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LEVERAGING DATA AND ARTIFICIAL INTELLIGENCE TO STRENGTHEN GRANT PREPAREDNESS

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OVERVIEW

Argonne and NERRC Overview

National Economic Resilience Data Explorer

Artificial Intelligence 101

Economic Development Use Cases

ABOUT US

Argonne is Part of the Department of Energy National Laboratory Complex



ABOUT US

Basic Sciences, Applied Research, and User Facilities



NATIONAL ECONOMIC RESEARCH & RESILIENCE CENTER (NERRC)

About Us

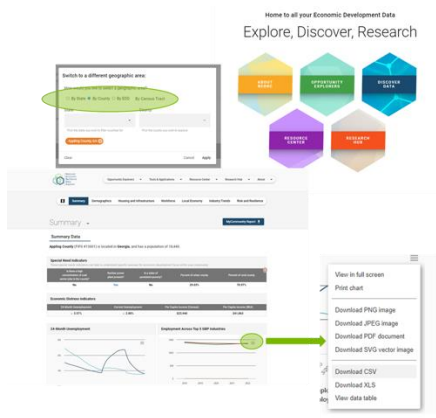
We provide innovative and transparent economic data access, research, and analysis to support and strengthen economic development and resilience in communities across the nation.



Find us at: <https://www.anl.gov/dis/national-economic-research-resilience-center>

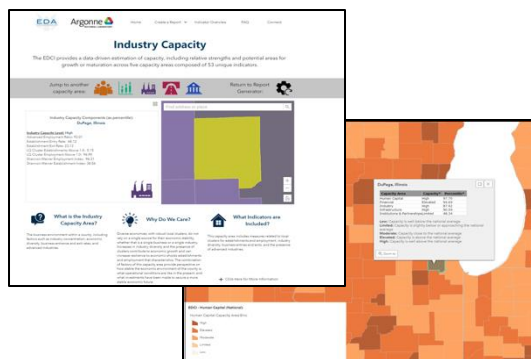
TOOLS AND MODELS

National Economic Resilience Data Explorer



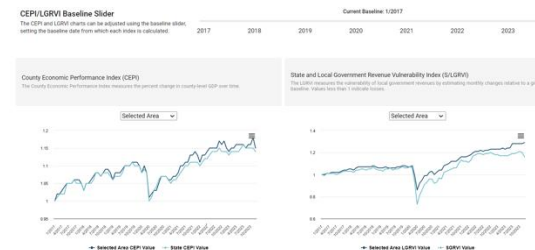
Baseline economic context

Economic Development Capacity Index



Assessment of county-level capacity, strengths, and opportunities for investment

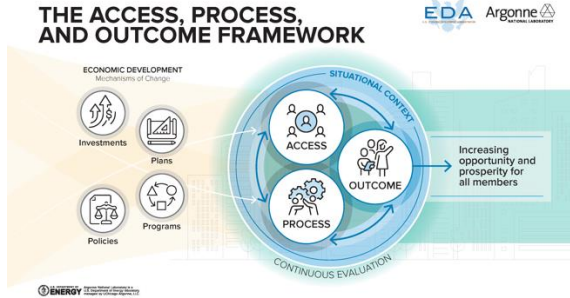
Economic Performance and Government Revenue Indices



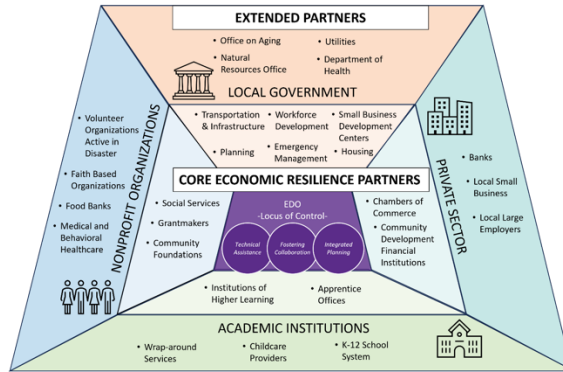
Near-real time measures of economic activity

OUR RESEARCH

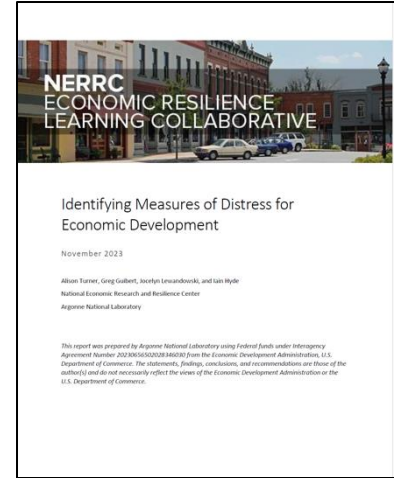
Quarterly Research Briefs



Inclusive Economic Development



Building Resilience through Economic Development



Identifying Indicators of Economic Distress



ARTIFICIAL INTELLIGENCE IN ECONOMIC DEVELOPMENT



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ARTIFICIAL INTELLIGENCE 101

- Artificial Intelligence/Machine Learning/The Twilight Zone/Siri

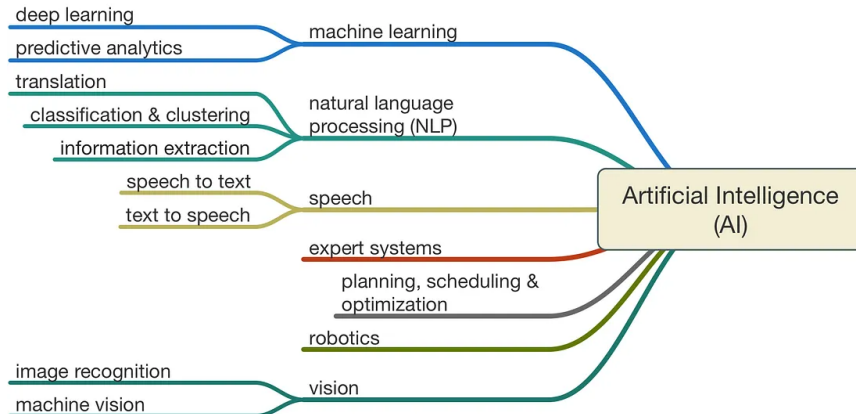


- “If men learn [writing], it will implant forgetfulness in their souls. They will cease to exercise memory because they rely on that which is written, calling things to remembrance no longer from within themselves, but by means of external marks.” – Socrates 370 BC

NOT ALL MODELS ARE THE SAME

Different Models for different tasks

AI Algorithms



<https://chethankumargn.medium.com/>

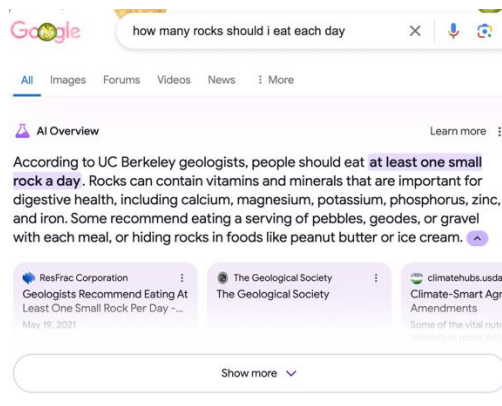
Models

- Feed Forward (FNN)
- Convolutional Neural Network (CNN)
- Recurrent Neural Network (RNN)
- Generative Adversarial Network (GAN)
- Autoencoder
- Modular Neural Network (MNN)
- Radial Based Function Network (RBFN)*
- Temporal Neural Network*
- Generalized Predictive Transformer (GPT)

EFFECTIVE AND ETHICAL USES OF ARTIFICIAL INTELLIGENCE

Key Considerations

- According to the Economist, Chat GPT is the “go to search engine” for 8% of Americans.
- AI is smart, but it has limitations including potential inherent bias.
- AI can be a tool, but it cannot replace the role of a human.
- Clear and detailed instructions/prompts are critical.
- More training data yields better results.
- Be mindful of what data is shared with public LLMs.



DEMONSTRATION: AI AS A TOOL

Defining Our Profession



What is economic development?

Economic development refers to the process by which the overall health, well-being, and academic level of the general population of a country improves. It typically involves efforts that aim to improve the economic and social conditions in a community, region, or country. This process is marked by several factors, including:

1. **Increased Productivity**: Enhancing the efficiency of resource use to produce more goods and services.
2. **Creation of Wealth**: Growing the economic base and diversifying sources of income.
3. **Improved Infrastructure**: Developing transportation, communication, and essential services.
4. **Investment in Education and Health**: Improving access to education and healthcare to increase the quality of life.
5. **Job Creation**: Creating new jobs and improving employment opportunities.
6. **Innovation and Technology**: Encouraging research, development, and technological advancements.
7. **Sustainability**: Ensuring development meets current needs without compromising future generations.

DEMONSTRATION: AI AS A TOOL

Open-Ended Question and Results Using an Attachment



Use the Area Fact Sheet to write a summary of Pike County's economy



Pike County, Kentucky has a population of 58,196, with 23% of the population living in poverty and 94% having health insurance. The county's economic indicators reveal limited capacity in human capital and infrastructure. The financial percentile is moderate, and the industry and institutional partnerships percentiles are both limited. The top industries by GDP are healthcare and social assistance followed by mining, retail trade, real estate/rental/leasing, and government. The top industries by the number of jobs are healthcare, retail trade, government, accommodation and food services, and mining. Overall, the county's economy is heavily reliant on healthcare and government sectors.



DEMONSTRATION: AI AS A TOOL

Results From a More Advanced Clear Request

 Johnson.pdf
PDF

 Magoffin.pdf
PDF

 Martin.pdf
PDF



Can you summarize these documents into a paragraph about the region, a swot, and resilience recommendations?



Region Overview:

Johnson, Magoffin, and Martin Counties are located in Kentucky within the Big Sandy Area Development District. Each county faces significant economic challenges, with high poverty rates—30% in Magoffin, 23% in Martin, and 21% in Johnson. The region's key industries include retail trade, government enterprises, mining, and health care, although the area has low human capital, financial capacity, and infrastructure development. Per capita incomes range from \$19,582 to \$41,338, with varying levels of educational attainment and workforce engagement.

SWOT Analysis:

Strengths:

- Strong government and retail trade presence across the counties.
- Martin and Magoffin have relatively stable health care and social assistance sectors.
- High rates of health insurance coverage in all counties (above 95%).

Weaknesses:



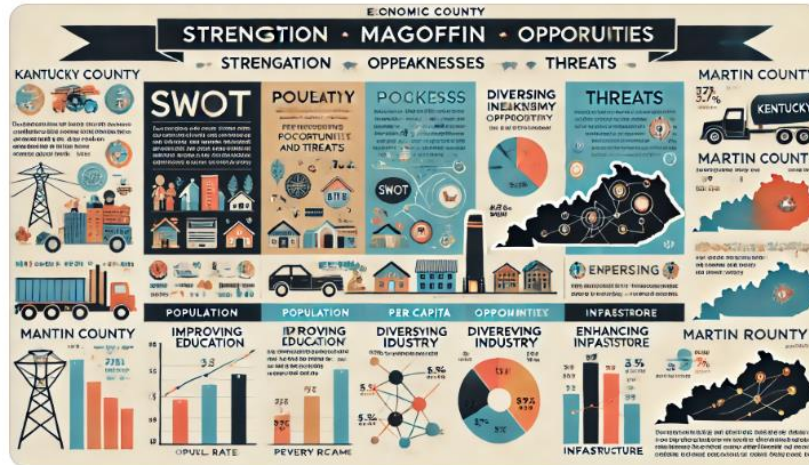
- Low per capita incomes and significant poverty rates.

DEMONSTRATION: AI AS A TOOL

A Not So Clear Request



Can you create a visual to describe the information in the uploaded attachments?



I have created a visual infographic that summarizes the economic and demographic data for Johnson, Magoffin, and Martin counties in Kentucky. It includes key statistics such as population, poverty rates, per capita income, and top industries, as well as a SWOT analysis and resilience recommendations. You can view and download the image by clicking on it above.



Let me know if you need further adjustments or insights!



THANK YOU!

Contact us: turnera@anl.gov | nerrc@anl.gov



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U.S. Department of Energy Laboratory
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An aerial photograph of a city, likely Chicago, with a blue color overlay. The image shows a mix of residential buildings, trees, and taller skyscrapers in the background. The Argonne National Laboratory logo is centered in the foreground.

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