

NLx Research Hub: Using AI for Skills



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Where to Start: Defining Skills

Skills are the operationalization of knowledge to perform tasks.



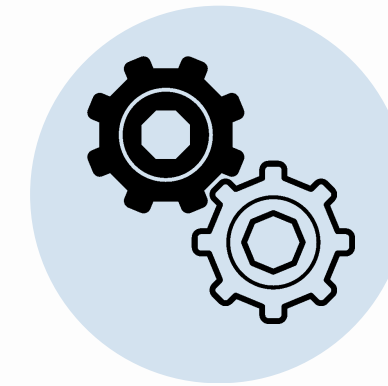
Knowledge

- Information learned from experience or transmission
- Discrete units with overlapping interpretations
- Can be assessed through existing methods
- Not unique to a single skill



Skills

- Synthesis of learning to functional knowledge
- Individual, not discrete
- Always evolving
- Measured on a spectrum, no existing effective tests



Task Abilities

- Smallest unit of work involved in an economic process
- Discrete units with overlapping interpretations
- Can be assessed through existing methods
- Not unique to a skill

Building Skills Definitions

- A skill is defined by two lists
 - Knowledge
 - Task Abilities
- Each skill is a unique combination
- Skills can share SOME elements
- Elements need not be discrete

Data Analytics

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graph TD; DA[Data Analytics] --> K[Knowledge]; DA --> TA[Task Ability]; K --> S[Statistics]; K --> PC[Python Coding]; K --> DS[Data Structures]; K --> DV[Data Visuals]; K --> PA[Policy Analysis]; K --> F[Finance]; K --> R[Regression]; K --> TS[Time Series]; K --> RC[R Coding]; TA --> EDA[EDA]; TA --> DV[Data Visualization]; TA --> OA[Outlier Analysis]; TA --> DC[Data Cleaning]; TA --> RW[Report Writing]; TA --> DA[Data Analytics];
```

Knowledge

Statistics
Python Coding
Data Structures
Data Visuals
Policy Analysis
Finance
Regression
Time Series
R Coding

Task Ability

EDA
Data Visualization
Outlier Analysis
Data Cleaning
Report Writing
Data Analytics

The Problem:

- Skills are not observable
 - They are unique, internal processes
 - They can't be quantified or compared
 - Knowledge and Task Abilities can be identified in data
- Labor data is incomplete
 - Data is biased toward Task Abilities
 - Employers hire for what you can do
 - “Skills” are often mislabeled task abilities
 - Many jobs assume knowledge, level is conveyed by experience/degrees and don't list them explicitly

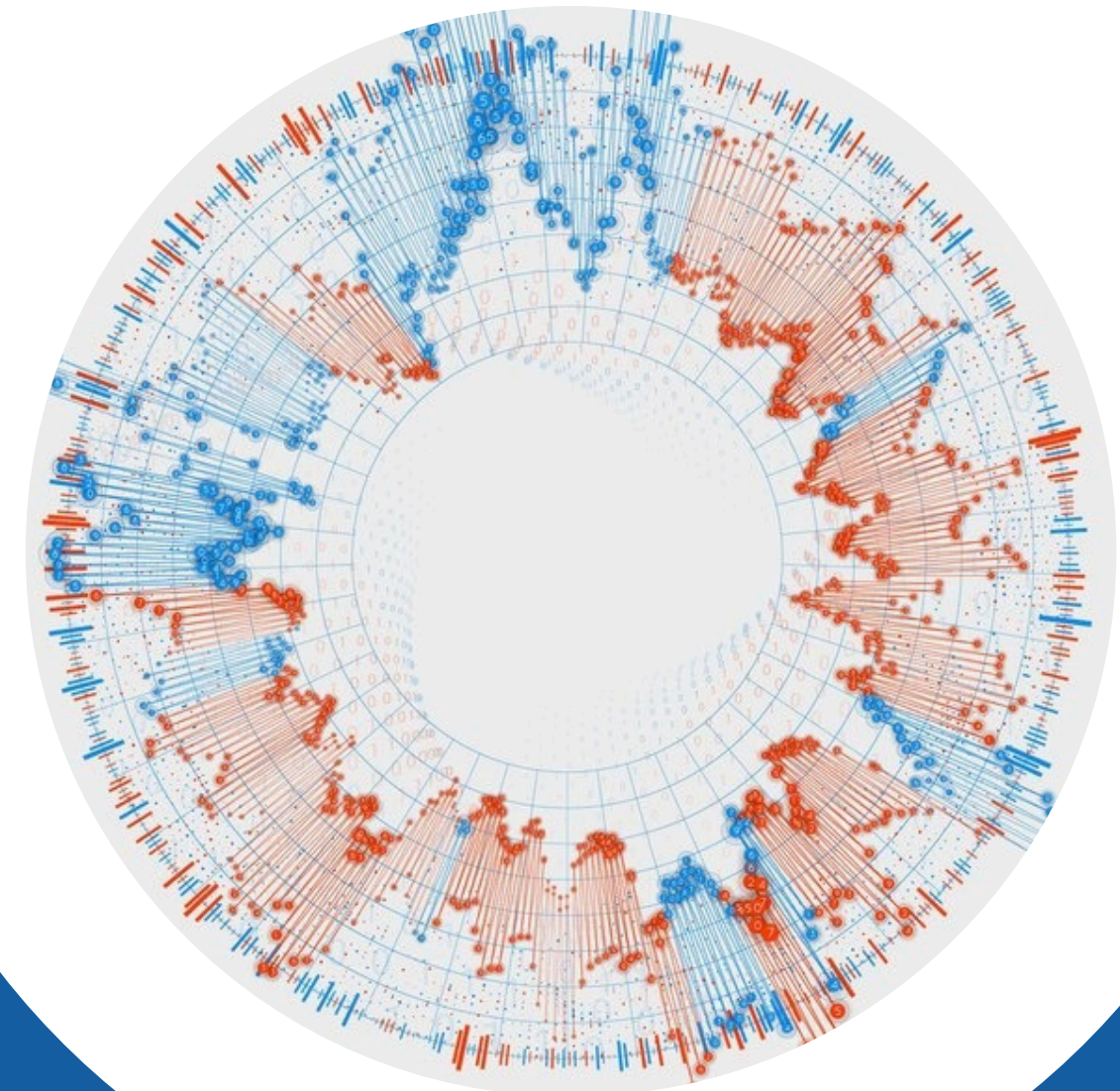


**Overcoming Data
Limitations**


Solution

1. Create a flexible set of KSAs (linking keys)
2. Map their relationships across data sources
3. Create a process for inferring missing data
4. Make the system open and easy to use
 - Open-source
 - Open-license
 - Free/cheap to use

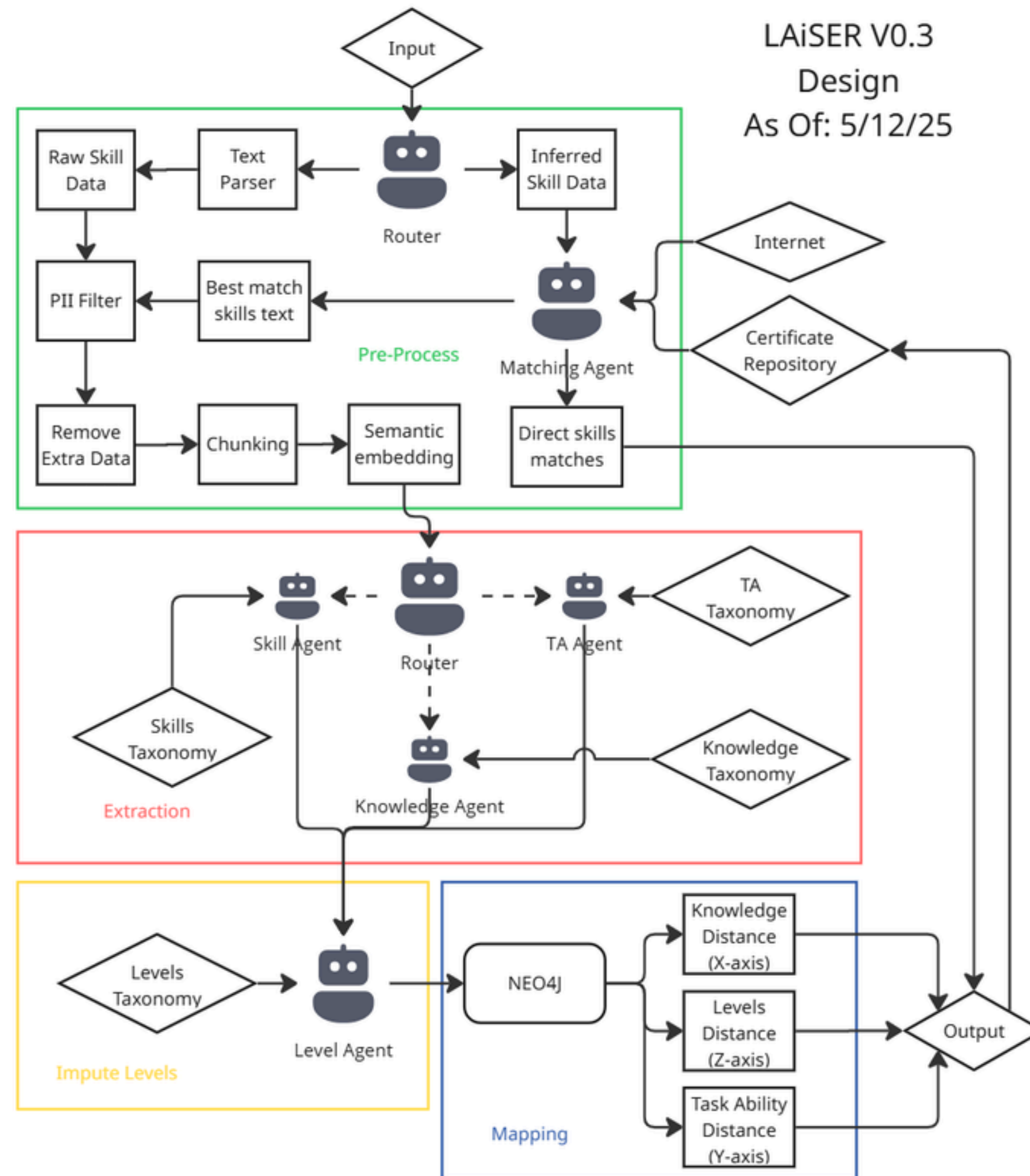
Skills as a Universal Language of Education and Work



What is LAiSER?

- 
- Open Source Tools
 - Extraction
 - Knowledge, Skills, Task Ability
 - Mapping
 - Inference (AI)
 - API/EXE implementations
 - Skills ontology
 - Public literature
 - Technical documentation
 - Validation research

LAiSER Data Flow Diagram



Example: Certificates

A software company is interested in locating a new office in a city serviced by a large community college. To help fortify their entry level staff they want to quickly ramp up a certificate program for training coders on Agentic Agents.

Red

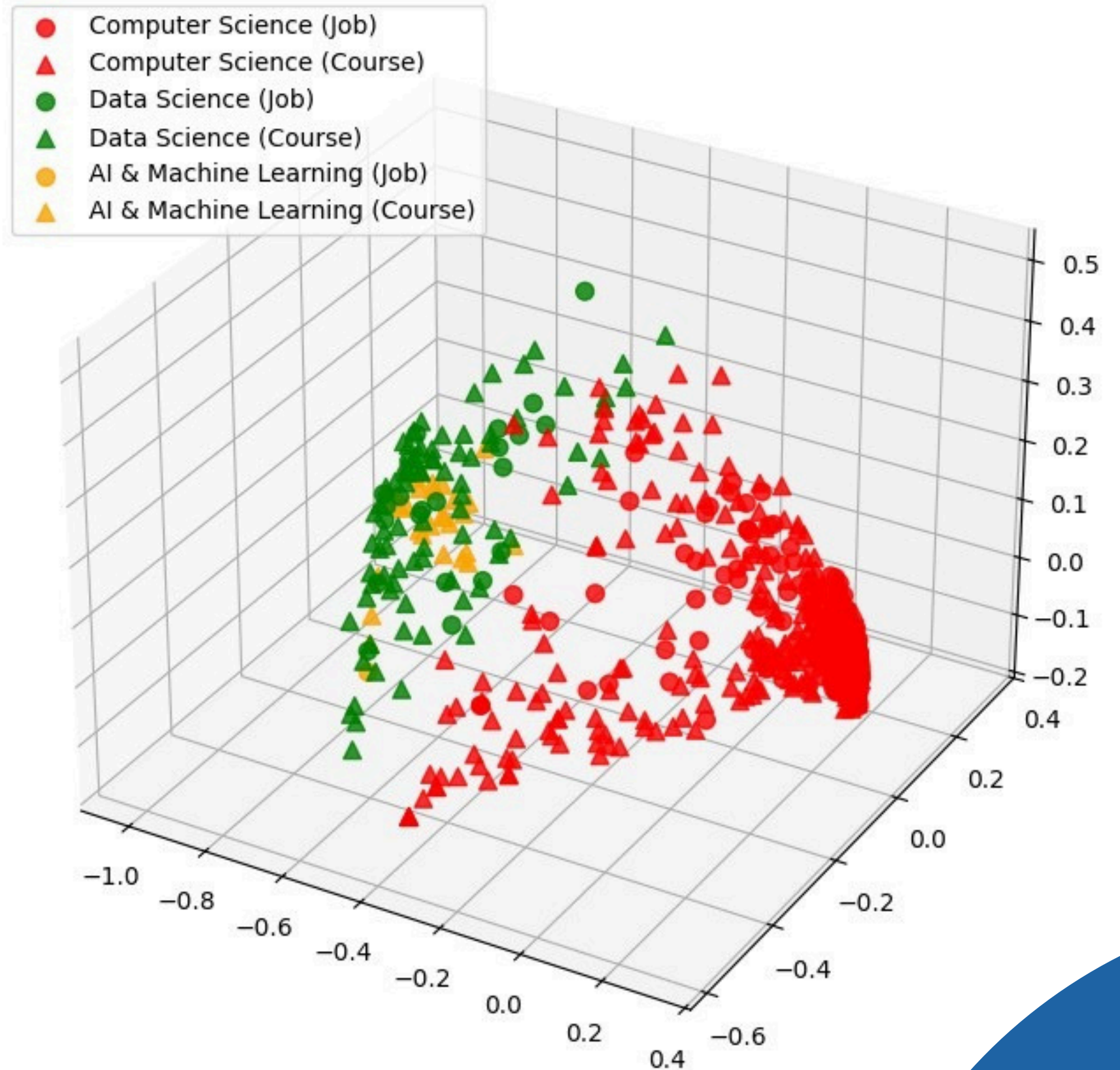
Computer Science
Skills

Green

Data Science
Skills

Yellow

AI & ML
Skills



Demo

- AWS server running LAiSER V0.2.2
- Uses Gemini 2.5 AI model for extraction
- LAiSER V 0.3 and .exe launch in Q4!

THANK YOU

Questions?

Email: Micah.Sanders@GWU.edu

Visit our website for more info

Github Repository for LAiSER



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Long Term Vision: Skills Will Change the World



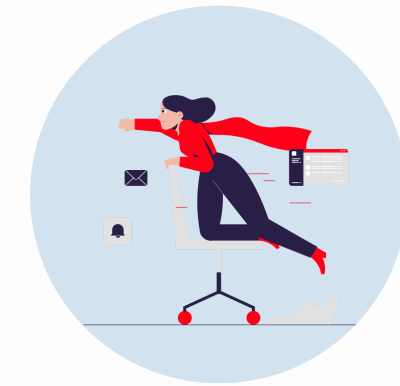
Skills-Centered

- A world where skills, not credentials, are the currency of the labor market – because credentials are recognized for the skills they contain
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Interoperable Data

- Seamless data interoperability is the norm because AI LLMs can effectively handle unstructured data



Empowered Learners

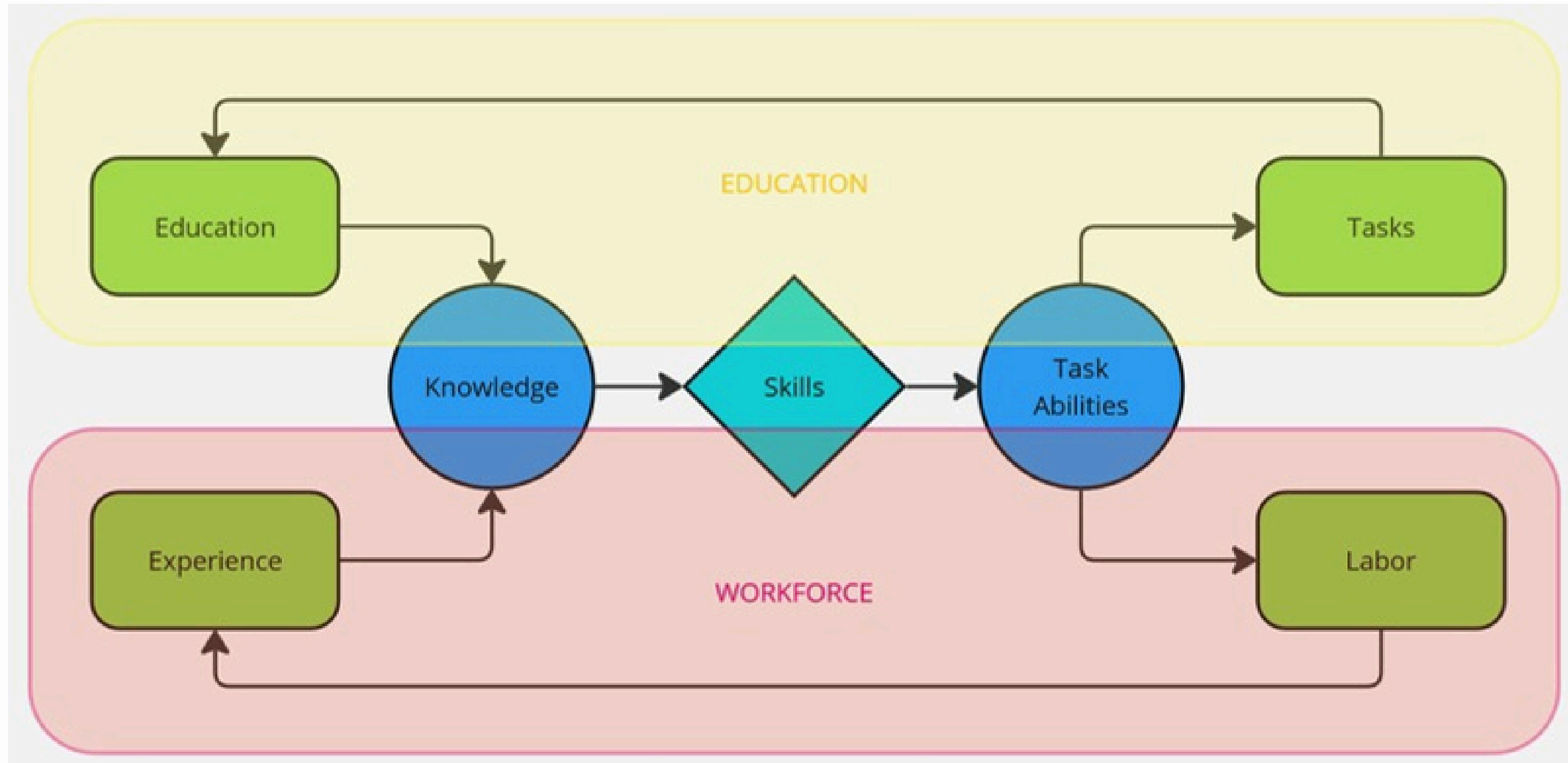
- A world where individuals are empowered by transparency about what they are learning and the full range of opportunities that are unlocked by that learning.

Why Open Source?

- Allows for organic integration into applications
 - Cost advantage over systems tied to proprietary data
 - Implement locally with their own data
 - Ingest data from many sources
 - Improves as we bring in more training data
- Near future: Locally hosted AI models can reduce the risk of disclosure or security breaches



Theory of Skill Development



Defining Skill Progression

Data Analytics

Develops into

Data Science

Knowledge

Statistics
Python Coding
Data Structures
Data Visuals
Policy Analysis
Finance
Regression
Time Series
R Coding

Task Ability

EDA
Data Visualization
Outlier Analysis
Data Cleaning
Report Writing
Data Analytics

Knowledge

Linear Algebra
Statistics
Python Coding
Data Structures
Data Visuals
Policy Analysis
Finance
R Coding
ML/AI
Regression
Time Series

Task Ability

EDA
Object Oriented Prog
Data Visualization
Outlier Analysis
Inference
Data Cleaning
Report Writing
Data Analytics
Projection

Defining Skill Development

Data Analytics (5.8)

Develops into

Data Science (6.4)

Knowledge

Statistics (4)
Python Coding (5)
Data Structures (6)
Data Visuals (4)
Policy Analysis (3)
Finance (2)
Regression (5)
Time Series (7)
R Coding (5)

Task Ability

EDA (4)
Data Visualization (3)
Outlier Analysis (6)
Data Cleaning (3)
Report Writing (4)
Data Analytics (2)

Knowledge

Linear Algebra (6)
Statistics (4)
Python Coding (5)
Data Structures (6)
Data Visuals (4)
Policy Analysis (3)
Finance (2)
R Coding (5)
ML/AI (7)
Regression (5)
Time Series (7)

Task Ability

EDA (4)
Obj Oriented Prog (5)
Data Visualization (3)
Outlier Analysis (6)
Inference (6)
Data Cleaning (3)
Report Writing (4)
Data Analytics (2)
Projection (4)

Defining Skill Pathways (Ontologies)

