CSE 416, SECTION 1

Project Discussion
Part 2

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Session Objectives

This is part of your requirements analysis phase of the project

- Understand issues and terminology used in the VRA district plan analysis
- Understand the top-level goals of your project
- Understand some of the data requirements to support your analysis

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Overall Project Goals

- Understand the implications of the potential Supreme Court dismissal of Section 2 of the Voting Rights Act (VRA)
- Assess the impact on a preclearance state and a non-preclearance state
- Approach
  - Develop a probability distribution of minority representation under the existing VRA
  - Compare with the probability distribution of minority representation under a restructured VRA (i.e., race-blind districting)
  - Apply data analysis techniques to the available data
  - Generate data summaries and visualizations that summarize the results of the analysis

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Research Paper

- The project is based on the paper “Computational Redistricting and the Voting Rights Act” (link on class home page)
- Topics in paper
  - Background discussion of minorities in Congress and ensemble generation
  - Discussion of racial/language constraints from VRA and Equal Protection Clause
  - Methodology to create VRA compliant ensembles
  - Methodology includes an elaborate analysis of state electoral history (we simplify)
  - Example of Texas

Goal of paper is to build an ensemble that would be relatively safe from a VRA challenge

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Legal Basis

- Section 2 of the VRA prohibits a redistricting plan that abridges any citizen's right to vote "on account of race or color or membership in a language-minority group"
- Recent election outcomes are considered
- No requirement for equal proportionality (although it appears logical)
- Candidate should be a chosen representative of a group, independent of the candidate's race or language group
- VRA does not apply when majority and minority groups favor the same candidate
- Courts reject the mandate of a certain percentage of minority population

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Legal Guidelines

- Noncompact districts may be unconstitutional if they appear to segregate voters by race
- Majority-minority districts can be unconstitutional if the plan maintains arbitrary racial targets
- No mandates for specific racial percentages in districts unless needed for minority candidate success
- Courts require examples that minority groups can constitute a majority in proposed districts
- Districts should be assessed based on actual electoral history
- Districts with fewer than 50% minority can be "minority-effective"

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Designing a VRA-Conscious Ensemble …

- Constrained ReCom algorithm
- Combined electoral data and demographic information in assessing district effectiveness
- Ecological inference used to estimate racial group voting preferences
- Effectiveness scores are used to predict electoral success (we simplify these effectiveness scores)

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… Designing a VRA-Conscious Ensemble

- A procedure for identifying minority preferred candidates (EI)
- A benchmark that prescribes a threshold number of districts for each minority group (an enacted plan that has withstood VRA scrutiny)
- Changes to ReCom to add constraints (e.g. split counties) that allow a random plan to be accepted only if the constraints are met
- We use EI precinct estimates of candidate effectiveness for minority groups
- Precinct data is aggregated to form district-level estimates (for the random districts in each random district plan)
- A threshold is set for the classification of a district as an effective district (e.g., .6)

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Simplifications in Your Project

- We do not consider primary elections
- We only use statewide effectiveness (s^{state})
- Maybe other simplifications
- Removal of simplifications may be available as optional use cases

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How is Geographic Data Organized

- Think of each area as a large polygon (but sometimes it might be a multi-polygon)
- Boundary data of interest
  - State
  - District
  - County (possible)
  - Census block (possible)
- Usually, m census blocks form a precinct, n precincts form a county, and k counties form a state
- Usually, m precincts form a district

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Shapefiles

- Geospatial vector data format
- Developed and maintained by ESRI
- Introduced in early 1990s
- Collection of files
  - Usually stored as a zip file
  - Mandatory files (.shp, .shx, and .dbf) and other files
- Represents points, lines, polygons
- Formatted as fixed length header, followed by one or more variable length records

Dominant format for geographic data due to the market dominance of ESRI

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GeoJSON

Be alert for MultiPolygon data

- Open standard format for representing simple geometric features
- Based on JSON
- Types – Point, LineString, Polygon, MultiPolygon
- Supported by Leaflet, Google Maps, et al
- Position information expressed as longitude, latitude

Become familiar with conversion SW


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"name":"precincts",
"description":"Minnesota Congressional District 1
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"publisher":"Office of the Minnesota Secretary of
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Non-Geographic Data

- Population data
  - Total population
  - Voting age population (VAP)
  - Citizen voting age population (CVAP)
- Demographic data
  - Racial/ethnic

If you cannot get data by town/county, you may need to sum up contained census blocks

Consistently use one category of population data – VAP is best

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Stuff to do After Week 3

- Get familiar with a GUI builder
  - Pick one
  - Build a splash page (with US map)
- Use Leaflet (or alternate) for including maps in your GUI
- Download enacted district plan for your states
- Integrate district plan (as a GeoJSON) into GUI map of state
- Read Becker, et al paper
  - Read/run GerryChain
  - Read/run modified GerryChain
  - Read/run PyEI
- Start using a client-side visualization library (e.g., D3) and build
  - Bubble chart
  - Bar chart
  - Box & whisker chart

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Have You Satisfied the Session Objectives?

- Understand issues and terminology used in the analysis of election issues in the US political process
- Understand the top-level goals of your project
- Understand some of the data requirements to support your analysis

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