Indium Prospecting Using Neural Nets

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Indium is widely used in green technologies, including solar energy production. Indium is often found in trace amounts in zinc deposits; however, it is becoming scarcer. A neural net was used to predict the locations of possible zinc deposits. Artificial neural networks are a form of machine learning algorithm capable of recognizing convoluted patterns where basic models are ineffective. Selecting a region of Colorado as a sample area, zinc deposits were modeled based on their distance from fault lines, local magnetic field intensity, local gamma radiation intensity, and the age and rock type. With this geological data formatted as an input to the neural network, the data was divided into training, validation, and test sets. Using the training set, the neural net optimizes through a series of. The validation set was used to optimize various parameters of the neural network, and the test set was used as a final verification that the neural net is not overfit. The neural net outperformed a linear baseline with an error of 21.1% +- 4.9% compared to 39.0% +- 0.8%, respectively. This demonstrates the utility of neural nets for recognizing potential indium deposits. Additionally, the neural net predicted a mine outside of our training region, further verifying our results.

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