# Artificial Intelligence in Maine

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# **Outline of Presentation**



Outline why and how we created our definition of Artificial Intelligence (AI) used in our analysis.



#### Demand in Maine

Where is demand coming from?
What industries demand AI?
What AI skills are in demand?



Compare AI skills demand in Maine to United States.



Explore growth in Al skills demand in Maine. 5

Understand the limitations of this study.

# **Defining Artificial Intelligence**

### **Early Definitions**

"The conjecture that every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it."

- John McCarthy

"Al is the science of making machines do things that would require intelligence if done by men." - Marvin Minskey

#### **Issue With These Definitions**



## **Creating a Backward-Looking Definition**

### Goal

Define artificial intelligence (AI) by describing the research and outcomes that already exist within the field

### Challenges

- 1. All is evolving rapidly, thus a backward-looking definition will always be evolving and need to be updated frequently.
- 2. There is a lot of research being conducted about AI, and thus, a lot of research to analyze and understand.
- 3. There are many different research areas within AI as well as many different ways AI will be classified by researchers, thus is is challenging to understand the full breadth of the research.

### **Our Definition**

Web of Science

Advanced Search: "Artificial Intelligence" must appear in either the Source Title, Publication Title, Abstract, or Author Keywords



#### 2011 Top 10

Artificial Neural Networks, Neural Networks, Support Vector Machines, Multi-Agent System, Fuzzy Logic, Data Mining, Machine Learning, Genetic Algorithm, Simulation, Optimization

### <u>2014 Top 10</u>

Artificial Neural Networks, Genetic Algorithm, Neural Networks, Machine Learning, Fuzzy Logic, Multi-Agent Systems, Support Vector Machines, Expert Systems, Optimization, Pattern Recognition

### <u>2018 Top 10</u>

Machine Learning, Deep Learning, Neural Networks, Artificial Neural Networks, Convolutional Neural Networks, Feature Selection, Big Data, Support Vector Machines, Internet of Things, Natural Language Processing

#### <u>2022 Top 10</u>

Machine Learning, Deep Learning, Convolutional Neural Networks, Internet of Things, Neural Networks, Natural Language Processing, Explainable Artificial Intelligence, Task Analysis, Artificial Neural Networks, Feature Extraction

### Framework for Understanding Al Demand

### About the Data:

- Secondary Data Collected from Lightcast
- Skill Demand is Measured by Job Postings Containing that Skill

### Aggregate AI Job Postings ≠ Sum of Job Postings For All AI Skills:

- ➤ Aggregate AI Job Postings → Job postings that contain at least one AI skill in the posting.
- ➤ Job Postings for AI Skills → Job postings that contain the specific AI skill in the posting.

**Example:** One posting requires "Natural Language Processing" AND "Data Mining"

- For aggregate AI job postings this counts as ONE job.
- For specific skill postings this counts as one job for Natural Language and one job for Data Mining.



### Demand for Artificial Intelligence Skills in Maine

#### Job Postings Demanding AI Skills in Maine



### Demand for Artificial Intelligence Skills in Maine (Non-Remote)

#### Non-Remote Job Postings Demanding AI Skills in Maine



## Where is the Demand?



### **Top Three Counties Across All Four Years:**

Kennebec County
 Cumberland County
 Oxford County

# What Industries Demand AI Skills?



2014

# What Industries Demand AI Skills?



### What Al-Related Skills are Demanded Most in Maine?

Top 5 Demanded Al Skills by All Job Postings (2022):

Machine Learning
 Artificial Intelligence
 Optimization
 Big Data
 Simulation

Top 5 Demanded Al Skills by Non-Remote Job Postings (2022):

**1.**Machine Learning

2.Data Mining

3.Big Data

4. Artificial Intelligence

5.Optimization

### How Has Demand Changed in Maine Relative to the Other States?



Non-Remote AI-Related Job Postings Per 1000 People

### How Has Demand Changed in Maine Relative to New England States?

#### Job Postings Demanding AI Skills in New England



### What Industries are Driving Growth?

### Non Remote AI Job Postings by Industry in Maine

2011 - 2022



# Limitations



We are not looking to see if these job postings are getting filled, thus we do not know if demand is being filled or left unfilled.



We are only looking at the top 10 AI skills per year, thus are not capturing the full scope of AI skill demand.



We still need to estimate how well AI technologies and skills discussed in academic literature translate to skills demanded in the labor market.