

Nilayasutram: An Advanced Approach for Gruha Vastu

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Abstract— This project introduces an intelligent Vastu Compliance Analyzer that modernizes traditional Vastu Shastra analysis through data-driven techniques. Using advanced processing image, optical character recognition (OCR), and machine learning, the system evaluates architectural floor plans for Vastu compliance. Uploaded plans are processed with OpenCV and Tesseract OCR to extract spatial and textual information, which is analyzed by a pre-trained model. Implemented in libraries of Python like pandas and scikit-learn, the system provides automated predictions, annotated visualizations via a Tkinter interface, and generates a detailed compliance report with corrective suggestions. By combining compass detection, 3x3 zoning, and room classification, the analyzer enhances accuracy and accessibility, bridging ancient principles with modern AI technology.

Index Terms— AI in Architecture, Floor Plan Analysis, Machine Learning, OCR, Vastu Compliance.

I. INTRODUCTION

Vastu Shastra, the ancient Indian science of architecture, focuses on harmonizing buildings with natural elements and cosmic forces. Derived from the Sanskrit words 'Vastu' (dwelling) and 'Shastra' (science), it offers guidelines for creating spaces that promote health, prosperity, and well-being. "Nilayasutram" is an automated system designed to analyze floor plan images and assess their compliance with Vastu principles. By combining processing image, optical character recognition (OCR), and rule-based analysis, the project offers a practical tool for architects, designers, and homeowners to create Vastu-compliant spaces. Vastu Shastra dates back to the Vedic period (1500–500 BCE), with its principles first recorded in ancient texts like the Rigveda and Atharvaveda. Over time, scholars like Varahamihira and Maya expanded these ideas in classical works such as the "Brihat Samhita"

II. LITERATURE REVIEW

Mehul Hotwani [1] In modern architecture, Vastu Shastra is increasingly popular, blending tradition with science. Ancient Indian scholars had deep astronomical knowledge, reflected in concepts like the Vastu Purusha Mandala, a spatial grid guiding site selection, orientation, and room placement to harness positive energies. Karishma Pakhale [2] Vastu Shastra promotes sustainability by balancing human settlements with nature through the Panchabhutaas (five elements). Proper site orientation based on eight cardinal directions optimizes natural light and reduces energy use. Jayanta K Dutta [3] Sustainable architecture focuses on minimizing environmental impact when enhancing human comfort. Vastu Shastra supports sustainability by harmonizing the five natural elements within building designs, promoting health, prosperity, and environmental stability. Chirag Patel [4] This study reviews Tesseract OCR, highlighting its efficiency in converting printed text to editable format. Tesseract, especially on grayscale images, shows better accuracy and speed than commercial alternatives like Transym OCR, making it ideal for OCR tasks P. Schönfelder [5] Deep learning techniques are involved to detect text in poor-quality architectural floor plans, improving legacy document digitization. A specialized model trained for text extraction outperforms transfer learning methods, enhancing facility management and digital twin applications. Ar. Pradnya Patki and Ar. Neha Joshi [6] the authors correlate Vastu principles with vernacular climate-responsive architecture, aiming to create sustainable, culturally rooted building practices. Their study emphasizes balancing traditional wisdom with new environmental and technological needs. Hasan Ahmed Salman, Ali Kalakesh, Amani Steiti [7] This paper explains the Random Forest algorithm, noting its strength in classification and regression tasks. Random Forest handles large, incomplete datasets

well and is widely used in various domains for complex decision-making.

III. PROPOSED SYSTEM

The proposed system applies advanced image processing and OCR technologies to automate the assessment of architectural floor plans for Vastu compliance. By integrating libraries like OpenCV, Pytesseract, and NumPy with a rule-based analysis module, the system accurately identifies room placements and directional alignments according to Vastu principles. A user-friendly graphical interface further simplifies the process, making it accessible to architects, designers, and homeowners alike.

Beyond providing a compliance score and detailed analysis, the system also introduces a personalized recommendation module designed to enhance the user experience. This module suggests practical and easy-to-implement adjustments for floor plans that do not fully meet Vastu guidelines. The recommendations are generated by systematically applying a set of predefined Vastu rules, ensuring that the advice remains authentic to traditional principles. In addition to pointing out areas of non-compliance, the system provides users with multiple possible solutions, offering flexibility based on their specific requirements. By delivering clear, actionable feedback, the system transforms itself from a passive compliance checker into an intelligent design assistant, empowering users to make informed decisions and create more balanced, harmonious, and Vastu-aligned living and working spaces.

IV. SYSTEM IMPLEMENTATION

The Vastu Compliance Checker system combines modern technology with traditional architectural wisdom to make Vastu analysis easy and accessible. When users upload a floor plan image, the system divides it into a 3x3 directional grid, inspired by the Vastu Mandala layout. Using image processing techniques such as OpenCV and NumPy, the system carefully analyzes the floor plan, detecting room labels and their placements within each section of the grid. Then, Optical Character Recognition (OCR) refers to applied using the Tesseract engine to identify the textual elements, such as room names, within the grid. Once the room placements are extracted, the system applies a set of rule-based logic to check if the layout

follows Vastu principles. If the floor plan doesn't align with these principles, the system's machine learning model, based on a Random Forest Classifier, steps in. It generates personalized recommendations, suggesting optimal room placements based on learned patterns from a trained dataset. In the end, users get a comprehensive report, complete with both a compliance score and actionable suggestions on how to improve their design.

The system is built with three core modules that work together seamlessly to ensure both efficiency and ease of use. The Image Processing and Text Detection Module is responsible for all the technical background work, such as loading images, detecting directional markers, dividing the floor plan into grids, and extracting room labels through OCR. The Graphical User Interface (GUI), developed using Tkinter, offers a user-friendly platform where users may upload their floor plans, input required directional data, view the processed images, and get results in an intuitive, visual format. Finally, the Vastu Compliance Analysis Module ties it all together. It applies the Vastu principles to check compliance and, using the machine learning model, suggests improvements for any non-compliant areas. This module ensures the system is not just a passive checker but an active assistant that provides guidance for improving the floor plan.

By combining cutting-edge technology with the ancient science of Vastu Shastra, this system becomes higher than just a tool for evaluating floor plans. It serves as a virtual design assistant, providing users with both insight and actionable advice for designing areas that are not only visually beautiful but also aligned with the principles of Vastu. Whether you're an architect, a homeowner, or a designer, the system

V. SYSTEM DESIGN

In Fig. 1, the flowchart for the Vastu Compliance Analyzer system outlines the complete process used to evaluate floor plan images for compliance with Vastu principles, utilizing machine learning and advanced image processing techniques.

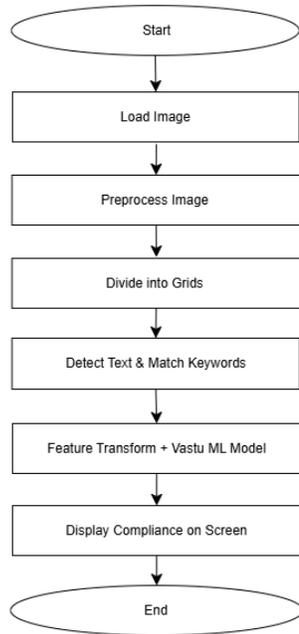


Fig. 1: Flowchart Diagram of Model

The analysis begins with the Start step, which triggers the automated system. The user initiates the process by uploading the floor plan images in the Load Image phase. The system then proceeds to the Preprocess Image stage, in which image enhancement techniques are applied to improve the clarity and quality of the floor plan, making it applicable for Optical Character Recognition (OCR) and spatial segmentation. This step is essential to ensure that the image is optimized for accurate data extraction and analysis. The system then divides the floor plan into a 3x3 grid during the Divide Image into Grids phase, which structures the image into shorter regions for focused analysis, creating a framework for subsequent steps. Next, the system enters the Detect Text & Match Keywords phase, where OCR is performed on each grid cell to extract room labels and match them with known Vastu-related terms. This textual data, along with the spatial information about room placements, is then processed in the Vastu Compliance Prediction step. Here, the system analyzes the alignment of rooms and their directional placements, comparing them against Vastu principles to predict compliance. The output of the analysis are displayed in the Display Compliance on Screen phase, where users can view a clear, visual representation of compliant and non-compliant areas within the floor plan. The process concludes with the

End step, marking the completion of the floor plan assessment. This flowchart captures the system’s holistic approach, integrating processing image, natural language processing (NLP), and predictive modeling to provide users with accurate, data-driven Vastu evaluations.

VI. RESULTS

a creative or modern interpretation or application of the traditional Vastu Shastra principles with a focus on residential architecture, perhaps fusing traditional knowledge with modern design or scientific discoveries.

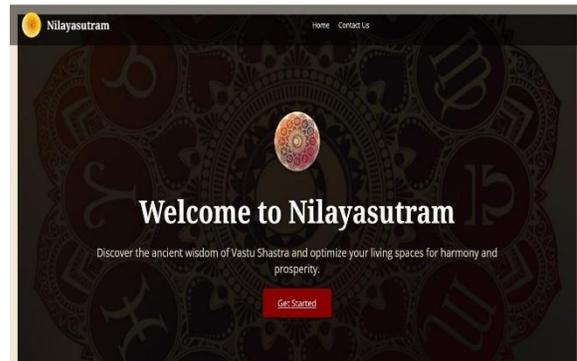


Fig. 2: Home Interface

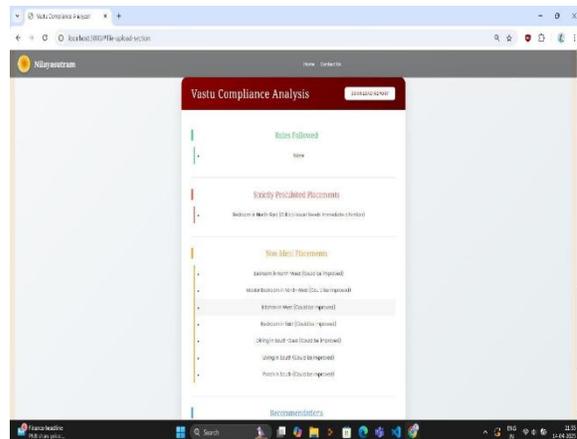


Fig. 3: Vastu compliance analysis report diagram

VII. CONCLUSION

In the conclusion, Vastu Compliance Analyzer represents an innovative solution that incorporates cutting-edge technologies with ease to automate the analysis of floor plans for Vastu compliance. By combining processing image, optical character recognition (OCR), machine learning, and structured analysis, the system offers a powerful tool for

architects, interior designers, real estate professionals, and homeowners who seek to create Vastu-compliant living spaces. With its user-friendly interface and robust architecture, the system simplifies the traditionally complex and time-consuming process of Vastu evaluation, enhancing accuracy, consistency, and transparency.

This system demonstrates the practical application of technologies such as OpenCV, Pytesseract, and NumPy, together with machine learning models trained to predict compliance. This integration not only improves the efficiency of Vastu analysis but also provides actionable insights and recommendations to optimize floor plan layouts. Furthermore, the system's ability to process various image formats and support complex room layouts highlights its flexibility and real-world applicability. Future enhancements, including the detection of architectural elements and expanded dataset integration, will further elevate the system's capabilities, making it an even more powerful tool for modern architectural design. Overall, the Vastu Compliance Analyzer bridges the gap between traditional architectural principles and modern AI-driven technology, offering a valuable solution for users seeking to incorporate Vastu principles into contemporary living spaces

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