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Gerrymandering Workshop
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SPEAKER TITLES/ABSTRACTS

Soledad Villar
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"Machine Learning for Fair Redistricting (and hardness)"

We propose a game where two players take turns assigning precincts to districts. In a simplified setting where districts have no geographic constraints, both players have a strategy that allows them to win a number of districts proportional to their number of voters. For the game in real maps (with geographic constraints) we are developing a player based on neural networks and reinforcement learning that aims to learn how to optimally play this game through self-play (inspired by AlphaZero). As in other simulations-based gerrymandering research, the difficulty in this approach is the size of the problem. In fact, we show that the problem of deciding whether there exists a 'fair map' in the set of 'legal maps' (for appropriate simple definitions of 'legal' and 'fair') is actually NP-complete.