AI-Driven Automated Redistricting
Sponsored by NSF

www.zillioninfo.com
Who We Are

- Zillion Info, LLC
- Located in Columbia, South Carolina
- Affiliated to University of South Carolina
- Sponsored by National Science Foundation (NSF)
- Bring the new redistricting technology to the market

NSF Consider that this is a technology that could make changes
iRedistrict: The Next Generation Redistricting Technology

Traditional Redistricting
Human User to Optimize
Try & Error Approach
Time Consuming
Hard to make high quality Plans

New Redistricting Technology
Powerful Optimization Algorithm
Set your requirements & Provide your ideas
The computer will finalize the plans

Less effort, less time, better work done

Our Goal
Make redistricting easy enough
Everybody can make their own Redistricting Plan
Main Features

Leverage User Inputs

- Powerful Computer Algorithms

High Quality Plans Satisfy

Mandatory Requirements & User-Specified Preferences

Criteria
- Enforce Contiguity
- Population Equality
- Shape Compactness
- Preserve User-Specific COI
- Preserve Majority-Minority Zones
- Respect Exiting Boundaries

Other Features
- Produce multiple plans in one run
- Compare different plans with scores
- Generate Configurable Reports
- Export plans into ESRI Shapefile
- Save the Redistricting Project workspace

Collaboration
- Share Plans within the Group
- Collaboratively create plans
- Publish the plans
- Comment on the plans
- Vote on the plans
iRedistrict

- **Standalone** Software for both Desktop and Online Service

- **iRedistrict Desktop:**
  
  - For Redistricting professional
  
  - Single user license: discount available for multiple-license purchase

- **iRedistrict Online:**
  
  - for the public or a group of users, e.g. the redistricting committee
  
  - SaaS Mode: Charge Annual Subscription Fee for the group, no cloud infrastructure cost involved
  
  - On-Premise Mode: In-House Deployment

- **Handle Any Boundaries:** Blocks, Block Groups, Tracts, Zip codes, County

- **Handle Any jurisdiction:** City, County, State, Country
iRedistrict Online: initial interface when the data is loaded
Dupage County: draw 8 districts, 30 plans, Consider Population, Shape, COI
Automatically delineate Minority-Majority Zones

Black Population

Black Regions
Dupage County: draw 8 districts, 30 plans, Consider population, Shape and COI

30 Plans
Deviation < 2 %
Shape Score: 0.6
Dupage County: draw 8 districts, 30 plans, Consider population, Shape and COI

Deviation < 1%

Shape Score 0.57
Rank the plans by the total score: population and shape, or others chosen

<table>
<thead>
<tr>
<th>District</th>
<th>Population</th>
<th>Ideal</th>
<th>Deviation</th>
<th>Pct of Ideal</th>
<th>Total_pop</th>
<th>White</th>
<th>Black</th>
<th>Asian</th>
<th>Compactness</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>115163</td>
<td>114615.5</td>
<td>547.5</td>
<td>0.47%</td>
<td>115163</td>
<td>87195</td>
<td>8586</td>
<td>13267</td>
<td>0.632</td>
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<td>114823</td>
<td>114615.5</td>
<td>7.5</td>
<td>0.0%</td>
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<td>93939</td>
<td>4883</td>
<td>11440</td>
<td>0.513</td>
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<tr>
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<td>114453</td>
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<td>-169.5</td>
<td>-0.14%</td>
<td>114453</td>
<td>82166</td>
<td>8867</td>
<td>10733</td>
<td>0.584</td>
</tr>
</tbody>
</table>

iRedistrict

Criteria: Plans, Gallery, Requests

Select current plan: 3292 (0.599)

Pop Equality: 3292 (0.599)

ShapeCompactness: 3292 (0.599)
Configure the Report

Configure the report

- Check boxes next to variables like Total_pop, Vote_pop, Male, female, White, Black, Asian, AmIndian, HawaiianPac, TwoOrMore, OthRace
- Variables: Total_pop, Vote_pop, Male, female, White, Black, Asian, AmIndian, HawaiianPac, TwoOrMore, OthRace
- Aliases: None
- Percentage of: None

Save Configuration | Close
Save the Plan to Your Personal Plan Gallery

- Publish for the Team
- To Edit, Comment, Vote
- Create a URL to share
- The plan and the report
- On Facebook or website
- Load a plan saved before
Create an URL to share the plan on Facebook, Twitter, and Website

https://services.zillioninfo.com/zi/redistricting/app/embedFrame?
o=228&view=map&org=26&key=2lqe4n04ki89ots84dklcjrdo2&host=zi_static
Public Plan Gallery

Comment On Plans
Load and Edit Plans
Submitted by Others
Vote On Plans
Preserve Community of Interests (COI)

Deviation 0.14%

Deviation 0.2%
Preserve Locked Districts

Deviation 0.13%

Locked

Deviation 0.2%
Support User Editing

Can enforce contiguity or choose not to
Preserve Existing COI Layers, e.g. Neighborhood

Load neighborhood layer; can be other layers
Divide and Conquer: Follow Highway Boundaries

meeting boundary requirements or dealing with large datasets
Blocks or higher level Units

- **In manual redistricting approach**
  - blocks are preferred because moving the blocks wouldn’t cause big population change
  - Higher level units are hard to handle because each move means a big population change and it is then hard to balance the population equality

- **In AI-based redistricting approach**
  - It is easy to balance the population even using higher level units
  - The user can still draw COI based on the blocks, and then load the COI layer into iRedistrict
  - Less units means faster calculation speed
  - We implemented technology to deal with larger datasets: Clustering and MEGA boundaries
  - Increase the computer memory could increase the capability of dealing with larger dataset
Thanks!

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