CNN-based Grain Size Determination of Microscopy Images

Jingchao Zhang
Stanford Center for Professional Development
Stanford University
jingchao@stanford.edu
Grain Size Plays an Important Role in Material Properties

- Thermal
- Mechanical
- Electrical
- Optical

Challenges from Traditional Methods

- Time
- Expertise
- Error
Traditional vs. CNN-based workflow
Morphological operations

Dataset

(a) Original Image
(b) HED + Threshold
Erosion
Dilation

Heyn's = 56.61 μm
GS = 54.82 μm
GS = 49.87 μm
GS = 57.51 μm

Heyn's = 8.24 μm
GS = 7.556 μm
GS = 7.488 μm
GS = 8.232 μm
Results

Conclusion

• Reduced time from 15 minutes to under 10 seconds.
• Can be applied to a wide range of pictures.
• Maintain an accuracy comparable to the golden standard.