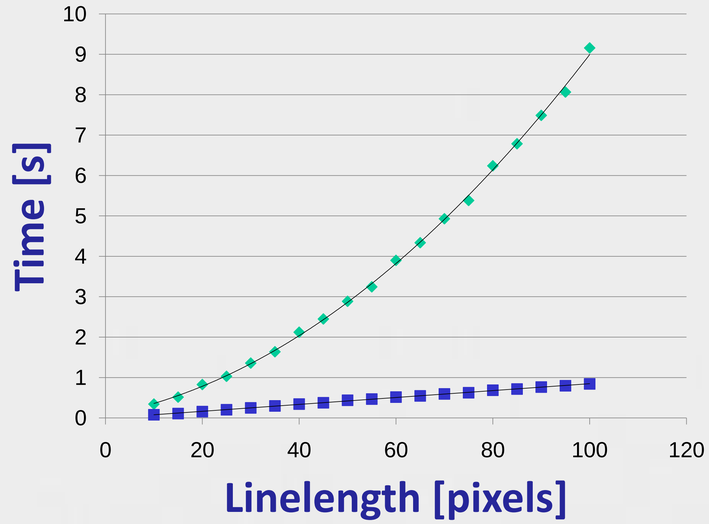
Efficient windowed Radon transform

UPPSALA UNIVERSITET

Emil Berwald
Staffan Einarsson
Karl Jungward

Finding lines faster!

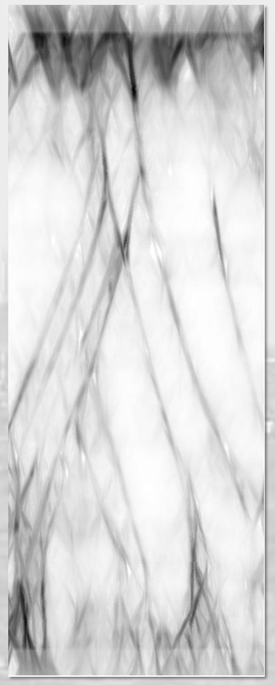
The commonly used Radon transform algorithm has **quadratic complexity** w.r.t. the scanned line length. A modified algorithm with a theoretically linear complexity has been investigated.



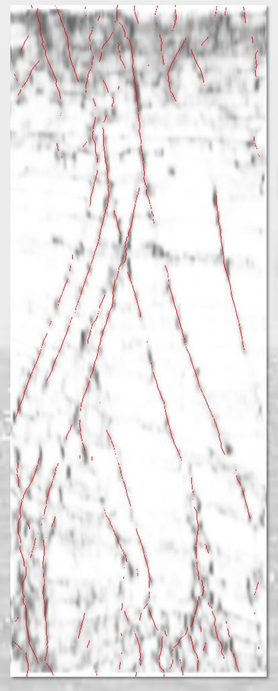
Drilling for oil is expensive!

Seismic images are generated in order to know where to start drilling. These images are scanned for **fault lines** where oil is likely to be found. The Radon transform is a common way to detect the fault lines in the images.

The seismic seabed image has low resolution



The transform detects the probable fault lines.



The red lines are the final result after two-pass peak detection.

Linear runtime complexity!

The implementation reuses data already available, lowering the order of computational complexity from **quadratic** to **linear**. By local optimization with a cost function the best angle for the line is chosen. Post-processing, thinning of the lines, is done by a peak detection algorithm.

Schlumberger

Supervisor: Victor Aarre

Department of Information Technology
Box 337
SE-751 05 Uppsala
Sweden

Project in course ”Scientific Computing, Advanced course” May 2010

Further information: http://www.it.uu.se/edu/course/homepage/projektTDB/

Contact: projektTDB@it.uu.se