions.**
- **To reduce errors and increase accuracy and precision.**

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B. Robot Constructors:

There are more to experience, for example – Robots, many assumptions are coming in recent technologies, from that we have assumed that, Robots would built their own buildings, some companies have already started testing and experimenting new devices like Flying Robots, Termite-like swarm builders. NCCR Digital Fabrication, a Switzerland-based company has developed a robot that can build steel-reinforced frame work, it is also known as a pre-programmed fabricator robot. In 2016, Robotics X has launched a smart Robot, who can share all the capabilities with other devices and can adapt task from other devices, to make a work technically easier, the Robot was identified by the name of X-1 Smart Industrial Robot.

https://www.freepik.com/free-photo/robot-constructor_1001142.htm [5]

https://newatlas.com/aist-construction-robot-humanoid-hrp-5p/56585/ [6]

C. Parametric Design:

https://archistar.ai/blog/the-top-5-buildings-that-make-use-of-parametric-design/ [7]

It is a different area which leverages algorithmic thinking, mainly manipulates geometrical structures and complex structures. Not only 3D designs or building is the ultimate result of the parametric design, it makes a shape that has been controlled by parameters. Parametric modeling is making of technical thinking into 3D CAD designs, in which we can repetitively change the features. It includes, automatic updates, if any change is required, during the session of modeling. When the change has been made, it is easier to define the ability to capture how the model should behave. Production time is very less for the manufacturing process of a model. There are also some disadvantages of parametric designs, which are, if there is some urgent need of design changes in a model, parametric models takes more time to update. Though, the designs are made by CAD software, it is very difficult to find such minor mistakes in a mixed up model designs.

D. Direct Modeling:

https://share-architects.com/tech-trends-in-architecture-to-watch-out-for-in-2019/ [8]

This modeling gives a certain idea of the clay model, there are no use of any feature or software programming interruption. It gives a shape which the architect wants, by pulling and pushing the geometry. Indeed, both Parametric designs and Direct modeling designs are needed for developing a better knowledge of both the designs, because, different clients or peoples have different visual sensation, some may like the virtual parametric designs which is made by CAD software, and others may like the direct modeling designs, which can be visualize directly. An architect must use both the technical and clay models for others satisfaction.

IV. CONCLUSION

As the generation is leveling up, so the demands are rising at its peak level, however, we all need the concepts of these architectural topics. We are also aware of this fact that, Architects and Engineers, all are experimenting something new and unique, they are eagerly worshiping for their new inventions. All we need to do is to motivate them, by dealing with their experiments, and to appreciate their work. Visualization in VR (Virtual Reality), Augmented Reality (AR), BIM, 3D Printing, these all are the novel technologies, from the earlier stages, use of these techniques are mandatory. But as the technical skills are developing, architects are in need of parametric designs, which will help them to focus on taking the basic designs into a new level. At the end of this article, we can conclude that we have to accept the old technologies with the new technologies, we cannot deny that, direct modeling or the models which has been created by clay are not successful, the fact is, they are much successful, but also physical labor is the vital part in this old architectural techniques, whereas, the new technical ideas gives an opportunity to rely on the software tools, here, we can fix problem by using new software techniques,

but in old techniques we have to redo the work again and again. It's a confusing part, whether to choose old techniques or the new techniques. I will suggest that, we can use both the techniques simultaneously, because if we face, any sort of technical fault issues during the final presentation or might get some error while presenting the design technically, we can provide a hand- made model in front of the clients and clarify their doubts instantly. A smart architect will always give the best by impressing their clients, using both the old and the new techniques as per requirements. Now, it is much clear that, we need to energize our brain as well as our body and have to create a different architectural world.

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With this, I was a lucky opportunist, to enlighten the topic in front of the readers. And I am happy to express my views from the references and the knowledge gathered from different sources. I was eagerly waiting for this type of opportunity. After grabbing this opportunity, I took it as my own responsibility to relate with the current technologies of Architecture.

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Authors Short Profile

I feel glad to introduce myself, and thanks for giving me the opportunity. My name is Aabruti Chakraborty, I hail from Madhyamgram, West Bengal. I am currently pursuing Diploma course from a reputed institute that is "WOMEN'S POLYTECHNIC COLLEGE", CHANDERNAGORE, from architecture stream. I did my schooling from Sudhir Memorial Institute. My hobbies are painting, singing, reading story books, writing article, helping needy people and I am fond of mythology. My strength is that, I am a kind of a person, who have faith in god and believes in honesty, and I obey all the sayings of my parents which helps me to become an better person day by day. My weakness is, I am scared of dishonest people and also, when I cannot help the barefoot beggars or poor people. I felt, that is my biggest weak point and for strengthening that point, I have to work very hard and have to gain that capability to help them. I have achieved some certificates for singing and painting, also some of my articles have been published, one is by Orange book publication, which is available on flipkart, and the book is named as Women's Empowerment, in which I have written on the topic "Women and Society", also written some articles on New Education Policy, Business Analytics on present era, soon to be published. We all have some dreams in our mind, through which we get the motivation to design our future, and my dream is to design an artistic come standout society. That's all about me. Thank you.