

Planning Construction Automation

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Abstract-A long-term preparation is necessary to adapt technological development to advanced construction methods due to the high complexity of the construction process. In this adaptation process Architects, engineers and all other participants of the construction process have to be integrated . The development of automation will takes place step-by-step and also it will be oriented to the respective application and requirements. In the initial phase the existing softwares will be automated step-by-step. Here the automation process is done by 2 concepts which are datamining and imageprocessing.The proposed system can easily construct complete plan for home which cannot be done through the existing system. Here we need to input the dimensions of each section of the home through which the plan is constructed automatically. The main purpose or goal of this system is to make construction planning easy with minimum investment and time. And the customers can choose the model for their home which is inbuilt in the software according to the dimension. The software asks to input dimensions of each section separately which is necessarily to complete it.

I. INTRODUCTION

Mostly the planning construction was done by the engineering drawings. However, so many orthographic projections was introduced in the eighteenth century. Because of the visual representation transcend languages, engineering drawings have evolved and become popular over the years.

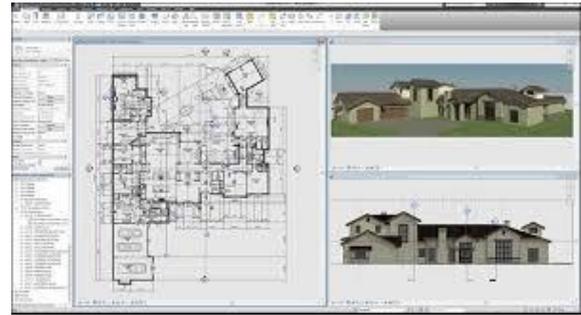


Fig I.a planning construction

In the above figure it explains how the software displays the plan of home according to the dimensions that have entered. It also displays the model of home from which the user can understand about the plan which is to be constructed.

The studies have shown that engineering designs are quite complicated why because the engineering drawings were handmade.. And this engineering problems requires a solution of combination of organization, analysis, problem solving principles and a graphical representation of the problem. In engineering

the objects can be represented by a technical drawing. It is also called as drafting and it represents designs and specifications of the object and its relationships. The technical drawing is more precise and it communicates all information of the object clearly. This is where CAD software comes to the fore. And the proposing system forwarding the concept of automating those tools for drawings which will be very easy to construct such plans for home, building, etc.

By the automation process, the total time required for planning construction can be minimized and also automated and robotized construction process lead to a continuous working time. Introduction of the automation technology. The reduction of construction time would also improve cost of construction project due to faster availability through the software. The concept can be related to artificial intelligence because here the computer draws the entire plan. But the proposed system makes software automated using data mining and image processing.

The main contributions of the paper are as such:

- 1) The section II describes survey about the related work
- 2) The section III describes traditional softwares used for engineering drawings.
- 3) IVth section further proposes automation to the existing system.
- 4) Vth section describes the result and analysis.

II RELATED WORK

So many related papers have done based on this planning construction. It can be explained using the following technologies implemented in some IEEE papers. "Low-power networking in Home and Building Automation Systems", paper will try to address the issue by evaluating the introduction of power state switching in a real scenario and proposing the concept of functional and spatial adjacency among packets. "A 3D Based Integrated Automation Control Platform for IBS Building", paper introduces a concept for solving the limitation on visualization and integration of data and information in controlling and managing a lot of facilities and devices used in buildings. "CAD/CAE integration framework with layered Software architecture", paper introducing an open-sourced CAD abstraction component common geometry module (CGM) as the integration middleware, a three-layer scheme is implemented to integrate our CAE software.

III TRADITIONAL DRAWING TOOLS

Now a days we know, people can't take efforts and they try how to work with maximum effortless and efficiently in plan construction field, also the man power replaces to machine power and to build the plans, many drawing tools are used traditionally. In this area we discuss about such traditional drawing tools.

- 1) CAD (Computer aided design)

CAD is a software which is used to replace manual drawing into automatic process. This is

a famous and most used traditional drawing software.

Now discuss about the CAD tools.they are

- Text:-insert or remove characters to single line text.
- Lines:-Area calculation.
- Layers:-Move to layer by object.
- Draw:Draw from coordinates.
- Surface:-Create longitude features
- Convert:-convert 3D to 2D

The next question comes,what the motive to use the CAD software for drawing automated plans or car designing etc.we have lot of answers to that question.

- Compatibility:-the Autocad softwares are compatible.workflow between CAD products.
- Compare CAD software:-which means compare the plans and choose out the best plans.

And also the CAD softwares have some problems included.because in any softwares they have some limitations also CAD.which are:-

- Work can be lost because of the spot shutdown of systems.
- Chances of hacking is very high.

These are the some limitations in CAD software.

And also the CAD used some additional softwares.and they used in the profession of Architects, Building engineers, Civil engineers,car designers,etc.

- AUTOCAD
- AUTOCAD LT

- FUSION 360

2)REVIT

The another automatic drawing tool is Revit software.it also like the autocad software.and the Revit software create more accurate and optimized designs.with BMI tools,communicate concepts and to become visualization.the REVITs jobs are:-

Design and documentation:-in this section,we place the elements like walls,doors and the system generates the 3D optimized views.

Analysis:-it analyse and run cost estimation of the construction.

Visualisation:-the views become the visualized effect.

And the REVIT software is works with BMI tools.which means mainly 3 processing steps.first,Design high performing plans,then create 3D models,and finally automate routine workflows.the REVIT software classifications are:-

- REVIT BMI
- AUTODESK REVIT

3) AUTODESK REVIT

In this software the BMI or Building information modeling) is enabled.it is very advanced technology used and demanded softwares.because of its affordable price.

By using autodes revit softwares,many architects,engineers and construction professionals can create information models to create BMI model.

The main problems of Autodesk softwares are the following:-

- The heavy focus on structural designs, which means while Revit focus on accuracy, it does take away from some other areas of the softwares.
- And the another problem the REVIT software is difficult to perspective editing of plans or designs.

4) Fusion 360

Fusion 360 is a software for designing and drawing automation. It is especially the designing of mechanical products. And the fusion 360 is a cloud based 3D CAD tool for product development. And this software enables fast and easy making of design ideas. The fusion 360 software introduce to

3D modeling:-the software introduced to 3D drawing of tools and it make more understood drawing experience.

And the software connects the CAD, CAM or any other systems in a single cloud based platform that works on both mac and pc. The main tool or job in this software is

3D printing:-the tool or software is popular in 3D printing. And the fusion 360 is the excellent tool for the 2D and 3D objects.

And the main disadvantages are:-

- The software will very laggy when connects slow internet connection.
- Without CAD experience, the fusion 360 can't use for users.

IV AUTOMATION IN CONSTRUCTION

In system design, high-end decisions are taken regarding the basic system architecture, platforms and tools to be used. The system design transforms a logical representation of what a given system is required to be the physical specification. Design starts with the system requirement specification and converts it into a physical reality during the development. Important design factors such as reliability, response time, throughput of the system, maintainability, expandability, etc. should be taken into account.

Sets of fundamental design concepts are over the past three decades. Although the degree of interest in each concept has varied over the years, each has stood the rest of the time. Each provides the software designer with a foundation from which more sophisticated design methods can be applied. Fundamental design concepts provide the necessary framework for "getting in right".

The automation to engineering drawing tools is achieved by image processing concept. When the user enters complete data for the construction of plan, the system process the image and retrieves according to the users input. It can be explain using 3 modules.

1) Project Management module:

The project management module provides a workspace for identifying all the relevant components relating to a specific design. It is to create a variety of configured design documents for implementing connectivity diagrams, bill of materials..etc. This assessment is to take the overall view of the project to minimize the cost and effort.

2) Drawing Management module:

It manages drawings individually using a hierarchical structure.

- Input dimensioning : Here all the dimensions that we require to build the plan is given as input to the software.it includes the measurements of all the sections in home to be constructed.
- Model Selection :The user can select appropriate model for plan construction from the software itself.

3) Drawing Automation module:

The drawing automation module provide the functionality for creating the complete plan from all the dimensions using designing softwares.the plan of each section is automated as per the dimensions.and the last step of the module is to check whether the plan is within the user specification or not.if there any mismatch occur it backs to the drawing management module.this module gives total plan as output.

The following guidelines to be used for the 3 processes.

- Project Management:Select the project management section,it will identify all the materials wants to create the minimized designs.
- Drawing Management:Select the section,and give input the dimensions and selection of plan models.
- Drawing Automation :Press the Drawing automation section,and it gives the output or complete plan.

V RESULT AND ANALYSIS

With this framework,the users or engineers can develop custom applications quickly for their needs.In the comparison of proposed system and existing system it is observed that no software helps to automate the designing the plans for construction.But in the proposed system when the dimensions are entered the complete plan will be displayed in the software section by section through automation.

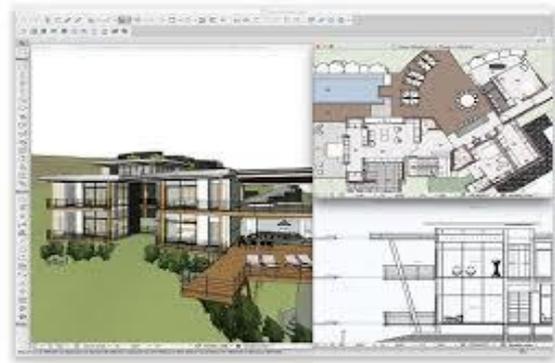


Fig III.a 3D modeling architecture

The above figure is the output structure of this proposed system.In the section III,some traditional tools are described.All of them really helps to construct a plan.But in this proposed system it can be design with much less time than using traditional tools.Why because here the system uses its own efficiency rather than the engineers brain.At the earlier the home construction have to be done by the engineers themselves.But in growing of year engineers tools were introduced.The proposed system have also a drawback because it uses dataset to construct a plan.Eventhough it can reduce the engineers effort by 60% atleast and also minimize the time to draw an entire plan

for the home. The main advantage of the system is that the user can select the model which they really want for their home.

CONCLUSION

This system is important because it is socially relevant. Here we need to input the dimensions only for the complete planning construction which is done through automation system. It cannot be performed by CAD software itself. The ultimate goal for this project is to build a home with minimized cost and time. The reduction of construction time would improve cost benefit analysis of construction project due to faster availability and return on investment of real estate. The proposed system can easily construct complete plan for home which cannot be done through the existing system. The project mainly concentrates to reduce the time required for planning construction.

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