XML to COCO JSON Conversion
for
Auto-Annotation of Floor Plans

Project Overview:

The project aims to develop a comprehensive and meticulous pipeline for manual XML annotations. This pipeline will address the challenge of converting XML annotation formats into the widely recognized COCO JSON format, which is crucial for preparing data for sophisticated machine learning tasks, particularly image annotations. The project will focus on various phases, each designed to ensure the accuracy and quality of annotations. The primary goal is to create a robust framework for annotating images with precision, consistency, and efficiency.

Objective:

The objective of this project is to create a pipeline that enables the annotation of images from XML format to COCO JSON format for machine learning tasks. The project is grounded in the methodologies and insights captured in the 'xml_pipeline.ipynb' notebook and will follow a systematic approach, as outlined below:

Proposed Phases:

1. XML >> COCO JSON Pipeline Prototype:

- Develop a prototype for converting XML annotation formats into COCO JSON.
- Ensure no data loss or misinterpretation during the conversion process.
- Lay the foundation for subsequent project phases.

2. Plotting Coordinates from XML:

- Visualize annotations by plotting coordinates extracted from XML files.
- Verify correctness, consistency, and integrity of the annotations.

3. Converting XML Coordinates to Polygons:

- Transform individual coordinates from XML files into meaningful polygons.
- Represent annotated areas in images, such as objects or regions of interest.

4. Superimposing the polygons on the image (Without manually adjusting scaling):

- Overlay generated polygons on source images.
- Inspect annotations without manual adjustments to identify inconsistencies or misalignments.

5. Superimposing the polygons on the image (After manually adjusting scaling):

- Fine-tune polygon placement, size, and orientation for precise alignment with images.
- Ensure annotations accurately represent the intended areas without distortion.

6. Converting the XML Polygon Coordinates to COCO JSON format for Semantic Segmentation:

- Meticulously convert refined and adjusted polygon annotations into COCO JSON format.
- Prepare the data for advanced machine learning tasks, such as semantic segmentation.

Key Project Outcomes:

Upon successful execution of these phases, the project will yield the following outcomes:

- A meticulously annotated dataset in COCO JSON format.
- A comprehensive pipeline for manual XML annotations.
- Enhanced image data quality for machine learning tasks.
- Improved precision, accuracy, and consistency in image annotations.
- A framework suitable for advanced analytical tasks, particularly semantic segmentation.

Accomplishments:

- Robust Conversion Pipeline: We have successfully developed a robust and meticulous pipeline for converting XML annotations into the widely recognized COCO JSON format. This pipeline ensures data integrity and precision throughout the conversion process, which is essential for the quality of our annotations.

- Visual Verification: The project included a crucial step for visual verification. By plotting coordinates from XML files and converting them into meaningful polygons, we have not only created visual representations but also validated the correctness, consistency, and integrity of the annotations.

- Alignment Testing: We conducted thorough testing to superimpose polygons on images without and with manual adjustments to ensure they fit accurately. This process served as a critical litmus test for the quality of annotations, revealing any inconsistencies or misalignments.

- Data Readiness for Plexxis: The meticulous conversion of XML polygon coordinates into COCO JSON format has prepared the data for advanced machine learning tasks, such as those required for Plexxis, effectively improving the quality of auto-annotations.

- Resolution of Challenges: We encountered challenges related to fluctuating coordinates with image size and data format discrepancies. Through research and careful consideration, we identified and resolved these challenges by maintaining consistent dpi settings during image conversion.
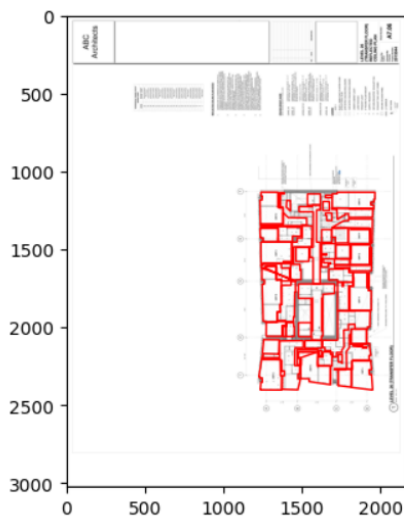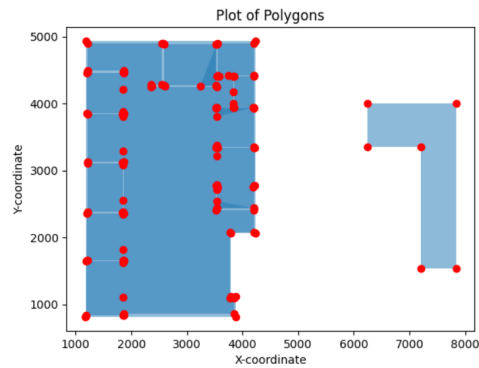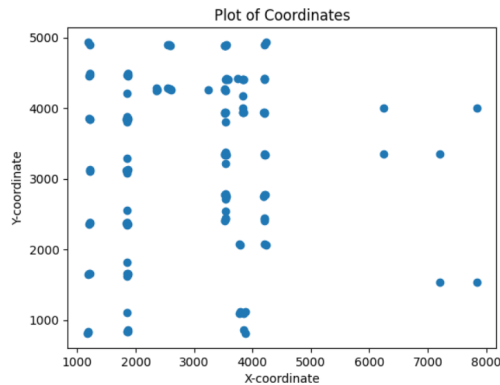
Challenges Encountered and Resolved:

- Fluctuating Coordinates with Image Size: Coordinates in XML files change with image size modification. This issue has been resolved by ensuring consistent dpi settings during image conversion.
- Data Format Discrepancies: Mixed format coordinates combining string and floating-point representations have been addressed by maintaining consistent dpi settings during image conversion.
  Note: A consistent dpi setting of 72 dpi has been identified as the solution to address the challenges related to image size and data format discrepancies.

Project Impact:

This project's successful completion has significantly improved our ability to handle floor plans and Plexxis data. The refined COCO JSON dataset, produced through this pipeline, serves as a solid foundation for machine learning model training and, more importantly, for the auto-annotation of floor plans within the Plexxis system.

The project's meticulous approach, precision, and time commitment have ensured that our data meets the highest industry standards. This achievement aligns with our goal of enhancing image annotation capabilities and facilitating the auto-annotation of Plexxis floor plans, ultimately increasing efficiency and accuracy in our workflows.

Conclusion:

The impact of this project is substantial, as it enhances our ability to work with floor plans and Plexxis data efficiently and accurately. The refined COCO JSON dataset provides a solid foundation for machine learning model training and auto-annotation, contributing to increased efficiency in our workflows.

Looking ahead, we are committed to continuous improvement. User feedback and ongoing testing will guide further refinements and optimizations to our processes and technologies. We extend our gratitude to the project team for their contributions and dedication to the successful completion of this endeavor. With the achievements of this project, we are well-prepared to meet future challenges and maintain our position at the forefront of image annotation and data preparation for complex machine learning tasks.