

The issue

Problem

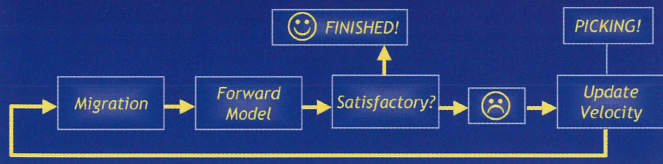
- Velocity analysis bottleneck in prestack migration
- Iterative process of converging to a velocity model is limited by picking events

Solution

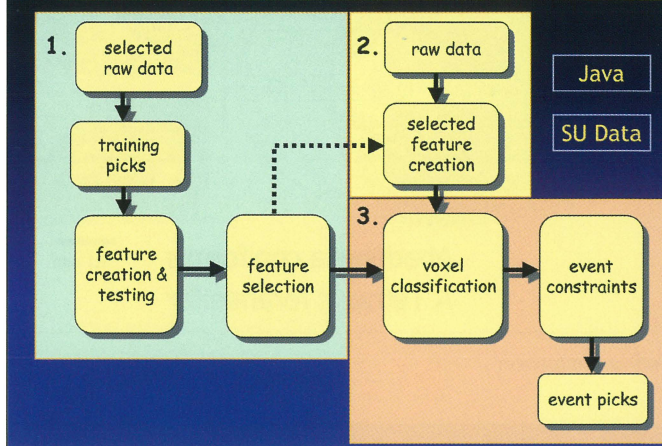
- Automate the picking process

Goals

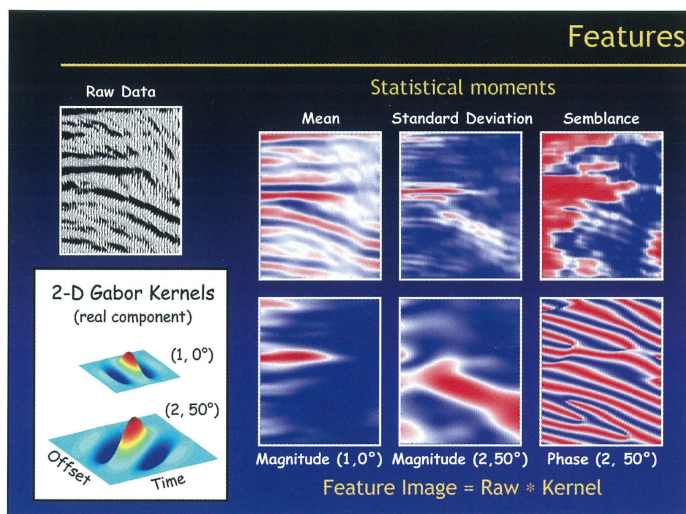
- Reduce manual picks
- Reduce cycle time



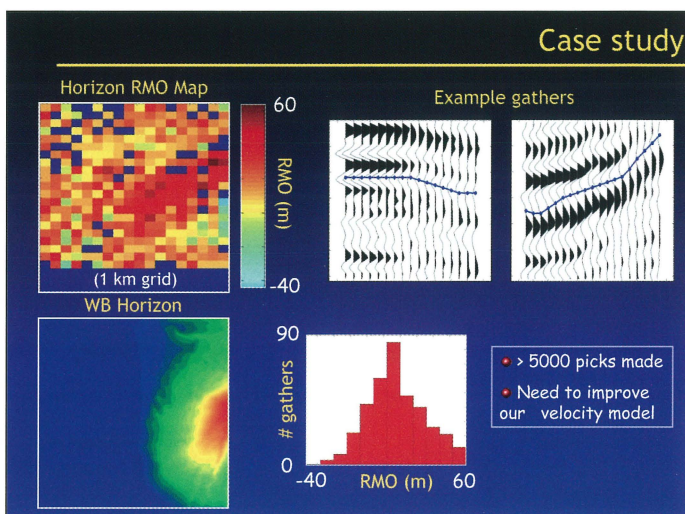
Processing flow



Features



Case study



Automatic Event Picking Using a Probabilistic Neural Network

by Troy Thompson

Abstract

Automatic picking of events on common image gathers has the potential to reduce the cycle time of prestack depth migration and improve inversion robustness. An algorithm incorporating supervised learning, statistical classification and image processing will be further developed as an autopicking tool. The use of wavelet-transform methods for feature creation and statistically derived constraints will be discussed.

Feature images are created from the raw data. Optimal images, which capture the important behavior of measured signals, are used for voxel classification by a probabilistic neural network. Classification produces a posterior probability image depicting the location of signal events in the raw data. Further processing converts these probabilities into final event picks. Emphasis will be placed on a new method using flow features and probability for calculating and constraining these final picks.

The method gives improved results with good agreement to human interpreted picks.

Biography

Troy Thompson received a B.Sc Hons (1st class) in Exploration Geophysics from Curtin University in 1998. In 1997, he was awarded the Dean's Prize for the most outstanding third year student in the Faculty of Science at Curtin, as well as the Australian Institute of Physics Prize as the top geophysics graduate

of that year. He is currently in the final year of a PhD in geophysics during which he was awarded the John Curtin Postgraduate Scholarship, a MERIWA Supplementary Scholarship and the 2001 PESA Post-Graduate Scholarship for Research in Geosciences. He is a student member of the SEG, ASEG, EAGE, and PESA. His claim to fame in 1999 was to hike the full length of the Appalachian Trail over a 7-month period.

Summary

- Java application
- SU compatible
- Features for residual moveout
- More robust cloud collapsing algorithm utilising flow features and probability
- Field data testing