Color grading of diamond using Deep learning

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Introduction:

- Traditional methods of diamond grading involve using a ‘Master Stone’ as a reference to which
- The purity of diamonds and other characteristic such as color, tinge, cut, etc. are compared.
- Usually diamonds are evaluated on the basis of 4 characteristics : color, carat, cut, clarity.
- The fallbacks of traditional methods include subjectivity, conflicts in gradings of two different graders.
- To solve this problem using deep learning, we use ecosystems such as detectron2 of Pytorch.

Data Collection:

In the setup, a camera is used to produced high definition images.

A macroscopic lens is mounted on the camera which helps in taking HD images.

A zeber motor (the camera is mounted to the motor) is used to focus.

A base with a groove is present at the bottom on which the diamond is placed.

Lights are used to highlight the specific features of the diamonds. These come with a automatic setup to control their location.

All of this is controlled via an app installed on the local machine.

Training:

Detectron2

Take images from the data collection stage.

Use LabelMe to annotate images which generates json files.

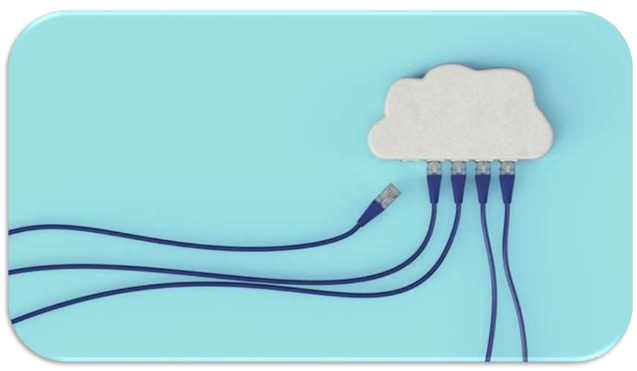
The ‘MaskRCNN’ model is used on the datasets.

The output model is created after every 5000 iterations.

Optimal models are shortlisted based on training loss and test accuracy.

Testing & Deployment:

Flask
web development, one drop at a time



We choose a specific set of data to check the performance of optimal models for the color grading task.

Deployment in Flask

Conclusion:

In conclusion, the grading process comprises of the following key points:

- **Automated Grading**: Detectron2 automates diamond color grading by detecting and classifying color attributes like hue and brightness.
- **Training the Model**: The model requires a labeled dataset of diamonds to learn color grading based on IGI standards.
- **Testing and Deployment:** The best fit models are chosen, and deployed in the cloud using Flask.