



BELMONT
DATA & AI
COLLABORATIVE

IMPACT REPORT

Spring 2025

Letter from the Executive Director

Dear Belmont Community and Partners,

I am pleased to share an update on the progress of the **Belmont Data & AI Collaborative (BDAIC)** as we continue to advance its mission of empowering Belmont faculty, students, staff, and partners to turn data into action. Through practical application, education, and strategic partnerships, we join collaborators in integrating advanced analytics and artificial intelligence into meaningful solutions.

This quarter, we've made notable progress across our core pillars: **Data-to-Action empowerment, deep expertise development, and impactful partner collaborations.** Our work addresses pressing social challenges while building the technical infrastructure needed for responsible AI deployment.

Empowering Data-to-Action (D2A)

BDAIC is tackling one of the most urgent challenges in today's workforce: the ability to rapidly discover, integrate, and operationalize data for AI-driven insights.

Key Achievements:

- **AI & Data Tools:** Prototypes developed include Mobile Maps, Community Alliance Builder, Intelligent Unstructured Data Extractor, and RAG.
- **Research & Internships:** Interns contributed to projects like LangExtract, MedaHuman, hypertension dashboards, and presented AI research to Nashville Health.
- **Grant Activity:** Active grants include Nashville Health, Foster Care, Engage Together, and BIP, with several new applications underway.
- **Data Infrastructure:** Expanded our Data Lake, acquired diverse datasets, and piloted analytics and AI projects with multiple partners.
- **Reports:** Delivered advanced analytic reports on topics such as the Vulnerable Population Index (VPI) and foster care transition.
- **Collaborations:** Engaged with external groups (Imagine Nashville, Thriving Cities) and internal teams (Senior Data Fellows).
- **Governance & Strategy:** Implemented governance for Nashville Health data and created an AI Best Practices Guide.
- **Education & Outreach:** Hosted faculty workshops, expanded social media engagement, and published instructional materials from BDAIC AI committees.

Our focus this quarter has been on building seamless workflows that bridge the gap between raw data and actionable insights—ensuring that AI capabilities translate into real-world impact.

Deep Expertise Development

We continue to grow our technical capabilities while maintaining a strong emphasis on practical application.

- **Advanced Analytics:** Developed methodologies that blend traditional statistics with modern AI, improving prediction accuracy and decision-making speed.
- **Generative AI:** Formed a dedicated team focused on the deployment of AI components and tools.
- **Data Operations:** Developed and implemented AI tools and techniques for data lifecycle management, encompassing data identification, ingestion, validation/verification, and governance within Belmont's proprietary data lake.
- **Natural Language Processing (NLP):** Developed and implemented specialized models for document analysis, sentiment assessment, and automated analytics generation, supporting both research and partner needs.

Strategic Partnership Impact

Our partnerships continue to drive meaningful social impact while advancing our technical and research goals.

- **Human Trafficking Prevention:** In collaboration with law enforcement and nonprofits, we deployed AI tools to expedite the identification of vulnerable populations in multiple states.
- **Foster Care Transition Support:** Partnered with Belmont Innovation Labs to develop analytics models to identify challenges for youth aging out of foster care.
- **Nonprofit Collaborations:** Expanded partnerships with organizations focused on education equity, environmental justice, and community health—ensuring our tools address real-world challenges.
- **Corporate Engagements:** Worked with companies committed to responsible AI, providing technical expertise and ethical guidance while generating revenue to support our mission.

Looking Ahead

As we move into the next quarter, **BDAIC** is well-positioned to expand its impact across technical innovation, education, and mission-driven partnerships. Our integrated approach continues to demonstrate how AI can serve both economic and social goals.

With growing demand for our expertise, we remain committed to making AI accessible, ethical, and actionable. Key challenges ahead include scaling our programs, navigating evolving governance, and reinforcing that technical excellence and social responsibility go hand in hand.

Jeff Donahoo, Ph.D.

Executive Director

Belmont Data & AI Collaborative

Table of Contents

Our Core Mission

Fostering an AI-Ready Culture

Data Lake Explorer

Data-Driven Health Equity in Nashville

AI Data Pipeline

Engage Together

Conversational AI

Transforming Foster Care Outcomes

AI & Animation

AI Conversation



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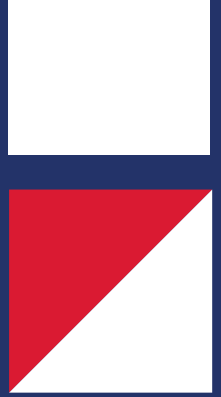
Our Core Mission

From Data to Action with
an AI-First strategy

At the heart of BDAIC's work lies a **fundamental mission**: to bridge the critical gap between data collection and meaningful action. We operate on the conviction that data, no matter how vast, is merely **potential energy**. Our purpose is to convert that potential into kinetic force—into targeted, measurable, and scalable interventions that **solve real-world problems**. This quarter's achievements are a direct reflection of our commitment to an AI-first, action-oriented philosophy.

We **reject the traditional model** of static data dashboards and retrospective reports. Instead, we **embed artificial intelligence** as the active, intelligent core of every project. Our AI-first approach means we begin every engagement by asking: "**What decision does this inform? What action does this automate? How does this prediction empower a person or improve a process?**" This ensures that every model we build and every insight we uncover is intrinsically linked to a tangible outcome.

Fostering an AI-Ready Culture



The “Embrace and Experiment” Initiative

Beyond our external partnerships, BDAIC is leading a vital internal mission: to make artificial intelligence approachable and empower every student, faculty, and staff member to confidently and responsibly use AI tools.

This quarter, we launched a dynamic AI literacy campaign under the theme “**Embrace and Experiment.**” Our goal is to shift our community from hesitation to hands-on exploration through frequent, low-pressure opportunities to engage with AI.

We believe that AI skills come from practice, not just theory. By encouraging curiosity and low-stakes experimentation, we’re unlocking creativity and boosting confidence across campus.

Key Initiatives Underway

- **AI Literacy Certification Pilot:** In partnership with the College of Business, we’re launching a tiered, test-optional AI literacy program—from **Novice to Developer**—focused on practical skills and real-world application.
- **“AI in Action” Workshops:** Hands-on sessions like “Prompt Engineering for Research” and “Automating Admin Tasks” have seen 150% higher attendance, showing strong demand for practical AI skills.
- **Data Fellows as AI Ambassadors:** Our Data Fellows are driving adoption by creating tailored toolkits and use-case libraries across departments, using a peer-to-peer model to build trust and relevance.

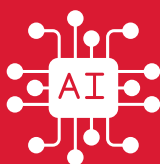
Data Lake Explorer

At the core of BDAIC is our dynamic, ever-expanding data lake

Built through partnerships and projects, the data lake continually grows by integrating both publicly available and private/shared sources. Our AI-powered data pipeline streamlines identification, ingestion, and processing, enabling faster turnaround for insights and data-driven storytelling.

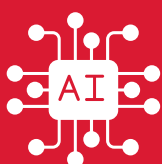
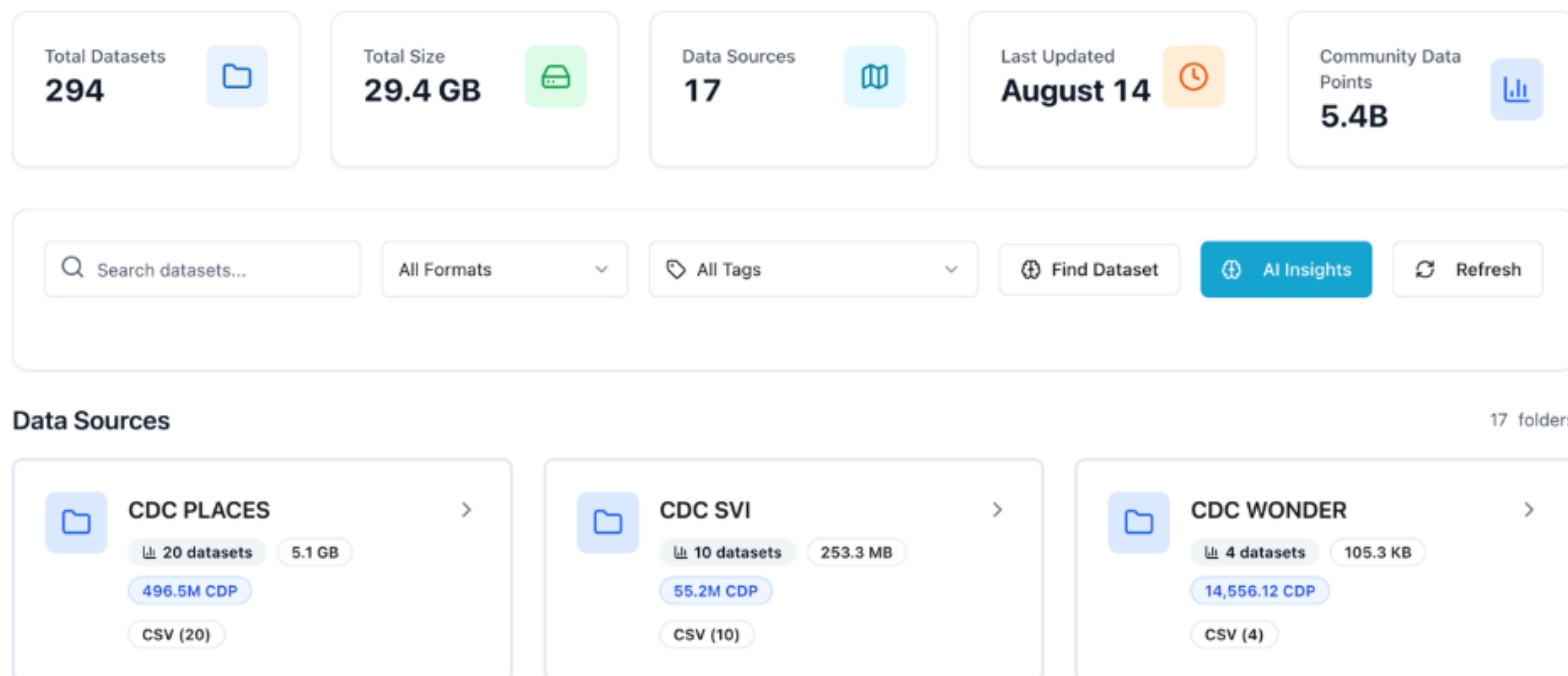
Sharing data to drive action is a central priority

Whether it's supporting Belmont's Master of Science in Applied Analytics program with project-based datasets or developing resources to address issues like human trafficking, BDAIC is committed to making data a catalyst for research, innovation, and impact across the university and the broader community.



We created the BDAIC Data Lake Explorer to simplify data access

This proprietary tool provides secure, user-specific access to data, with AI-powered conversational search, intelligent recommendations, instant insights, and visualization capabilities—helping users not just find data, but unlock its full potential.



Continuing to Deliver on a Shared Vision

Data-Driven Health Equity in Nashville

This quarter marked a major step forward in our strategic partnership with **NashvilleHealth**, turning a shared vision for a healthier Nashville into real, data-driven action. We've moved beyond planning and are now generating insights that identify disparities, guide interventions, and measure impact like never before.

At the heart of this progress is the **NashvilleHealth Data Hub**, powered by BDAIC's advanced analytics platform. Building on the successful integration of previously siloed datasets, we've established secure data sharing and launched advanced analytics. This foundational work is already delivering critical insights, shifting us from anecdotal assumptions to evidence-based understanding.



Key Accomplishments This Quarter

Data Hub Activation: Completed the Phase I integration of multiple datasets, establishing a single source of truth for community health analysis.

Stakeholder Alignment: Successfully presented on BDAIC's technology capabilities to NashvilleHealth's board, garnering interest and suggested direction from key stakeholders.



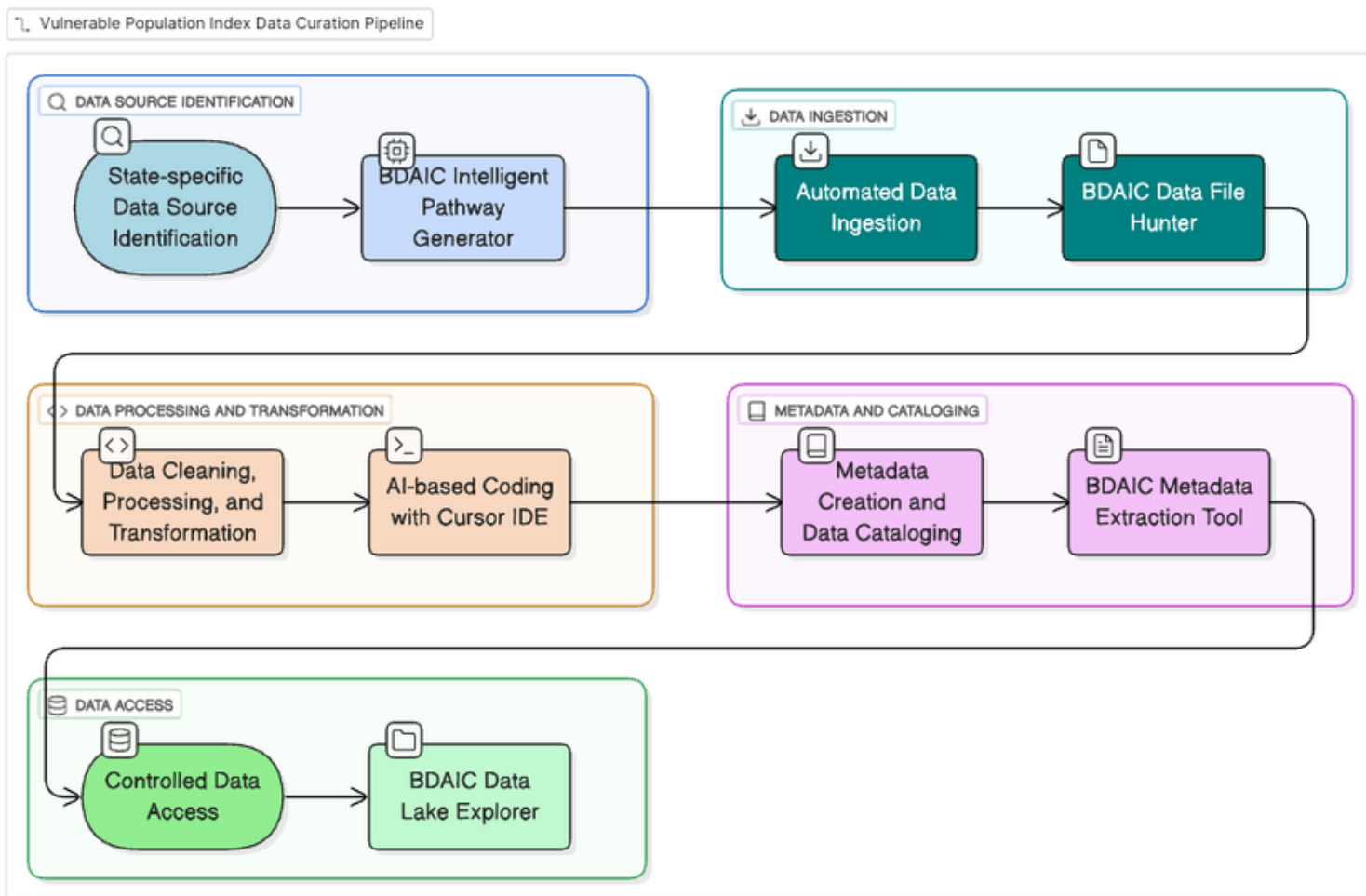
- This partnership reflects BDAIC's mission to use AI for social good, empowering nonprofits with data-driven insights to save lives.
- We are building infrastructure to scale impact through predictive analytics, expanded partnerships, and a public dashboard.
- Our work with NashvilleHealth is setting a national example of how data and compassion can drive healthier, more equitable communities.

AI Data Pipeline

BDAIC has developed a suite of tools to **automate** the entire **data pipeline lifecycle**. These tools support the growth of the BDAIC **data lake**, making data more **accessible** and **understandable** for the Belmont community and external partners.

The AI-powered pipeline includes the following components:

- Data source identification
- Automated data ingestion
- Data cleaning, processing, and transformation
- Data governance
- Metadata creation
- Data cataloging
- Controlled data access



Current Use Cases

Vulnerable Population Index

- Engage Together is expanding its anti-human trafficking efforts across multiple states, requiring region-specific data strategies.
- Each state's Vulnerable Population Index (VPI) is built using tailored data sources to reflect local conditions and risk factors.
- BDAIC's AI-driven data pipeline enables scalable identification and integration of
 - Public national and state-level datasets
 - Non-public datasets shared by trusted partners
- This approach ensures accurate, actionable insights to support targeted interventions and resource allocation.

Community Organization Registry

- BDAIC is developing a comprehensive registry of U.S.-based community service organizations.
- The database currently includes over **500,000 organizations**, with detailed information covering
 - **Services offered**
 - **Programs run**
 - **Populations served**
- An AI-powered data pipeline supports dynamic growth of the registry by:
 - Continuously integrating new organizations
 - Enhancing data depth and accuracy
 - Adapting to new partnerships and emerging projects
- This registry helps improve **visibility, collaboration, and resource allocation** across the Belmont community and beyond.

Engage Together

The Vulnerable Population Index (VPI)

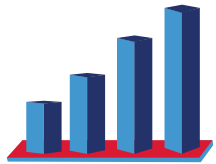
A data-driven tool that identifies the prevalence of populations and industries within communities that have an increased risk of human trafficking activity.

BDAIC has partnered with Engage Together to support their work in combating human trafficking. This work has spanned multiple states, with current efforts ongoing in Alabama and Tennessee. BDAIC is utilizing **artificial intelligence** for data identification, processing, analysis, and visualization to scale this work as **Engage Together** brings its partnerships to more states across the country.

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BDAIC Initiatives

BDAIC continues to collaborate with Engage Together to explore how advanced analytics and artificial intelligence can enhance their mission. Current initiatives include:



Interactive Data Visualization Platforms

Development of dynamic, conversationally interactive platforms to present the Vulnerable Population Index in an accessible format for diverse audiences



AI-Powered Research for Law Enforcement Support

Customized deep research using AI to identify current labor trafficking initiatives, creating insights that help state law enforcement agencies develop targeted programs and training resources

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VPI Score

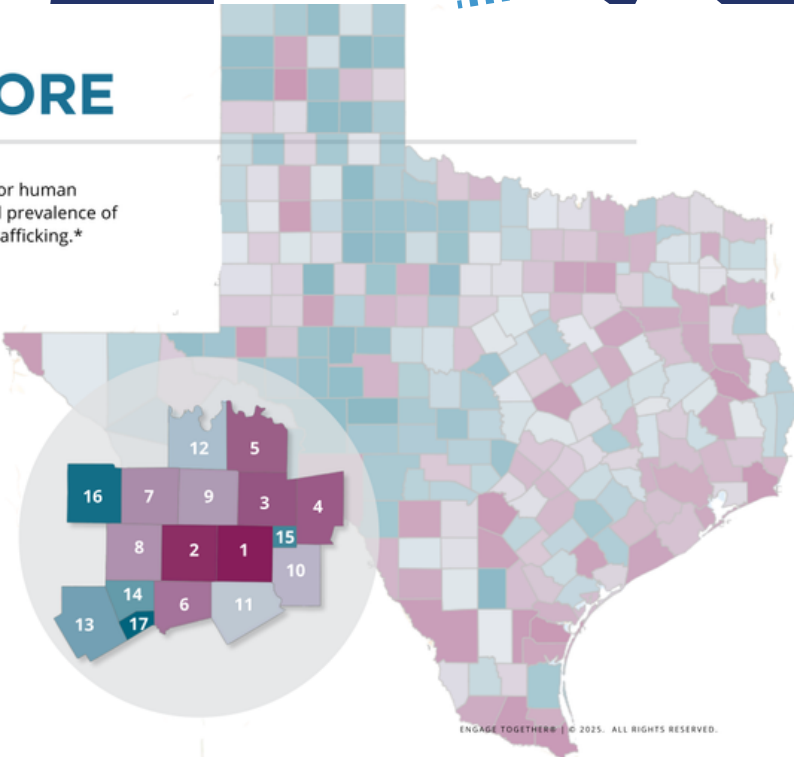
Vulnerable Population Index scores compiled from research conducted in Texas, Alabama, and South Florida



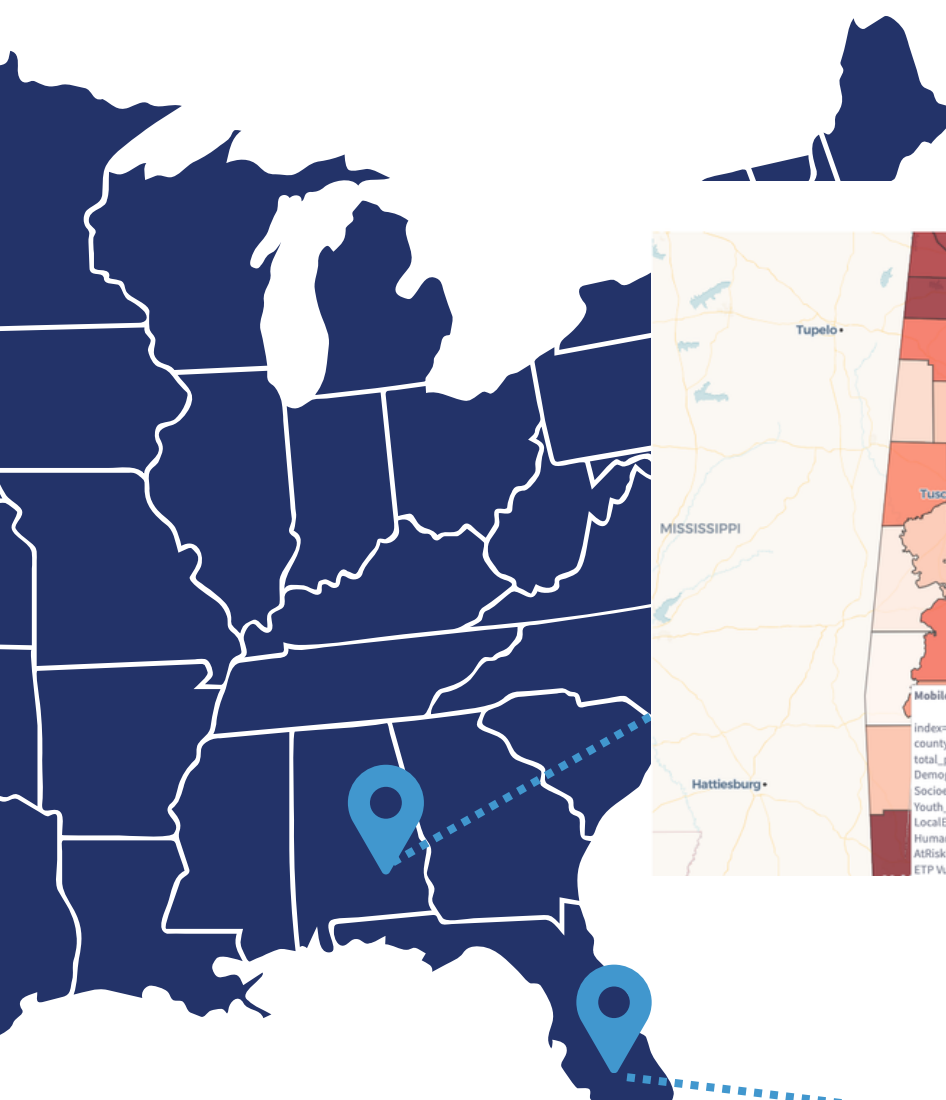
VPI OVERALL SCORE

The **Vulnerable Population Index (VPI) Score** assesses risk for human trafficking by analyzing data that illuminates the presence and prevalence of known risk factors and/or populations vulnerable to human trafficking.*

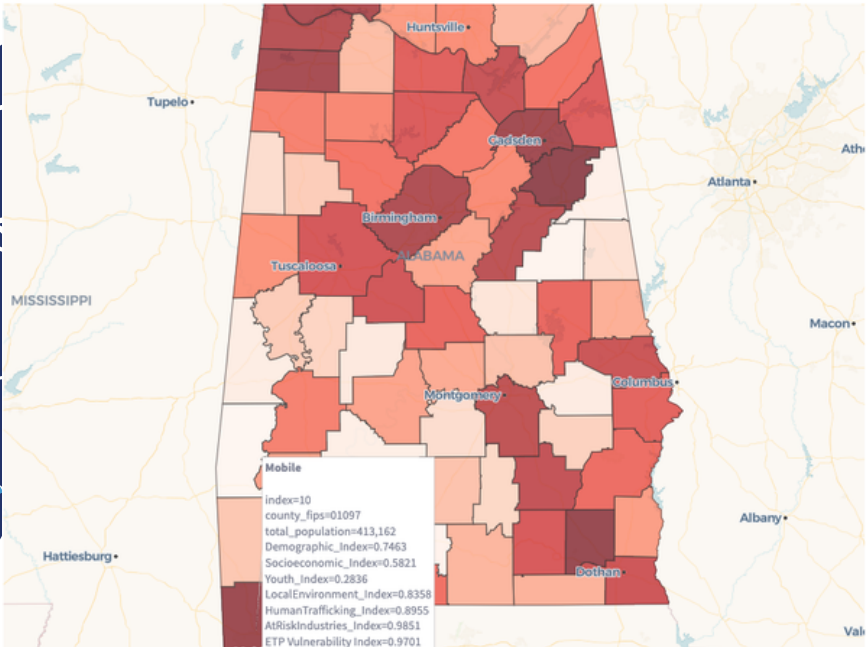
- | | |
|------------------|---------------------|
| 1. Dallas (95%) | 10. Kaufman (65%) |
| 2. Tarrant (92%) | 11. Ellis (62%) |
| 3. Collin (84%) | 12. Cooke (57%) |
| 4. Hunt (83%) | 13. Erath (47%) |
| 5. Grayson (82%) | 14. Hood (45%) |
| 6. Johnson (78%) | 15. Rockwall (38%) |
| 7. Wise (73%) | 16. Jack (31%) |
| 8. Parker (72%) | 17. Somervell (27%) |
| 9. Denton (71%) | |



Dive deeper and learn more by reading the County-Level Reports.



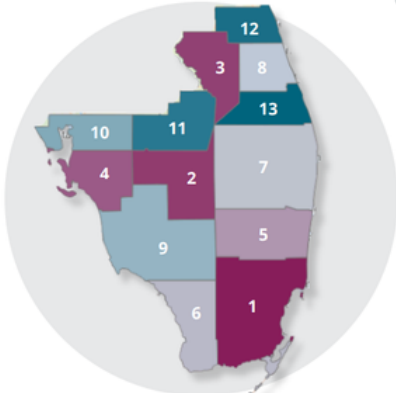
Alabama Counties - ETP Vulnerability Index



VPI OVERALL SCORE

The **Vulnerable Population Index (VPI) Score** assesses risk for human trafficking by analyzing data that illuminates the presence and prevalence of known risk factors and/or populations vulnerable to human trafficking.*

- | | |
|---------------------|------------------------|
| 1. Miami-Dade (91%) | 8. St. Lucie (57%) |
| 2. Hendry (85%) | 9. Collier (48%) |
| 3. Okeechobee (84%) | 10. Charlotte (45%) |
| 4. Lee (79%) | 11. Glades (28%) |
| 5. Broward (67%) | 12. Indian River (25%) |
| 6. Monroe (60%) | 13. Martin (21%) |
| 7. Palm Beach (58%) | |



Dive deeper and learn more by reading the County-Level Reports.

Conversational AI



Ask AI

We launched and expanded Ask AI in the Data Lake Explorer — a conversational interface that lets users query datasets using natural language.

- By combining context engineering, intelligent sampling, and multi-dataset analysis, Ask AI turns raw data into clear, actionable insights for all users.
- This feature is already helping teams use it to uncover trends, test ideas, and explore large datasets **faster than traditional tools, driving quicker decisions and broader data adoption.**

How Ask AI Works



Context Preparation

- Ask AI automatically examines the structure, metadata, schema, and summary statistics of each dataset to build a foundational understanding before analysis begins.



Intelligent Sampling

- For large datasets, Ask AI intelligently selects representative samples, filters out low-quality records, and highlights the most informative columns to ensure efficient and meaningful exploration.



Rich Context Construction

- Using the prepared data, Ask AI creates a comprehensive contextual snapshot that grounds its responses in accurate, relevant information tailored to the dataset.



Conversational Flow

- Ask AI supports dynamic, real-time dialogue that allows users to ask follow-up questions, clarify results, and explore related variables through natural language conversation.

User Value & Impact

Accessibility

Ask AI lowers the barrier to entry for data analysis. Users who may not be fluent in SQL, Python, or advanced analytics can now engage directly with complex datasets through natural conversation.

Speed

Analysts and decision-makers are seeing measurable time savings. Common questions that might take hours of manual exploration can now be answered in minutes.

Breadth of Insights

- **Descriptive:** Overviews of distributions, demographics, and structures.
- **Comparative:** Regional, demographic, or temporal contrasts.
- **Diagnostic:** Correlations, anomalies, and outliers.
- **Predictive:** Trends, risk factors, and forecasting.

Real-World Example

In one use case, Ask AI compared US Census poverty data with CDC health outcomes, surfacing correlations between economic hardship and chronic illness prevalence. This type of **cross-dataset insight** would traditionally require specialized joins and queries. Now it is conversational.

Adoption Highlights

- Early adopters report **improved collaboration** between technical and non-technical team members.
- **Cross-dataset chat** is proving particularly powerful for policy and community-focused projects.
- Feedback indicates that **iterative Q&A flows** are enabling more dynamic data storytelling.

Looking Ahead

Our roadmap for Ask AI includes

- **Enhanced visualization support:** AI-suggested charts and graphics embedded alongside answers
- **Domain-specific context packs:** Tailored prompts and explanations for health, education, and economic datasets
- **Continuous model tuning:** Improved handling of large datasets, better multi-dataset synthesis, and reduced noise in responses

Ask AI is reshaping how teams interact with data. By making advanced analytics conversational, it extends the reach of our Data Lake Explorer, accelerates discovery, and democratizes insights across the organization. With further enhancements, Ask AI will continue to evolve as a cornerstone of our AI-first data strategy.

Transforming Foster Care Outcomes with Data & AI

The **Belmont Data & AI Collaborative (BDAIC)** has partnered with Belmont Innovation Labs to explore and address the challenges faced by youth aging out of foster care in Tennessee.

Through this collaboration, BDAIC has:

- **Mapped** the statewide foster care landscape by identifying and visualizing the network of organizations supporting foster youth across Tennessee
- **Leveraged** AI-powered tools developed by BDAIC to significantly expand the list of identified organizations—nearly doubling the number found through manual research, and doing so in a fraction of the time
- **Analyzed** key vulnerabilities in the foster care experience that contribute to adverse outcomes post-transition, including homelessness, incarceration, and barriers to employment and education

Youth Villages

NON-PROFIT



Youth Villages is a private, nonprofit organization dedicated to helping children with emotional and behavioral problems and their families live successfully. They provide direct help to thousands of children and families each year; partner with innovative states and high-performing nonprofit organizations that use their effective program models; and advocate for positive change to child welfare systems around the country. LifeSet program is a bridge from foster care to successful adulthood for young people who have experienced foster care.

Safe and Affordable Housing Mental Health Care

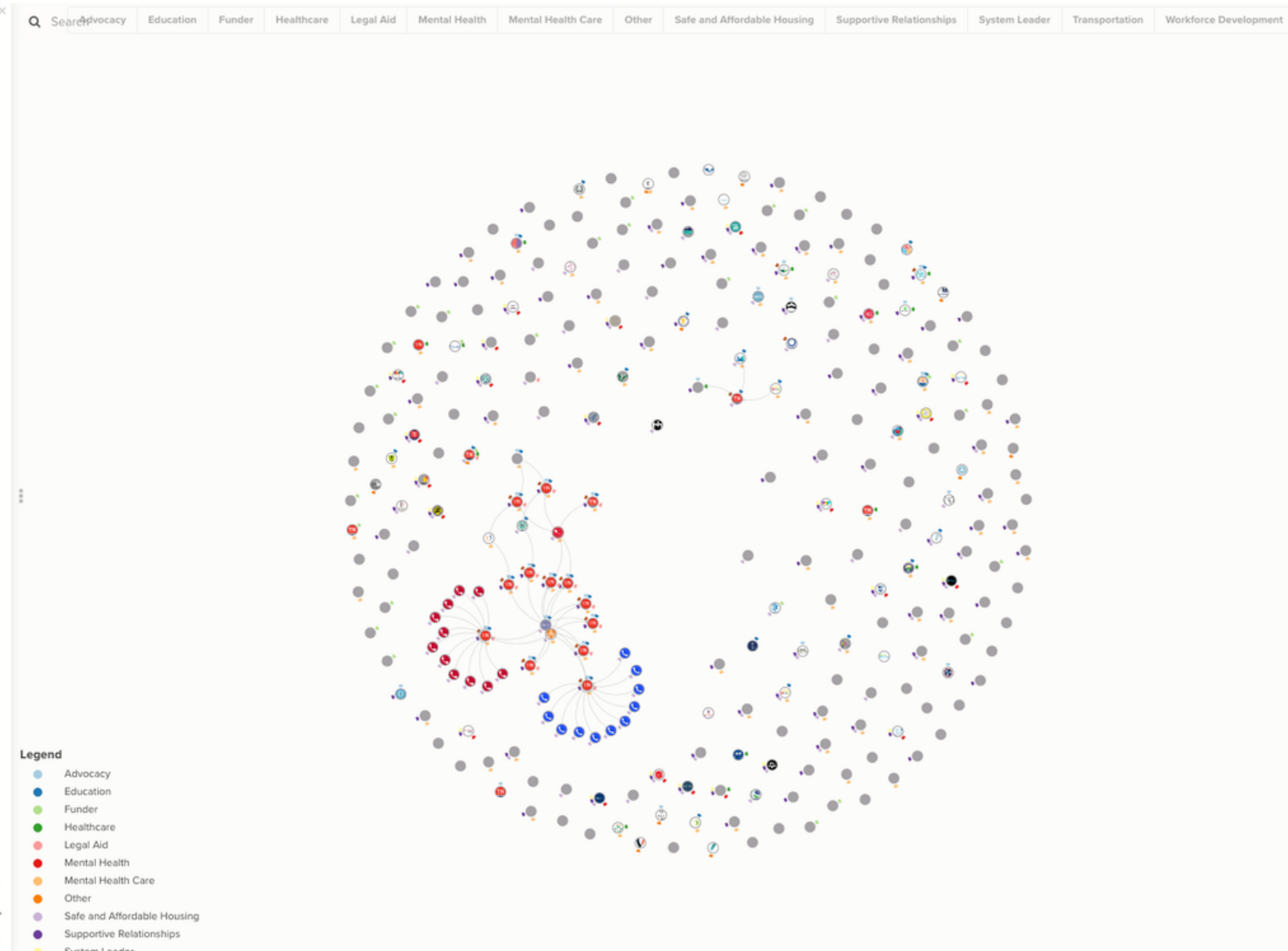
CONNECTED ORGANIZATIONS	Department of Children's Services DCS Regional Office - Davidson County DCS Regional Office - Shelby County DCS Regional Office - Mid-Cumberland DCS Regional Office - Northeast
ORGANIZATION WEBSITE	N/A
POPULATION SERVED	Youth (10-17)
PRIMARY CONTACT EMAIL	N/A
PRIMARY CONTACT NAME	N/A
PRIMARY CONTACT ORGANIZATIONAL ROLE	N/A
PRIMARY CONTACT PHONE	0
SERVICE AREA - GROUPED	East Tennessee Middle Tennessee West Tennessee
SERVICE AREA DETAILS	ADD SERVICE AREA DETAILS

PRIVATE ID 22

PRIVATE IMAGE



Currently, BDAIC is working with data provided by the Tennessee Department of Children's Services to analyze geographic patterns of vulnerability among youth aging out of foster care. This analysis also includes assessing the availability of local resources and programs designed to meet the unique needs of each community.



AI & Animation



BDAIC seeks to assist in the application of AI to a variety of disciplines. Recently, we have been exploring the use of AI in 3D model asset pipelines that are crucial for animation and game creation.

Our objective is to automate labor-intensive tasks, freeing graphic artists to focus on deep creativity. Initially, we focused on two areas: **Asset Generation and Retopology**.

AI-assisted asset generation using prompts and images produced limited results. While character models look reasonable from a distance, their facial features are often merged or distorted, restricting their use to distant background elements. Prop generation showed slightly better outcomes, but these assets also remain suitable only for background fill due to their lack of detail and refinement.



Topology	Triangle
Faces	341,522
Vertices	170,761

Retopology Results & Productivity Gains

Improved Asset Quality

- Automated retopology produced significantly cleaner models, requiring only minor manual corrections.

Time Savings

- Across a variety of model types, the automated process saved 2–6 hours per asset.

Scalable Efficiency

- Given the high asset volume in animation and game development, these time savings represent substantial productivity gains across the entire production pipeline.

AI Conversation

Imagine interacting with a lifelike, computer-generated avatar that looks, sounds, and behaves like a real person.

We are developing AI-powered avatars that can answer questions, express emotions, and interact naturally, all while drawing from vast stores of information and data.

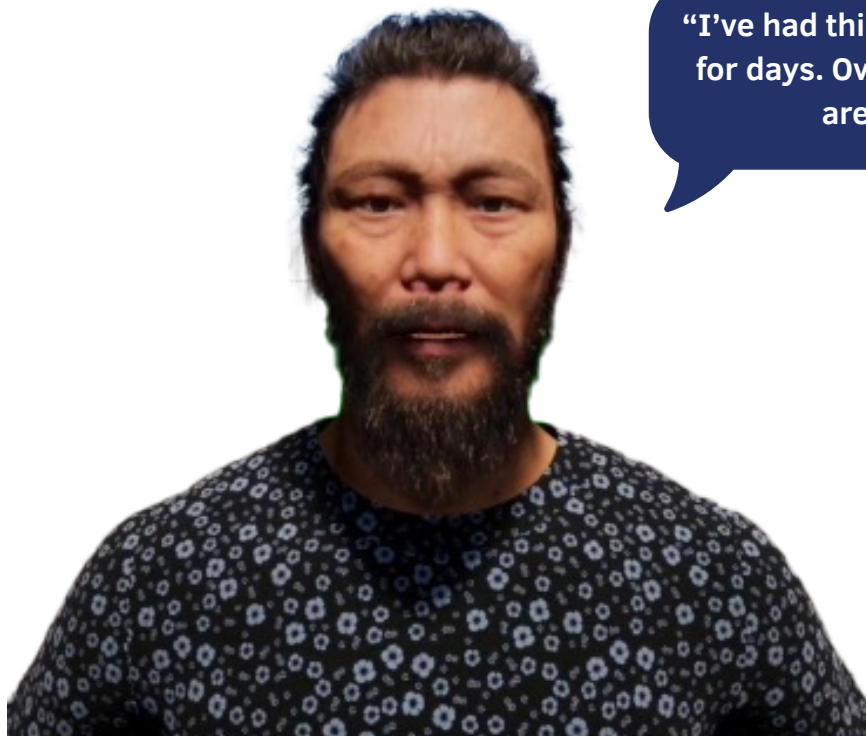
Our first target application of this technology is in **medical education**, through the creation of **digital patients**. This project is conducted in collaboration with the Belmont Simulation Center.

Medical students can practice diagnostics, as these avatars can

- Simulate symptoms
- Convey emotional distress through vocalization, facial expressions, and gestures
- Respond to clinical questioning in ways that help students sharpen both their diagnostic reasoning and bedside manner

Mental health training is another application area.

- Students can practice recognizing subtle signs of emotional distress, including indicators of self-harm risk.
- Digital patients can present complex mental health scenarios, react authentically to different therapeutic approaches, and provide a safe, controlled environment where students can build confidence without the fear of real-world consequences.



“I’ve had this persistent headache for days. Over-the-counter meds aren’t helping.”



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