Time to Join 'AAA": Are you an Al-Aware Archivist?

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Archives*Records 2022 August 26, 2022

The Evolution of Al

Darra Hofman Assistant Professor San Jose State University



Hello, everyone!

It's a delight to be able to share our work on AI, archives, and recordkeeping with everyone here at SAA!

While I cannot be there in person, please know that I am very much with you all in spirit, and I am thrilled that you have the exceptional Dr. Pat Franks with you in person.

You can just imagine Pat's volume up to 10 and her sophistication down to 4 if you want the Darra experience.

So what is Al?

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"It is well known that there is no widely accepted definition of Artificial Intelligence (AI)" ~Wang (2019)

That is super helpful...



"Artificial Intelligence is software that can anticipate how a human would act, and then perform that action. It can learn to be more precise in its decision-making the more data it has, and through the algorithms it deploys."

~Interview with Elizabeth Perkes, Utah Department of Government Operations, Division of Archives and Records Service, Electronic Records Archivist 8/23/2022.

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AI: Older and messier than you thought R. Anoyha (2017), The History of Artificial Intelligence, *Harvard University Science in the News*, https://sitn.hms.harvard.edu/flash/2017/history-artificial-intelligence/

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AI, ML, NLP, NN, NER, AAAAAAAAAAH!



- "To the larger community of computer science and information technology, AI is usually identified by the techniques grown from it" (Wang, 2019)
- Andrea Asperti, "The Deep Learning Revolution in Al"

ARTIFICIAL INTELLIGENCE

Early artificial intelligence stirs excitement.

MACHINE LEARNING

Machine learning begins to flourish.

DEEP LEARNING

Deep learning breakthroug drive AI boom.

1950's 1960's 1970's 1980's 1990's 2000's 2010's



Machine Learning (ML)

Machine learning is a branch of artificial intelligence (AI) and computer science that focuses on data and algorithms to imitate how humans learn, gradually improving accuracy. ~*IBM*



Deep Learning



Hybrid Intelligence

... a method for artificial intelligence and humans to work together to achieve desired outcomes and learn from one another.

Conversational AI: What Could Go Wrong?



TayTweets

The official account of Tay, Microsoft's A.I. fam from the internet that's got zero chill! The more you talk the smarter Tay gets

9 the internets

8 tay.ai/#about



@TayandYou's Tweets are protected.

Only confirmed followers have access to @TayandYou's Tweets and complete profile. Click the "Follow" button to send a follow request.

It took less than 16 hours for Tay to begin spouting misogynistic and racist remarks.

Meta lets algorithm pick 60 employees to fire



Image: This another step in the move to embrace 'black box' AI procedures Dev Kundaliya, Computing, 8/22/22

Porsche's Formula E project

Beginning in 2018, Porsche built a machine-learning system with limited data and a mixed bag of talent.



TAG Heuer Porsche Formula E Team clinches historic one-two finish

In Feb. 2022, the Team celebrated its greatest success to date with a onetwo victory at the Mexico City E-Prix.



Infuse - Operationalize AI throughout the business

Analyze - Build and scale AI with trust and transparency

Organize - Create a business-ready analytics foundation

Collect - Make data simple and accessible

Modernize Make your data ready for an AI and hybrid cloud world

Figure 1-1. The AI Ladder, a guiding strategy for organizations to transform their business by connecting data and AI.

The AI Ladder, IBM

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- Al is EVERYWHERE...driving cars, deciding who gets a mortgage and who gets released from prison....
- But, this ubiquity doesn't mean we've figured AI out:
 - RIM challenges, ranging from provenance and classification to destruction
 - Legal challenges, including agency and accountability
 - Ethical challenges including explainability/transparency and bias/discrimination

State of the ART in Al

Michael Stiber Computing & Software Systems University of Washington Bothell



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Al & Recordkeeping

Patricia C. Franks Professor Emerita San Jose State University



RIM Lifecycle





Create: The lifecycle begins when useful or relevant information is received or created in a variety of formats using different equipment and technologies.



Use: Information is transferred to or accessed by those who need it and used in the course of business operations.



Store: Information is filed or stored according to a classification scheme to permit quick retrieval and maintained and protected to safeguard the integrity of the information over time.



Destroy or Preserve: At the end of its retention period when it has no legal fiscal or administrative value, information is securely destroyed or preserved permanently for historical or research purposes.



Or is it ?



AI Creation & Capture: Data Ingestion

Store #05666 3515 DEL MAR HTS,RD SAN DIEGO, CA 92130 (858) 792-7040

Register #4 Transaction #571140 Cashier #56661020 8/20/17 5:45PM

wellness+ with Plenti Plenti Card#: 31XXXXXXXXX4553 1 G2 RETRACT BOLD BLK 2PK 1.99 T SALE 1/1.99, Reg 1/4.69 Discount 2.70-1 Items Subtotal 1.99

Tax .15 Total 2.14 *MASTER* 2.14 MASTER card * #XXXXXXXXXXX5485 App #AA APPROVAL AUTO Ref # 05639E Entry Method: Chip

OCR Receipt Example

 Output

 Store #056663515

 DEL MAR HTS,RD

 SAN DIEGO, CA 92130

 (858) 792-7040Register #4 Transaction

 #571140

 Cashier #56661020 8/20/17

 5:45PMwellnesst+ with Plenti

 Plenti Card#: 31XXXXXXXX4553

 1 G2 RETRACT BOLD BLK 2PK 1.99 T

 SALE 1/1.99, Reg 1/4.69

 Discount 2.70

1 Items Subtotal 1.99 Tax .15

Total 2.14 *xMASTER* 2.14 MASTER card * #XXXXXXXXXXX548S Apo #AA APPROVAL AUTO Ref # 05639E Entry Method: Chip

OCR (optical character recognition) captures text and converts it machine-readable unstructured characters. Vendors need to process OCR results with machine learning to turn machine-readable data into machine-actionable data.



CMR (cognitive machine reading) transforms paper and electronic documents into business-ready data. It combines the power of AI technologies such as Natural Language Proessing (NLP), Machine Vision, Natural Language Modeling (NLM) and Machine Learning (ML) to automatically pre-process, classify, extract, and validate all types of data.

AIOCR

Data extraction

 Validation & Correction

 (prompts for the Human-in-the Loop)

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	AFE4T90-120 FlashRite #4 EPDM Grev 90-150mm	Each	43	0	9.24	397.32

https://rossum.ai/data-capture/

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Book Reviews

Text Classification is the processing of labeling or organizing text data into groups.

Autoclassification of Records – Using Alfresco and Al artificial intelligence integrations

Document Analysis Amazon Textract Automatically extract text and data from documents.



Advanced Text Analytics Amazon Comprehend

Use natural language processing to extract insights and relationships from unstructured text.



Image and Video Analysis Amazon Rekognition Add video and image analysis to applications to catalog assets, automate media workflows and extract meaning.

Source: Hyland Modernizing AI & AWS (Webinar): https://www.alfresco.com/ecm-software/alfresco-intelligence-services







Manage: Al Analytics



Pick Your Model

You don't have to be a data scientist to leverage AI in BlueConic. Our user-friendly interface offers models like CLV, propensity, and lookalike right out of the box. Pick the ones you want, apply them to your data, and schedule the models to run as often as you need.





Casepoint: Advanced Analytics to identify most relevant documents

Al-as-a-Service

The 3 Big Players: Amazon Web Services (AWS) Microsoft Azure Google Cloud Platform (GCP)

Moving into their territory:

Salesforce Oracle SAP



New Solutions bring New Challenges...

which means we need to look for newer solutions ©



The real problem is not whether machines think but whether men do. (B. F. Skinner) ARMA's Generally Accepted Recordkeeping Principles



Integrity

A recordkeeping program shall be constructed so the records and information generated or managed by or for the organization have a reasonable and suitable guarantee of authenticity and reliability.

Beware of Deep Fakes





The ITrustAl Project

Corinne Rogers, PhD Project Coordinator InterPARES Trust AI



2022-08-17 10:58:31

Two ItrustAl Projects

Darra & Pat



Privacy – Many studies, one problem



01

Identifying personally identifiable information and managing records in compliance with freedom of information/privacy laws

02

Using underlying data without compromising privacy

03

Figuring out where to even start with looking for Al-based privacy solutions

Some urgent practical problems

We all know what privacy is, right?

Privacy is a concept in disarray. [...] Privacy is far too vague a concept to guide adjudication and lawmaking [...]



-Solove, 2006, p. 477







Preserving Al as Paradata – RP04

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Self-Driving

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What do we need to know that metadata won't tell us & why is it important? EX DAVIES TRANSPORTATION FEB 29, 2016 2:04 PM

Google's Self-Driving Car Caused Its First Crash

Google's self-driving car appears to have caused its first crash on February 14, when it changed lanes and put itself in the path of an oncoming bus.

First-ever self-driving vehicle crash report released. Nearly all the WA wrecks involved Teslas

June 15, 2022 at 4:13 pm | Updated June 15, 2022 at 5:51 pm

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Who should be held accountable? The manufacturer? The driver? Both? Neither?

My opinion is it's a bridge too far to go to fully autonomous cars." ~Elon Musk, Businessman, 2013

Elon Musk says Tesla will have selfdriving cars without the need for human drivers this time next year

Fred Lambert - May. 22nd 2022 10:52 am PT 🎔 @FredericLambert

In relation to AI, Paradata is ...



- information about
 - the procedure(s) and tools
 - used to create and process
 - information resources,
 - along with information about
 - the persons carrying out those procedures
 - and the outcomes

The National Archives (TNA) of the UK



Paradata in Practice

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Boundary Set for Paradata

Representations & Display to Promote Al Process Transparency Microsoft Datasheets for Data Sets (2018) – proposes every dataset used in Machine Learning should document the motivation composition, collection process, recommended uses, etc. Questions are posed that should be answered.

Example question related to Collection Process:

What mechanisms or procedures were used to collect the data (e.g., hardware apparatus or sensor, manual human curation, software program, software API)?

Representations & Display to Promote AI Process Transparency

Model Card for Census Income Classifier

Model Details

Overview

This is a wide and deep Keras model which aims to classify whether or not an individual has an income of over \$50,000 based on various demographic features. The model is trained on the UC census income bataest. This is not a production model, and this dataset has traditionally only been used for research purposes. In this Model Card, you can review quantitative components of the model's performance and data, as well as information about the model's interned uses, limitations, and ethical considerations.

Version

name: 36dea2e860670aa74691b5695587afe7

Owners

Model Cards Team, model-cards@google.com

References

interactive-2020-07-28T20_17_47.911887

Considerations

Use Cases

This dataset that this model was trained on was originally created to support the machine learning
community in conducting empirical analysis of ML algorithms. The AduR Data Set can be used in fairnessrelated studies that compare inequalities across sex and nace, based on people's annual incomes.

Limitations

This is a class-imbalanced dataset across a variety of sensitive classes. The ratio of male-to-female
examples is about 2.1 and there are far more examples with the "white" attribute than every other race
combined. Furthermore, the ratio of \$50,000 or less earners to \$50,000 or more earners is just over 3.1. Ou
to the imbalance across income levelit, we can see that our true negative rate seems quite low. This is true to an even greater degree when we only look at the "female"
sub-group, because there are even fewer female examples in the \$50,000 er earner group, causing our mode
to overfit these examples. To avoid this, we can try various remediation strategies in future iterations (e.g.
undersamples, To avoid this, we can try various remediation strategies is issue.

Ethical Considerations

Risk: We risk expressing the viewpoint that the attributes in this dataset are the only ones that are predictive
of someone's income, even though we know this in on the case.
 Mitigation Strategy, As mentioned, some interventions may need to be performed to address the class
imbalances in the dataset.

Train Set



Like the training set, we provide graphs showing the class distribution of the data we used to evaluate our model's performance



Google Model Cards (2018) - Once the Model Card Toolkit has populated the Model Card with key metrics and graphs, developers can supplement this with information regarding the model's limitations, intended usage, trade-offs, and ethical considerations otherwise unknown to model users.

Additional information on this example card is a Quantitative Analysis section showing graphics that visualize how the AI performs for data sliced by demographics such as race & sex.

Representations to Promote AI Process Transparency



7. Models must be checked for robustness to dataset shift.

IBM Fact Sheet - a collection of relevant information (facts) about the creation and deployment of an AI model or service, such as information about the purpose and criticality of the model, measured characteristics of the dataset, model, or service, or actions taken during the creation and deployment process of the model or service.

Dissemination & Next Steps

Davet, J.; Hamidzadeh, B.; Franks, P; Bunn, J. "Tracking the Functions of AI as Paradata & Pursuing Archival Accountability," in *Archiving 2022 Final Program and Proceedings*, pp. 83-88.

Davet, J.; Hamidzadeh, B.; Franks, P. "Archivist in the Machine: Paradata for Al-Based Automation in the Archives." Blind copy submitted July 2022 for peer review to Archival Science.

- 1. Clarify distinction between metadata & Paradata.
- 2. Determine the extent of Paradata required for interpretation.
- 3. Codify Paradata standards, deployment, and collection methods.
- 4. Consider the effects of archives resources on Paradata collection/ use.
- 5. Examine the extent of effects of Paradata on AI development.

2021 - 2024



It's the same old song, but with a different meaning

- Al might be new (although not as new as it seems), but many of the challenges with Al are not
 - Digital recordkeeping challenges, from authenticity to transparency to privacy abound
 - Arrangement and description will be even more critical with AI-based solutions
- Al is being built into ever more recordkeeping solutions, but the uncertain regulatory landscape around Al requires caveat emptor
- Machines might be thinking, but that doesn't mean we can trust their judgment!

Thank you! Questions?

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