PURDUE UNIVERSITY | The Data Mine

ENHANCING FARMER ACCESS TO AGRICULTURAL PROGRAMS IN INDIANA

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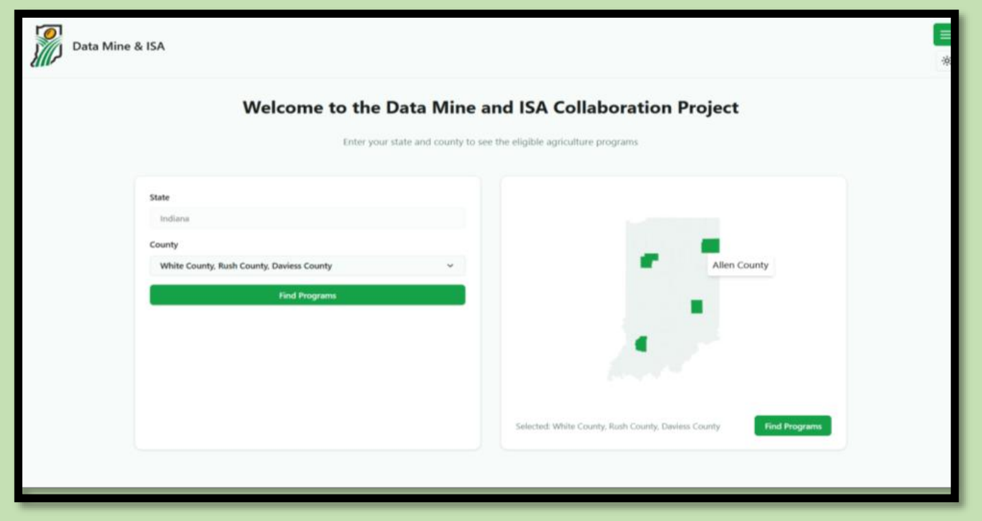
INDIANA SOYBEAN ALLIANCE®
INDIANA CORN Marketing Council

INTRODUCTION

About ISA & Soybean Checkoff

- Farmer-led alliance for Indiana soybean growers
- Growers invest **0.5%** of each bushel's net sale
- Funds split **50/50** between USB (national) & ISA (state)



Data Mine & ISA

Welcome to the Data Mine and ISA Collaboration Project

Enter your state and county to see the eligible agriculture programs

State: Indiana

County: White County, Rush County, Daviess County

Find Programs

Allen County

Selected: White County, Rush County, Daviess County

Find Programs

The Challenge

150+ available programs scattered across hundreds of websites, resulting in **$1.8 billion/year** in underutilized funds.

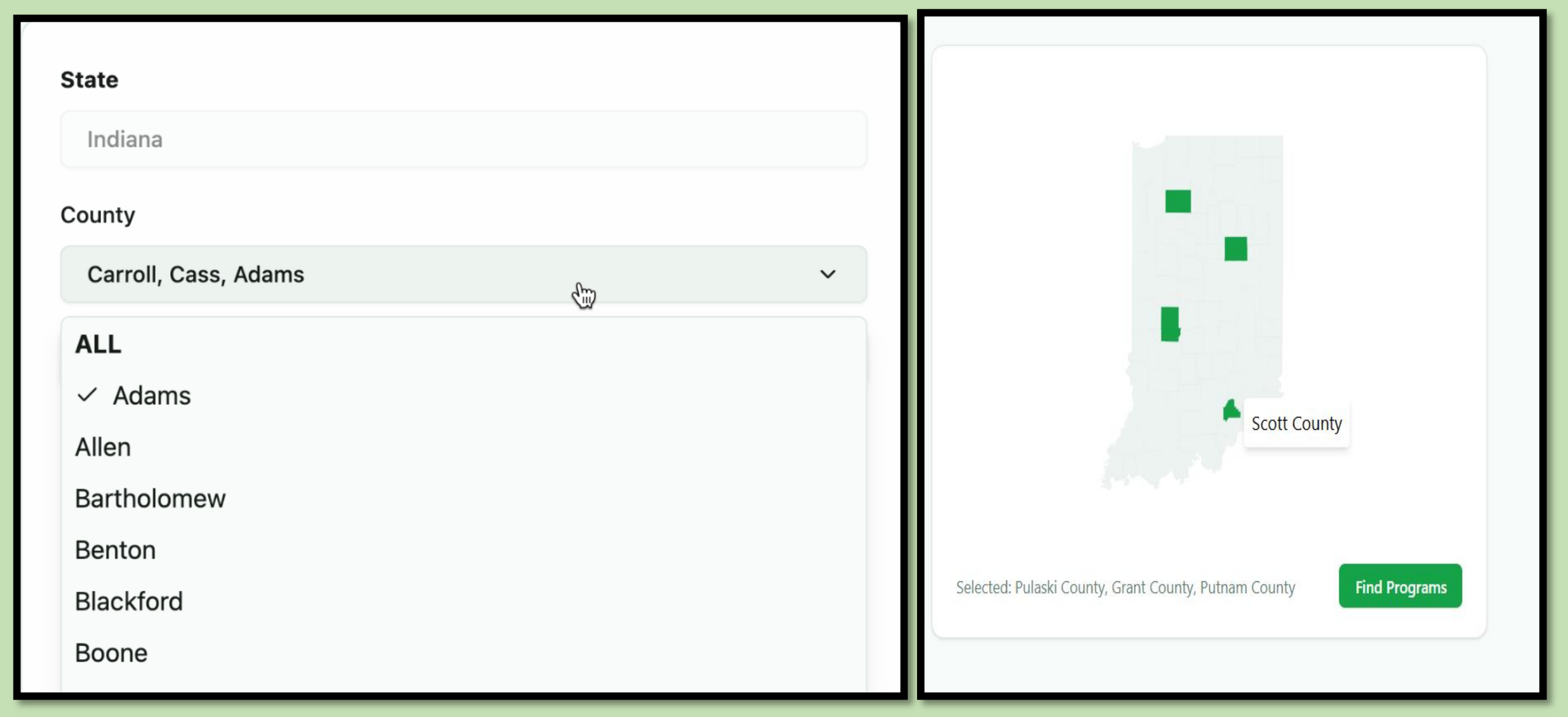
Our Approach

A single, **centralized** platform with **county-level filtering** and **streamlined updates** for both farmers and administrators.

MULTI-SELECTED COUNTIES

Interactive County Selection

- **Hover** over map to preview county name
- **Click** counties (or choose from the dropdown) to multi-select
- **Filter** program list in real-time by selected regions



State: Indiana

County: Carroll, Cass, Adams

ALL
✓ Adams
Allen
Bartholomew
Benton
Blackford
Boone

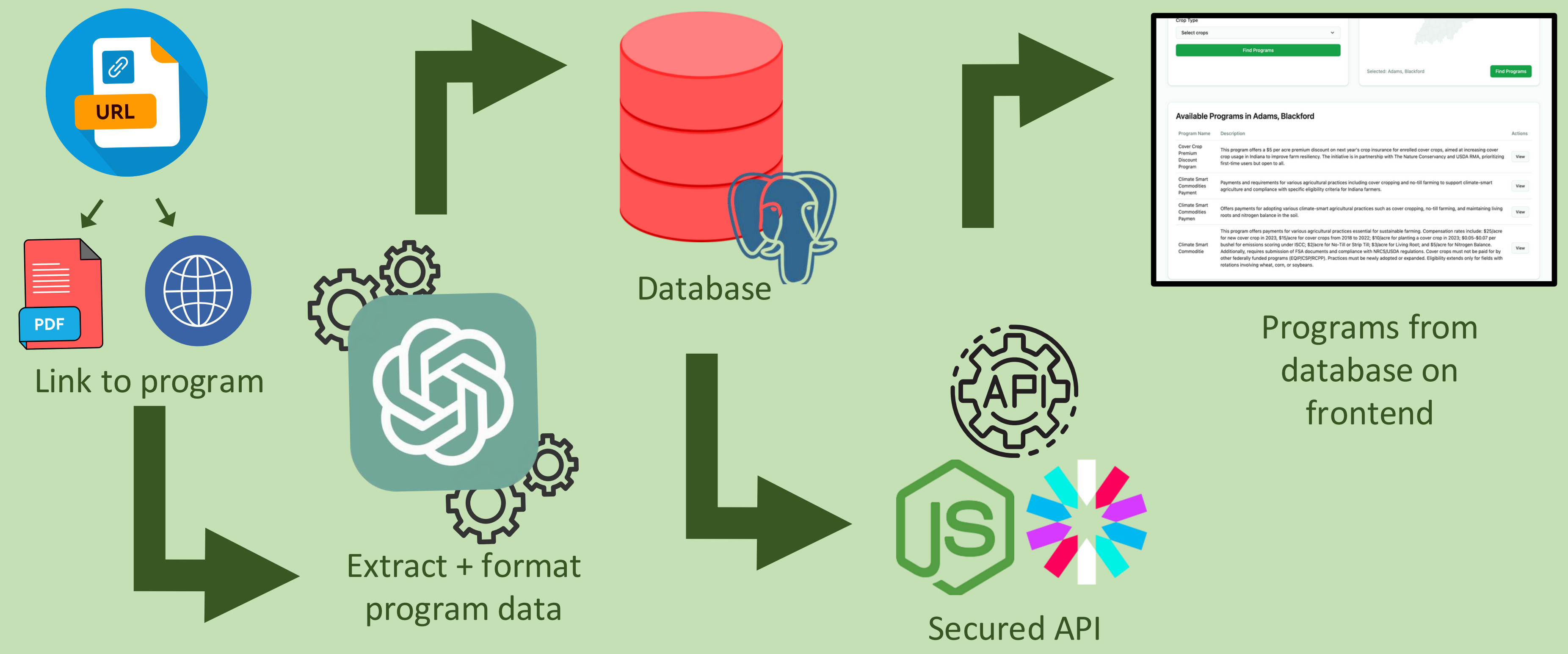
Scott County

Selected: Pulaski County, Grant County, Putnam County

Find Programs

Fig 1. Supports regional planning by letting growers compare programs across any combination of counties

WEBSCRAPING TOOL



Link to program

Extract + format program data

Database

Secured API

Crop Type: Select crops

Find Programs

Selected: Adams, Blackford

Find Programs

Available Programs in Adams, Blackford

Program Name	Description	Actions
Cover Crop Premium Discount Program	This program offers a $5 per acre premium discount on next year's crop insurance for enrolled cover crops, aimed at increasing cover crop usage in Indiana to improve farm resiliency. The initiative is in partnership with The Nature Conservancy and USDA RMA, prioritizing first-time users but open to all.	View
Climate Smart Commodities Payment	Payments and requirements for various agricultural practices including cover cropping and no-till farming to support climate-smart agriculture and compliance with specific eligibility criteria for Indiana farmers.	View
Climate Smart Commodities Paymen	Offers payments for adopting various climate-smart agricultural practices such as cover cropping, no-till farming, and maintaining living roots and nitrogen balance in the soil.	View
Climate Smart Commoditie	This program offers payments for various agricultural practices essential for sustainable farming. Compensation rates include: $25/acre for new cover crop in 2023, $15/acre for cover crops from 2018 to 2022; $10/acre for planting a cover crop in 2023; $0.05-$0.07 per bushel for emissions scoring under ISCC; $2/acre for No-Till or Strip Till; $3/acre for Living Root; and $5/acre for Nitrogen Balance. Additionally, requires submission of FSA documents and compliance with NRCS/USDA regulations. Cover crops must not be paid for by other federally funded programs (EQIP/CSP/RCPP). Practices must be newly adopted or expanded. Eligibility extends only for fields with rotations involving wheat, corn, or soybeans.	View

Programs from database on frontend

Fig 2. Automates program ingestions into a single, secure, and searchable platform.

TOOLS & METHODS

Frontend

REACT (with TypeScript): Builds an interactive user interface, including the geographic map and dynamic filters, so that farmers can easily locate and compare programs.

Mapping Libraries (e.g. Leaflet/Mapbox): Used to render interactive maps that provide intuitive, county-level visualization of available programs

Backend APIs & Database

Node.js/Express: Serves as the backbone for our RESTful API that enables communication between the web scraper, database, and front end.

PostgreSQL: Stores program records with fields like name, due_date, county and more. It is central to how we quickly retrieve and update program details for farmers.

Data Collection and Parsing

Python & Requests: Used to fetch raw HTML or PDF documents from USDA and NRCS websites

PDFminer and BeautifulSoup: Extracts readable text from both web pages and PDF documents

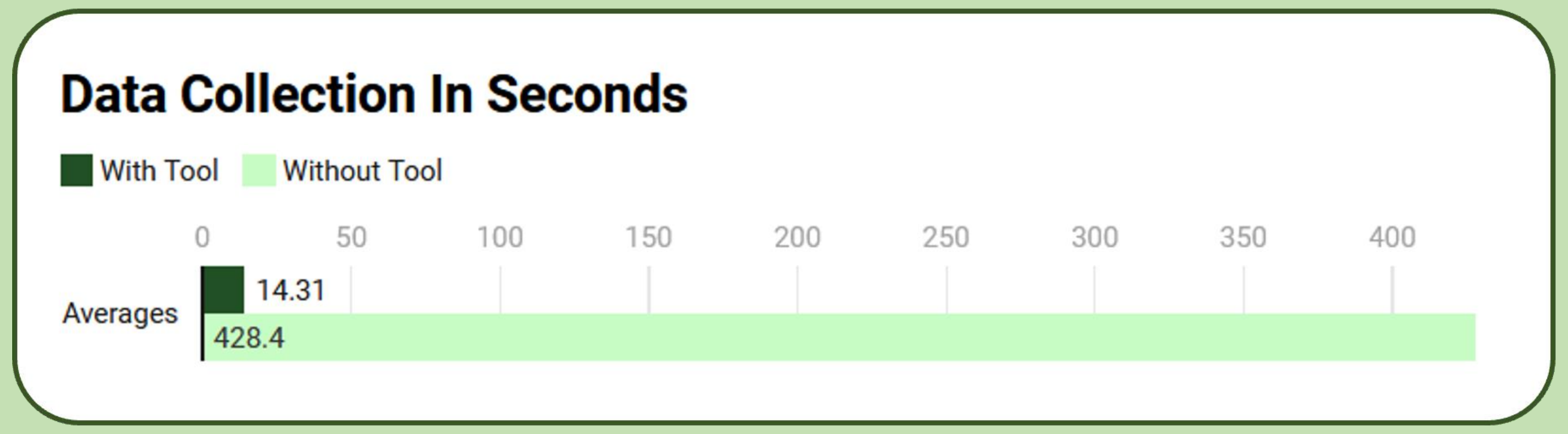
OpenAI API: Automates the extraction of key program fields (e.g., program name, deadlines, eligibility criteria) from the unstructured text.

Deployment and Infrastructure

Docker: Containerizes our entire application to ensure consistency from development to deployment, making the setup replicable and reliable.

AWS: Enhances scalability and availability of the service on a public server.

EFFICIENCY IMPROVEMENT

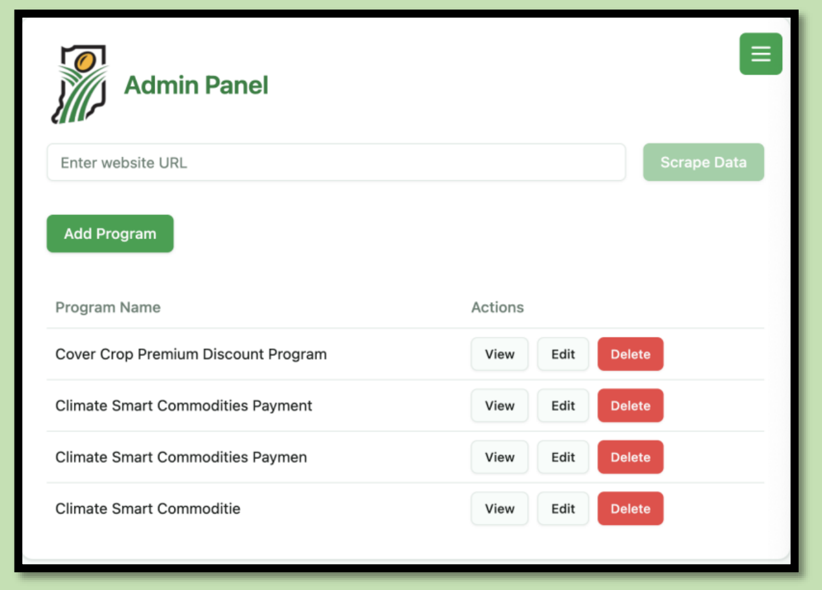


96.41%
FASTER

Fig 3. Data Collection Time which shows our tool cutting average scraping and parsing time from **428.4** seconds to **14.31** seconds, a **96.41%** efficiency boost.

ADMIN DASHBOARD

- URL-Driven Ingestion
- JWT-Secured CRUD on Postgres
- Role-based Swagger API UI, low code needed
- Instant Front-End Sync



Admin Panel

Enter website URL | Scrape Data

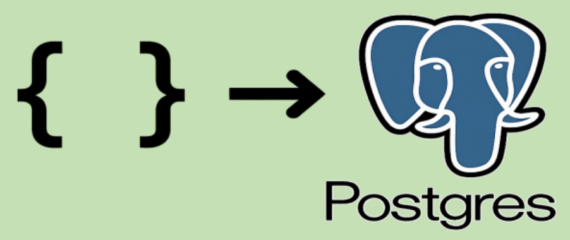
Add Program

Program Name	Actions
Cover Crop Premium Discount Program	View Edit Delete
Climate Smart Commodities Payment	View Edit Delete
Climate Smart Commodities Paymen	View Edit Delete
Climate Smart Commoditie	View Edit Delete

Paste a URL → scrape → publish in seconds

UPDATED PROGRAM LIST

Hard-coded JSON to secure, live database



100+ PROGRAMS

- Secure Access (JWT-backed)
- Faster Updates (**428 s → 14 s** scrape)
- Live Map & Filters for growers

FUTURE GOALS

MULTI-PAGE WEB SCRAPING — Automatically crawl every subpage (HTML & PDF) within USDA/NRCS sites so farmers never have to paste each URL manually

AI POWERED FARMER ADVISOR — Let growers create/update a profile (location, crops, history) and get **real-time** program matches plus **actionable steps** to qualify for new opportunities.

AUTOMATED SCHEDULED SCRAPING — Use a scheduler (cron/AWS EventBridge) to trigger full and incremental scrapes daily or weekly

CONCLUSION

- **Unified Site**: single interface for both admins and farmers
- **Live Data**: instant ingestion & real-time updates
- **100+ Programs**: secure, geo-indexed PostgreSQL backend
- **Interactive Map & Filters**: county-level map with attribute filters to help growers pinpoint programs by location and need
- **High Performance**: replaced manual data entry with a web-scraping tool
- **Low-Code Admin UX**: JWT-protected CRUD via built-in Swagger UI

Live Demo

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