

Fractal Compression

An Old Technique for the New
Challenge of Whole Slide Image
Storage

PRESENTER:

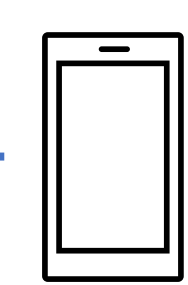
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BACKGROUND:

Whole Slide Images represent a massive storage challenge – a single slide can consume tens to hundreds of gigabytes. Lossy compression using the JPEG standard has helped tremendously, but other compression algorithms exist that may be more effective at compressing histological images. Here, we investigate the use of fractal compression, taking advantage of the natural fractals that occur in biology.

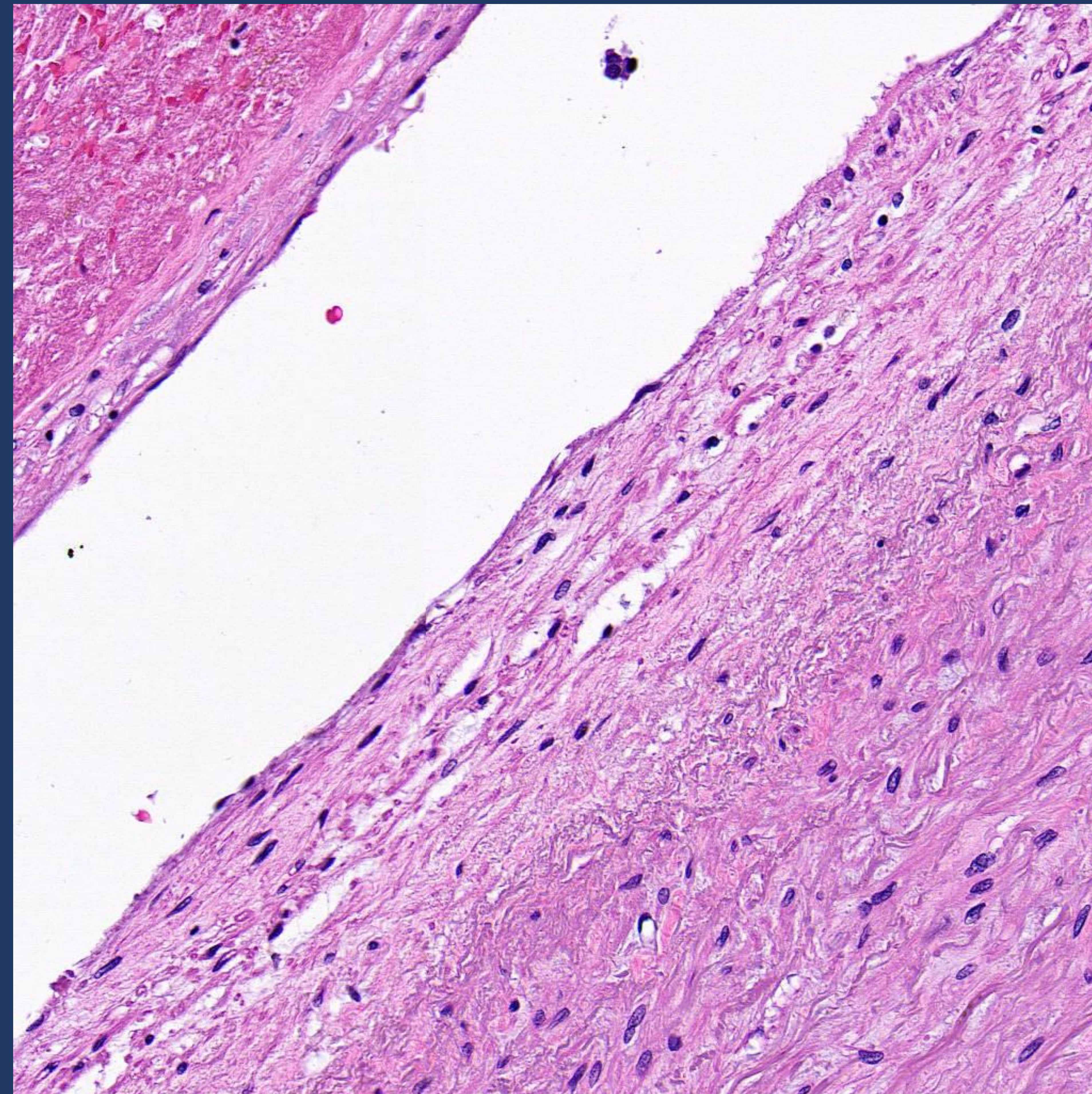
METHODS:

1. Acquired a 1024 x 1024 pixel histology tile, saved losslessly in the **PNG** format.
2. Compressed the original image in three ways:
 1. At **90% quality JPEG**.
 2. At **70% quality JPEG**.
 3. Into “**fractal code**” using a custom fractal compressor.
3. Measured the final file sizes.



Read the full abstract.

Fractals are found everywhere in nature – and we can use them to compress Whole Slide Images.



JPEG at 90% Quality = 569 kilobytes

Optimized Fractal Code = 164 kilobytes

RESULTS:

- The original losslessly compressed **PNG** image (1.05 MP) was **2,708** kilobytes
- The **JPEG** image at 90% quality was **569** kilobytes (21% of the PNG size)
- The **JPEG** image at 70% quality was **303** kilobytes (11% of the PNG size)
- The **Fractal Code** image was **164** kilobytes (6.1% of the PNG size)

CONCLUSION

The fractal code produced the smallest file size with no loss in subjective quality. Fractal compression may find a strong use-case in the storage of whole-slide images – where the one-off trade for computational complexity results in massive reduction of storage size.

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