Interactive Visualization Support for Comparing and Analysis of Multi-class Classifier Problems in Machine Learning

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Introduction

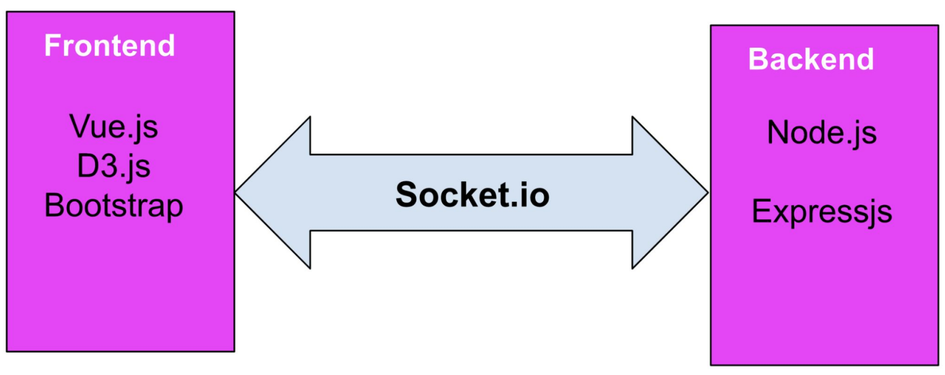
- **Problem Statement:** Visual clutter is a common problem in data visualization of classification problems involving more than 100 classes. It becomes even more prohibitive if results of several different models are displayed at once.
- **Our Solution:** We devised a new approach to visualize the results of multiple models solving the same classification problem using a concentric radial view. This approach was prototyped and tested on sets of synthetic data.
- **Our contribution** are the developed DataViz web application, Classifier Analyzer, which allows to user to filter data, compare results and compute various ML metrics of interest and displaying multiple models' results in one chart.

Design Approach & Prototyping

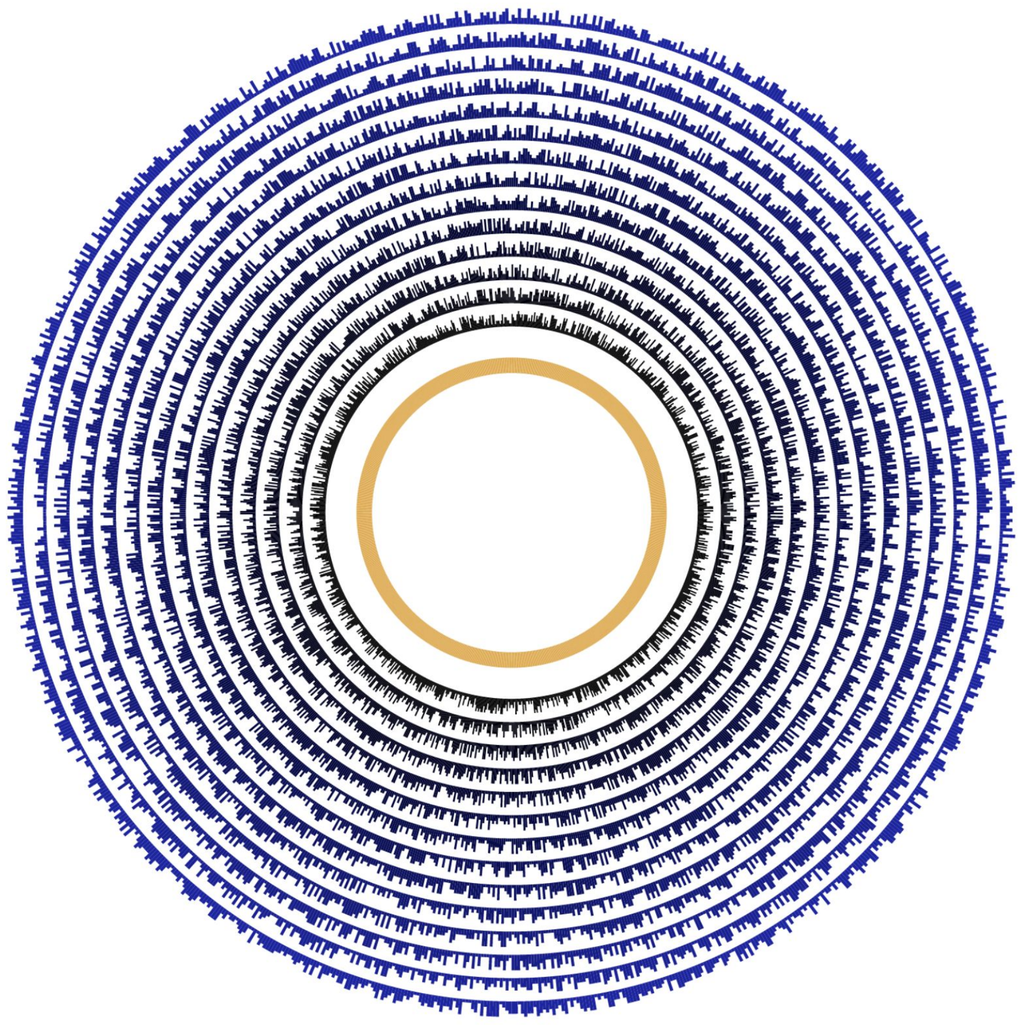
MVC flow example

User ->
uses ->
Controller ->
manipulates ->
Model ->
updates ->
View ->
sees ->
User

Architecture of the application



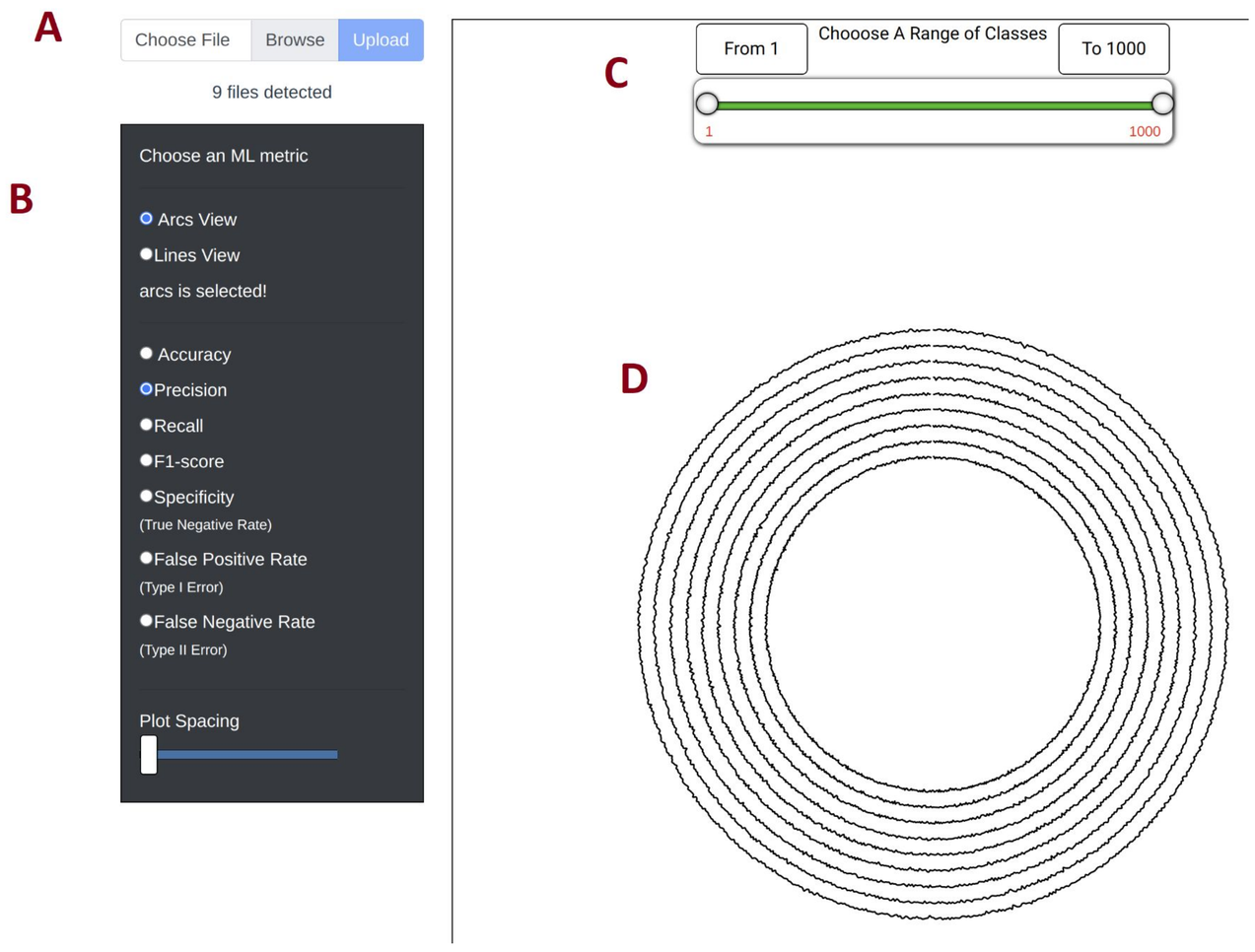
Early stage prototyping efforts: histogram radial lines visualization (1000 classes)



Source: https://github.com/nina-mir/d3-arcs

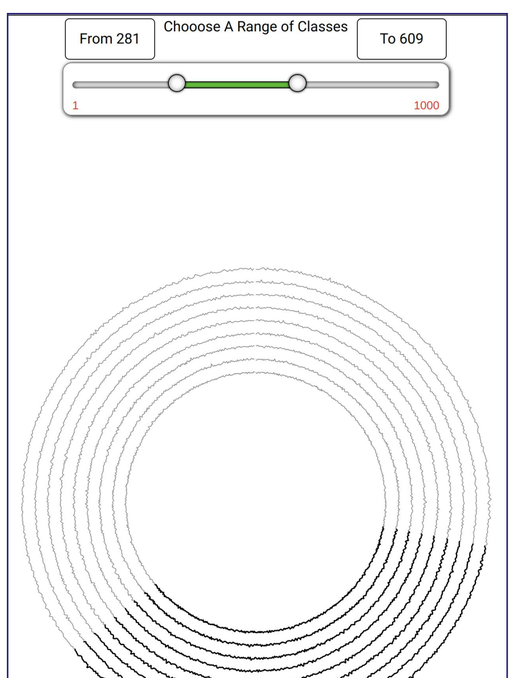
Results

UI View

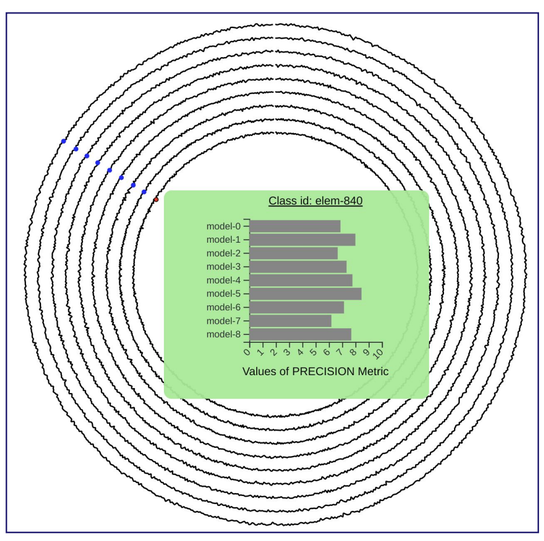


A) File input menu; B) ML metrics selecting menu;
C) Class range filtration slider; D) Chart Area

Filtration:
class range of interest in black while the unselected range is increased opacity.



Tooltip creates a horizontal bar chart of all the points of the same class that is in focus.



The cursor is the red circle.
Similar classes are identified by blue-black circular markers.