Data Visualization Assignment 2

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I. Introduction

Ocean currents change from time to time around the world. Understanding about the ocean currents(sinks, sources, saddle points, repelling spiral, attracting spiral etc.) can be very useful in predicting high tides and low tides, height of the waves etc. Visualizing this data helps people in understanding the data better and faster.

II. Data

The data is obtained from Indian National Centre for Ocean Information Services(INCOIS). The data is provided in a csv file which has velocity in x and y direction for every x,y in 90×60 grid. The velocities corresponding to land is given as 9999.0.

III. Visualization algorithms

A. Hedgehog plot

For each grid we calculate the u,v and then find the angle given by v/u. We show the direction by drawing a isosceles triangle.

B. Stream Lines

For generating streamlines we start we any random point and then find the next 600 points which has the direction of the flow using Runge-Kutta 2nd order and bilinear interpolation to calculate u, v for points lying inside a grid.

C. Linear Integral Convolution

Used LIC algorithm to generate the visualization for Indian Ocean currents.

IV. Conclusion

The visualization obtained can be used to understand the following aspects:

1) Where the sinks and sources are in the Indian Ocean
2) Where the current is strong and where the current is weak.
3) The flow of currents

V. References

1) http://www.ajdesigner.com/phpinterpolation/bilinear_interpolation_equation.php
2) http://www.cs.utah.edu/~wmartin/cs523project/