Generating Building Drawings using Image processing

By -Abhishek Chandra

Submitted to-
Dr. Kamlesh Dutta
Dr. Hemant Kumar Vinayak

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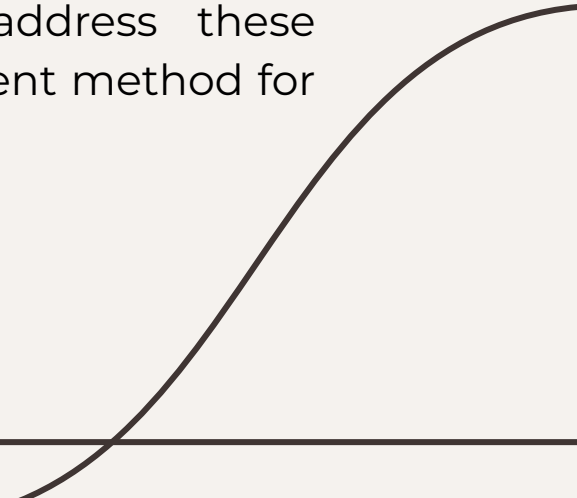**Result And Analysis**

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Introduction

- Generating accurate drawings of existing buildings is often a time-consuming and costly process.
- In cases involving old structures, obtaining precise measurements is difficult.Therefore, there is a need for a computer-aided approach to efficiently produce these drawings.
- This paper proposes a method that utilizes image processing techniques to generate building drawings, substantially reducing the time and cost compared to traditional methods

Motivation

- Obtaining accurate drawings of buildings is often an exhausting and time-consuming process.
- Currently, there is no effective, accurate, and computationally efficient solution that is simple enough for an average user and cost friendly.
- This paper proposes a novel approach to address these limitations, providing a more accessible and efficient method for generating building drawings.

Problem Statement

- The research, **"Generating Building Drawings using Image Processing,"** addresses the challenge of creating accurate Building drawings, particularly for old buildings.
- Traditional methods are often labor-intensive, time-consuming, and expensive, while existing tools are either too complex or lack precision and efficiency.
- This research proposes a computationally efficient and user-friendly solution using image processing to streamline the process of generating accurate building drawings.
- **Gaps-**Though there are softwares to obtain 3d models using various scanning techniques but there isn't any existing model that provides the Elevation drawing of the building in the DXF format.

Objectives

- To develop a computationally efficient, simple and straightforward method for producing accurate architectural drawings in a desired format that can be viewed and edited in CAD softwares.
- To generate Accurate Drawings without the use of complex Lidar and Laser based systems.

Related Work

Name	H/W used	S/W used	Technology used	Result
Documentation of architectural scenes using a hierarchical method. **2010**	8 MP point and shoot camera	Custom Model	Harris corner detector SFM RANSAC CAMPLAN	3D model of anna university made using 100 photo on 8mp camera along with a part of sw to conati text data.

Related Work

Name	H/W used	S/W used	Technology used	Result
Architectural Photogrammetry: A low cost image acquisition method in documenting built environment. **2021**	Canon DSLR D60 DJI Phantom 4	Lightroom ContextCapture	Point cloud Generation	3d model of SEWU temple was made results were compared to laser scanned model and turned out to be good enough solution.

Related Work

Name	H/W used	S/W used	Technology used	Result
Quality enhancement in Digital Twin production of complex architectures with integrated use of terrestrial and aerial images **2023**	Nikon D300 Dji Phantom 4 CHC i80 GNSS Geomax Zoom25	Lightroom ContextCapture	Point cloud Generation	3d point cloud Model made of Gebze Technical University Geomatics Engineering Building.Along with roof

Related Work

Name	H/W used	S/W used	Technology used	Result
3D modeling of cultural heritage with point cloud generation by integrating UAV and terrestrial photogrammetry techniques. **2023**	Canon EOS600D Dji zenmuse p1 Topcon HiPer Sr GPS Topcon Gpt-3500	Agisoft Metashape	Structure from motion	3D model of Yildiz Technical university guest house building was made.53 aerial photos 521 ground photos

Related Work

Name	H/W used	S/W used	Technology used	Result
3D Modeling of sanggrahan temple using UAV imagery and terrestrial photogrammetry method. **2023**	Nikon D300 DSLR 24Mp Dji Phantom 4, 20 Mp	N/A	Structure From motion	Dense point cloud Model,mesh model and textured model made of Sanggrahan temple.

Methodology

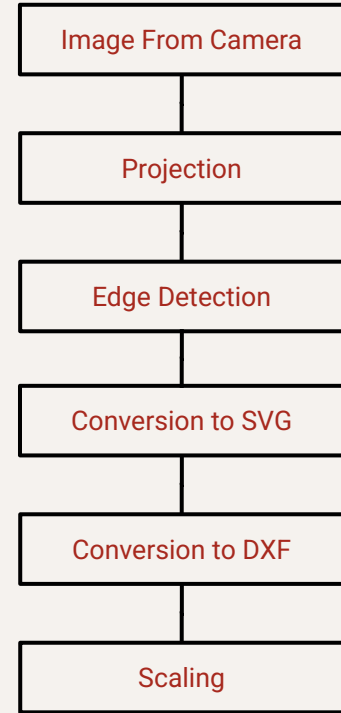**Step 1:**Capture images in JPG format.

Step 2: Obtain orthographic projection Using Perspective transform.

Step 3: Obtain Edge image using OpenCv.

Step 4: Convert Edge image to SVG file.

Step 5: Convert Svg file to dxf using INKSCAPE.
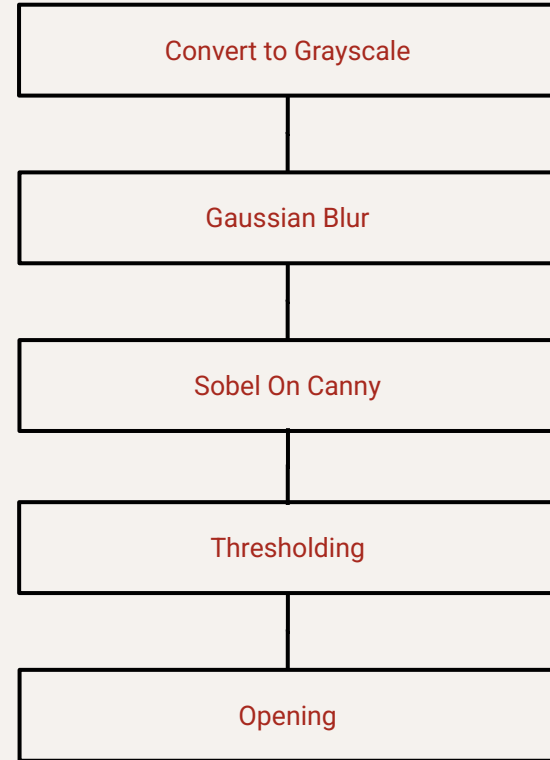
Step 6: Scale the drawing to in Autocad.

Image From Camera

Projection

Edge Detection

Conversion to SVG

Conversion to DXF

Scaling

Edge Detection

Step 1: convert to grayscale.

Step 2: Apply gaussian blur.

Step 3: Apply Sobel on Canny

Step 4: Thresholding

Step 5: Opening

Convert to Grayscale

Gaussian Blur

Sobel On Canny

Thresholding

Opening

Proposed Results

- The elevation drawings of the building will be obtained in DXF format as the output of the proposed model.
- The obtained drawings can be scaled in Computer-Aided Design (CAD) software to match the building's measurements.
- The model should be able to generated the elevation drawings from a simple JPG image taken with an ordinary camera, while using minimal computational resources.
- The edge detection pipeline will be able to extract a significant amount of contour data from the image, while effectively reducing noise to a tolerable level.

Conclusion

- The proposed model should be able to generate drawings of buildings with desired accuracy and minimal computational requirements.
- The model can be developed into an user friendly application as it doesn't need sophisticated equipments.
- The model will be able to perform the task of documentation using just a fraction of the cost required in traditional methods.

References

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Thank You