

LINGI2369

Artificial Intelligence and
Machine Learning Seminar

Siegfried Nijssen

Organisation

Siegfried Nijssen

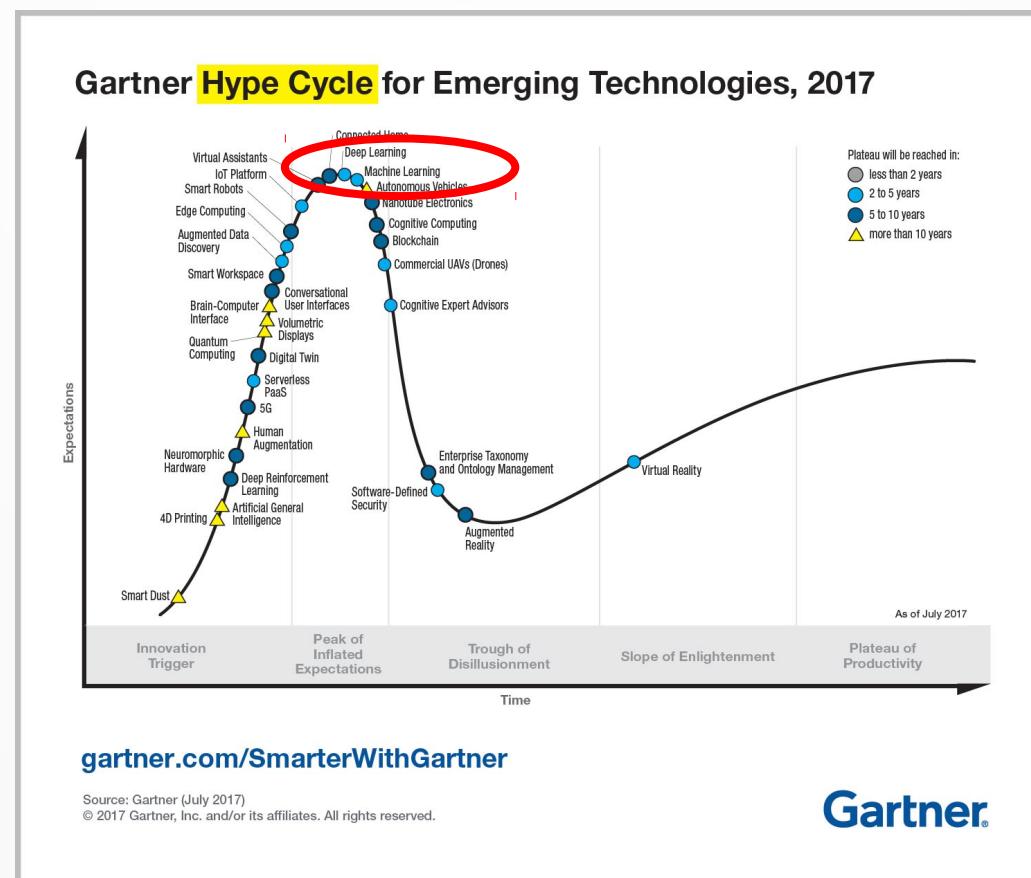
Reaumur, room 159

siegfried.nijssen@uclouvain.be



A and ML

Machine learning and Artificial Intelligence are popular, witnessing rapid developments



Aims of this Seminar

- To learn about recent developments in AI and ML
- To learn to search for good references
- To learn how to present scientific work
- To learn how to discuss scientific work
- To learn how to relate scientific work to the popular literature

Topics

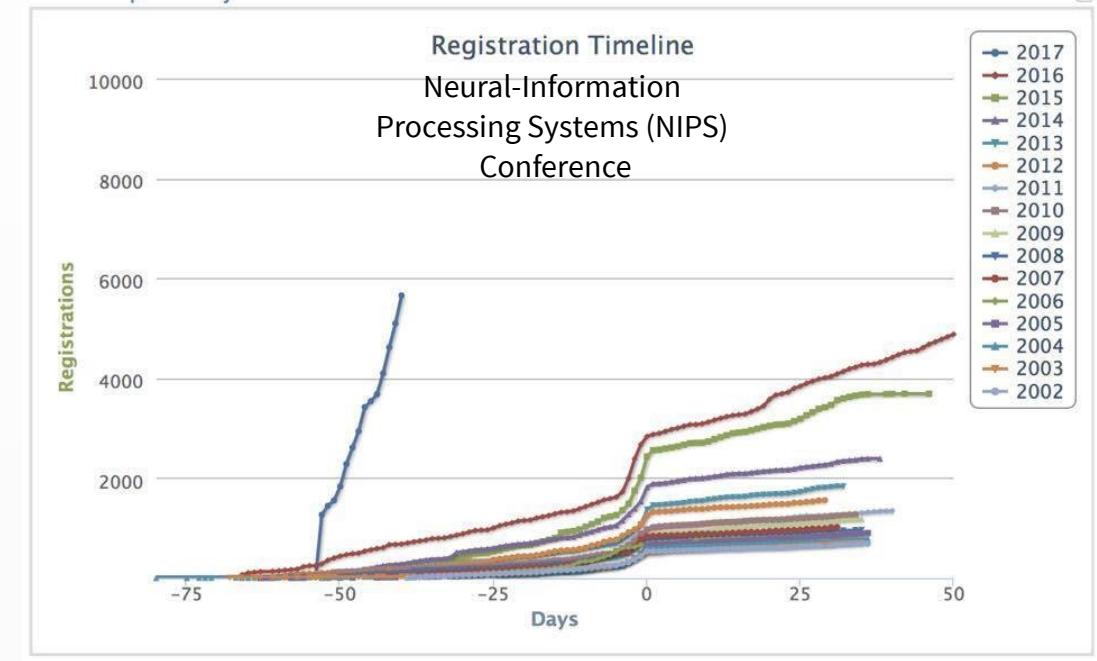
- Deep learning
- Explainable artificial intelligence
- Ethics in artificial intelligence
- Probabilistic programming

... or other topics that you find interesting

Deep Learning

- Is currently the most popular and most hyped type of artificial intelligence

The screenshot shows a web browser window displaying an article from Fortune magazine. The title of the article is "The AI Revolution: Why Deep Learning Is Suddenly Changing Your Life" by Roger Parloff. The article discusses how deep learning is transforming various industries. A red box highlights the main headline. Below the article, there is a quote: "Decades-old discoveries are now electrifying the computing industry and will soon transform corporate America." There is also a paragraph about how speech-recognition functions on smartphones have improved.



- Another example:
<https://www.youtube.com/watch?v=4rB9YiBxp4I>

Deep Learning

To Test a Powerful Computer, Play an Ancient Game - The New York Times - Opera

Menu To Test a Powerful Com X +

www.nytimes.com/1997/07/29/science/to-test-a-powerful-computer-play-an-ancient-game.html 62 X

SECTIONS HOME SEARCH The New York Times SUBSCRIBE NOW LOG IN

In Mexico, Weavers Embrace Natural Alternatives to Toxic Dyes

SCIENCE

To Test a Powerful Computer, Play an Ancient Game

By GEORGE JOHNSON JULY 29, 1997

Correction Appended

DEEP BLUE's recent trouncing of Garry Kasparov sent shock waves through the Western world. In much of the Orient, however, the news that a computer had beaten a chess champion was likely to have been met with a yawn.

While there are avid chess players in Japan, China, Korea and throughout the East, far more popular is the deceptively simple game of Go, in which black and white pieces called stones are used to form intricate, interlocking patterns that

But winning the \$1.4 million prize promised by the Ing foundation to a program that beats a human champion may be an impossible dream. The offer expires in the year 2000. Go programmers are hoping it will be extended for another century or two.

Deep Learning

A Google computer victorious over the world's 'Go' champion - Mar. 12, 2016 - Opera

Menu CNN A Google computer vict X +

< > C money.cnn.com/2016/03/12/technology/google-deepmind-alphago-wins/index.html 22 X Games

cnn tech BUSINESS CULTURE GADGETS FUTURE STARTUPS

A Google computer victorious over the world's 'Go' champion

by Sophia Yan @sophia_yan

(L) March 12, 2016: 5:20 AM ET



Social Surge - What's Trending

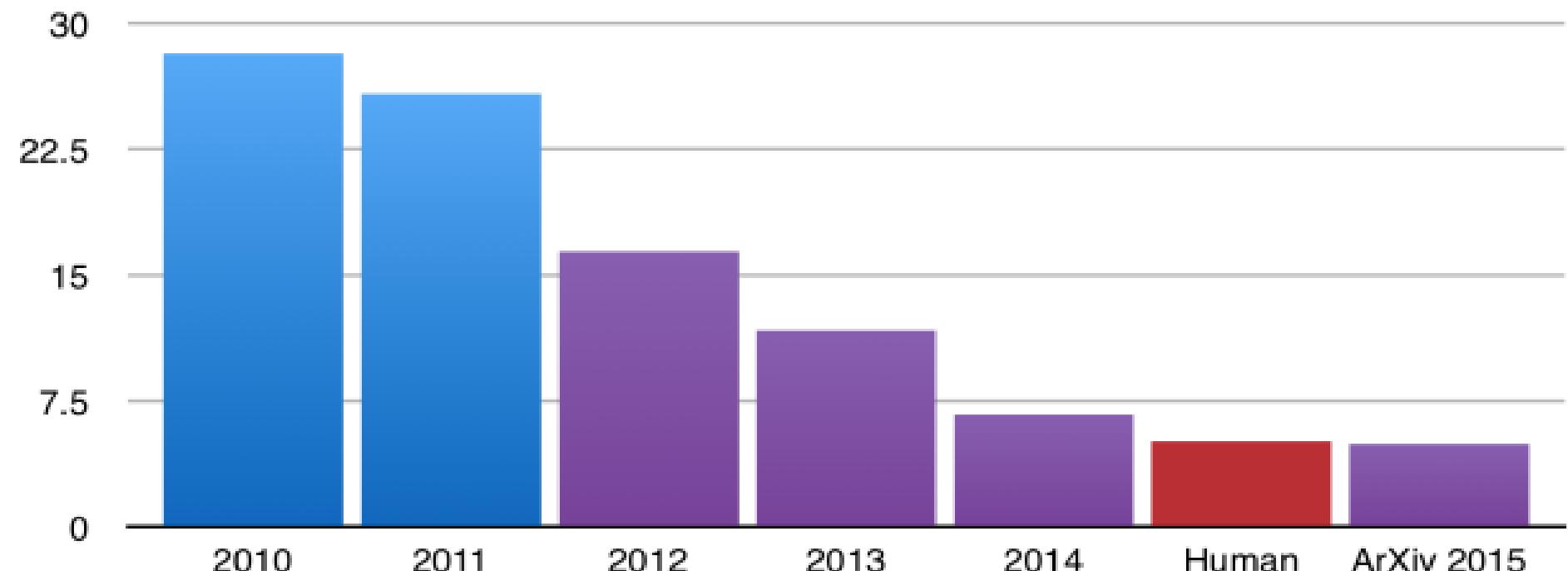
 These countries want to ban gas and diesel cars

 Will \$1,000 iPhone = \$1 trillion value for Apple?

 Fox host compares 9/11 memorial to Confederate monuments

Deep Learning

ILSVRC top-5 error on ImageNet



Deep Learning

The screenshot shows a web browser window with the title "The Amazing Ways Google Uses Deep Learning AI - Opera". The URL in the address bar is www.forbes.com/sites/bernardmarr/2017/08/08/the-amazing-ways-how-google-uses-deep-learning-ai/#620998a93204. The page content includes the Forbes header, a sidebar with social sharing icons (Facebook, Twitter, Email, LinkedIn), and a main article by Bernard Marr. The article discusses deep learning and its applications.

The Amazing Ways Google Uses Deep Learning AI

Bernard Marr, CONTRIBUTOR

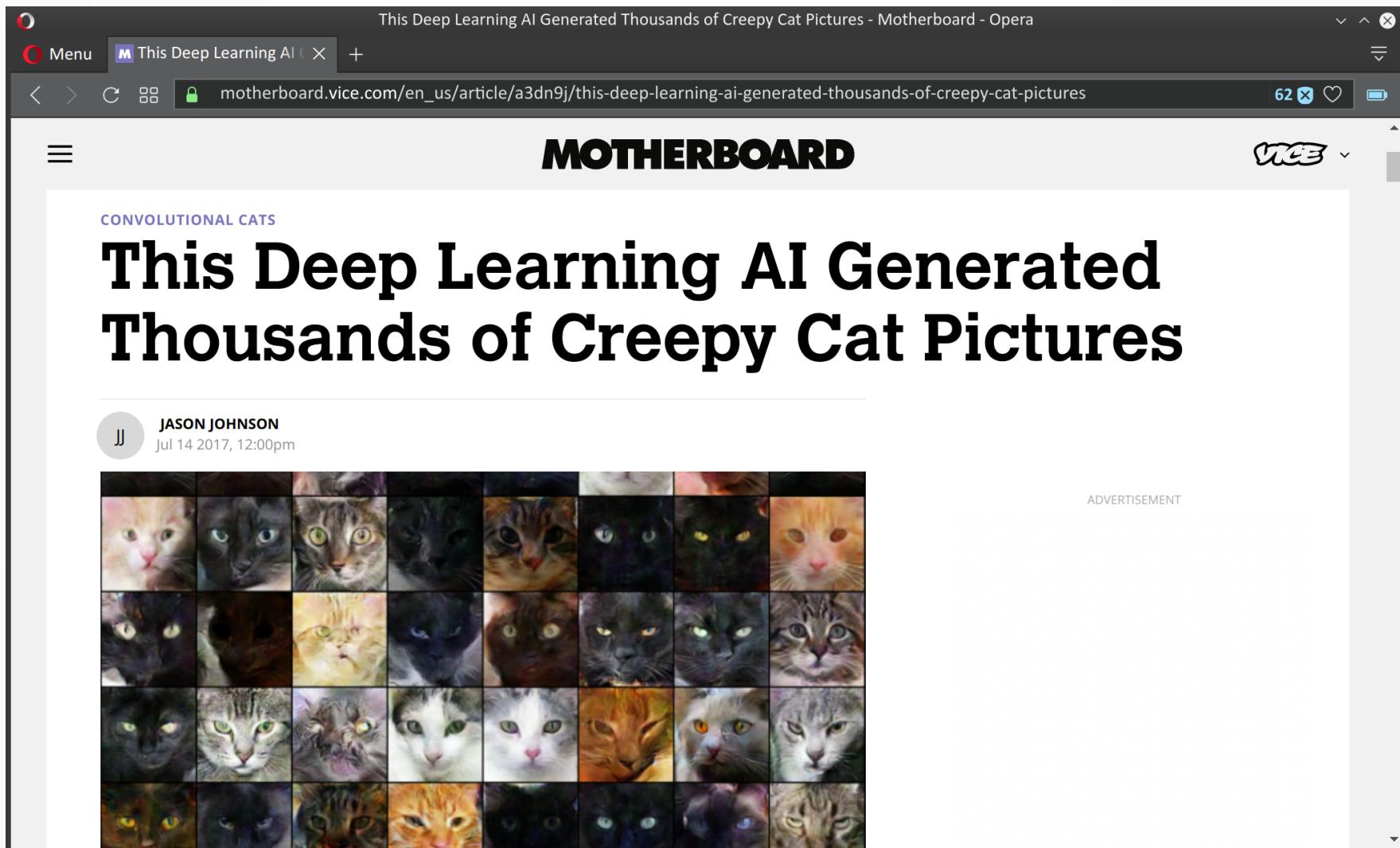
Opinions expressed by Forbes Contributors are their own.

Deep learning is the area of [artificial intelligence](#) where the real magic is happening right now. Traditionally computers, while being very fast, have not been very smart – they have no ability to learn from their mistakes and have to be given precise instructions in order to carry out any task.

Deep learning involves building artificial neural networks which attempt to mimic the way organic(living) brains sort and process information. The “deep” in deep learning signifies the use of many

- Used in Google to
- Index images
 - Enhance images
 - Index video
 - Recognize speech in Google Assistant
 - Translate text
 - Provide recommendations on YouTube
 - Drive cars

Deep Learning



Deep Learning

Science

The image displays two browser windows side-by-side. The left window shows a ScienceDaily news article titled "Artificial intelligence may help diagnose tuberculosis in remote areas". The right window shows a ScienceDirect article titled "Improving tuberculosis diagnostics using deep learning and mobile health technologies among resource-poor communities in Perú". Both articles discuss the use of AI and mobile health technologies for tuberculosis diagnosis.

ScienceDaily Article (Left):

Title: Artificial intelligence may help diagnose tuberculosis in remote areas

Date: April 25, 2017

Source: Radiological Society of North America

Summary: Researchers are training artificial intelligence models to identify tuberculosis (TB) on chest X-rays, which may help screening and evaluation efforts in TB-prevalent areas with limited access to radiologists, according to a new study.

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RELATED TOPICS [FULL STORY](#)

ScienceDirect Article (Right):

Title: Improving tuberculosis diagnostics using deep learning and mobile health technologies among resource-poor communities in Perú

Journal: Smart Health

Volumes: Volumes 1–2, June 2017, Pages 66-76

Editor: Honggang Wang

Abstract: Tuberculosis (TB) is an infectious disease and remains a major cause of death worldwide. In low- and medium-HDI countries, the burden of TB is high, and the diagnosis is often challenging due to limited access to healthcare facilities and resources. In this study, we propose a novel approach for improving TB diagnostics using deep learning and mobile health technologies. The proposed system consists of three main components: a mobile application for data collection, a cloud-based server for data processing, and a decision-making module for diagnosis. The mobile application allows users to capture chest X-ray images and upload them to the cloud server. The cloud server performs image segmentation, feature extraction, and classification using a deep learning model. The decision-making module provides a final diagnosis based on the classification results. The proposed system has been evaluated on a dataset of 1000 chest X-ray images from low- and medium-HDI countries. The results show that the proposed system achieves a diagnostic accuracy of 95% compared to 85% achieved by radiologists. The proposed system can significantly improve TB diagnostics in resource-poor communities by providing a cost-effective and accurate diagnostic tool.

Keywords: Deep learning, Mobile health, Tuberculosis, Diagnostic accuracy

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DOI: <https://doi.org/10.1016/j.smhl.2017.04.003>

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Deep Learning

Microsoft and Facebook create open ecosystem for AI model interoperability

Posted on September 7, 2017 by Eric Boyd

At Microsoft our commitment is to make AI more accessible and valuable for everyone. We offer a variety of platforms and tools to facilitate this, including our Cognitive Toolkit, an open source framework for building deep neural networks. We also work with other

The AI Computing Company | NVIDIA - Opera

www.nvidia.com/object/ai-computing.html

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FROM GAMING TO AI COMPUTING

The GPU has proven to be unbelievably effective at solving some of the most complex problems in computer science. It started out as an engine for simulating human imagination, conjuring up the amazing virtual worlds of video games and Hollywood films. Today, NVIDIA's GPU simulates human intelligence, running deep learning algorithms and acting as the brain of computers, robots, and self-driving cars that can perceive and understand the world.

This is our life's work — to amplify human imagination and intelligence.

Deep Learning

- Pick a topic about deep learning in a popular news source
- Find the underlying scientific article
- Understand what is in the scientific article
 - Deep learning approach
 - Alternative approaches
- Relate deep learning to alternative approaches in the literature
 - Is the comparison fair
 - Why would deep learning do better
- Relate the scientific article to the popular news story
 - Is the reporting accurate?
 - Which details were left out?

GDPR

4.5.2016

EN

Official Journal of the European Union

L 119/1

I

(*Legislative acts*)

REGULATIONS

**REGULATION (EU) 2016/679 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
of 27 April 2016**

**on the protection of natural persons with regard to the processing of personal data and on the free
movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation)**

(Text with EEA relevance)

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty on the Functioning of the European Union, and in particular Article 16 thereof,

GDPR

- The GDPR is changing how businesses in the world are managing and using data
- https://www.youtube.com/watch?v=1xy_afgALSI
- Major consequences:
 - explainable artificial intelligence
 - Privacy & discrimination

Explainable AI (“XAI”)

- (Article 22) “*1. The data subject shall have the right not to be subject to a decision based solely on automated processing, including profiling, which produces legal effects concerning him or her or similarly significantly affects him or her.*”
- (Article 22) “*...the data controller shall implement suitable measures to safeguard the data subject’s rights and freedoms and legitimate interests, at least the right to obtain human intervention on the part of the controller, to express his or her point of view and to contest the decision.*”

Explainable AI

- *(Recital 71) automated processing “should be subject to suitable safeguards, which should include specific information to the data subject and the right to obtain human intervention, to express his or her point of view, to obtain an explanation of the decision reached after such assessment and to challenge the decision.”*
- **“Right to an explanation”**
AI algorithms that take decisions (with “legal effects”) are required to provide explanations for decisions

Explainable AI

Deep Learning is not the AI future - GDPR.Report - Opera

Menu Deep Learning is not th X +

gdpr.report/news/2017/08/23/deep-learning-not-ai-future/ 10 X  

GDPR:REPORT

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HOME > NEWS > DEEP LEARNING IS NOT THE AI FUTURE

Deep Learning is not the AI future

 23RD AUGUST 2017 BY GDPR REPORT IN FEATURES, TECHNOLOGY



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RECENT POSTS

Explainable AI

Will current AI be illegal in the EU in 2018? - Opera

Menu ★ Will current AI be illegal X +

< > C 88 🔒 www.siliconrepublic.com/machines/ai-illegal-eu-2018-gdpr 14 X ❤️ ⌂

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MACHINES

Will current AI be illegal in the EU in 2018?

by Colm Gorey

26 OCT 2016 78 SHARES



To make matters more challenging, many of the latest AI advancements have been in deep learning that is not geared towards explaining its decision, unlike others previously developed.

LATEST NEWS

 Popular PC clean-up tool CCleaner hijacked to distribute malware

6 HOURS AGO

Explainable AI

Generating Visual Explanations

Lisa Anne Hendricks¹ Zeynep Akata² Marcus Rohrbach^{1,3}
 Jeff Donahue¹ Bernt Schiele² Trevor Darrell¹

¹UC Berkeley EECS, CA, United States
²Max Planck Institute for Informatics, Saarbrücken, Germany
³ICSI, Berkeley, CA, United States

Abstract. Clearly explaining a rationale for a classification decision to an end-user can be as important as the decision itself. Existing approaches for deep visual recognition are generally opaque and do not output any justification text; contemporary vision-language models can describe image content but fail to take into account class-discriminative image aspects which justify visual predictions. We propose a new model that focuses on the discriminating properties of the visible object, jointly predicts a class label, and explains why the predicted label is appropriate for the image. We propose a novel loss function based on sampling and reinforcement learning that learns to generate sentences that realize a global sentence property, such as class specificity. Our results on a fine-grained bird species classification dataset show that our model is able to generate explanations which are not only consistent with an image but also more discriminative than descriptions produced by existing captioning methods.

Introduction

Explaining why the output of a visual system is compatible with visual evidence is a key component for understanding and interacting with AI systems [1]. Deep classification methods have had tremendous success in visual recognition [2,3,4], but their predictions can be unsatisfactory if the model cannot provide a consistent justification of why it made a certain prediction. In contrast, systems which can justify why a prediction is consistent with visual elements to a user are more likely to be trusted [5].

We consider explanations as determining *why* a certain decision is consistent with visual evidence, and differentiate between *introspection* explanation systems which explain how a model determines its final output (e.g., “This is a Western Grebe because filter 2 has a high activation...”) and *justification* explanation systems which produce sentences detailing how visual evidence is compatible with a system output (e.g., “This is a Western Grebe because it has red eyes...”). We concentrate on justification explanation systems because such systems may be more useful to non-experts who do not have detailed knowledge of modern computer vision systems [1].

We argue that visual explanations must satisfy two criteria: they must both be *class discriminative* and *accurately describe* a specific image instance. As

Western Grebe



Laysan Albatross



Laysan Albatross



Description: This is a large bird with a white neck and a black back in the water.

Class Definition: The *Western Grebe* is a waterbird with a yellow pointy beak, white neck and belly, and black back.

Explanation: This is a *Western Grebe* because this bird has a long white neck, pointy yellow beak and red eye.

Description: This is a large flying bird with black wings and a white belly.

Class Definition: The *Laysan Albatross* is a large seabird with a hooked yellow beak, black back and white belly.

Visual Explanation: This is a *Laysan Albatross* because this bird has a large wingspan, hooked yellow beak, and white belly.

Description: This is a large bird with a white neck and a black back in the water.

Class Definition: The *Laysan Albatross* is a large seabird with a hooked yellow beak, black back and white belly.

Visual Explanation: This is a *Laysan Albatross* because this bird has a hooked yellow beak white neck and black back.

Explainable AI

IJCAI-17 Workshop on Explainable Artificial Intelligence (XAI) - Opera

Menu IJCAI-17 Workshop on X +

< > C ☰ home.earthlink.net/~dwaha/research/meetings/ijcai17-xai/ 0 X ⚡

IJCAI 2017 Workshop on Explainable Artificial Intelligence (XAI)



Venue: RMIT University Building 80 | 445 Swanston Street | Floor: 2 | Room: 2
20 August 2017 | Melbourne, Australia | Number of Registered Attendees: 137 (as of 2017 Aug 16)
<http://home.earthlink.net/~dwaha/research/meetings/ijcai17-xai>

[Description](#) | [Topics of Interest](#) | [Agenda \(PDF\)](#) | [Speakers](#) | [Accepted Papers \(Proceedings\)](#) | [Paper Submissions](#) | [Dates](#) | [Organizers](#) | [Related Work](#) | [Related Events](#) | [FAQ](#) | [News](#)

Description

Explainable Artificial Intelligence (XAI) concerns, in part, the challenge of shedding light on opaque machine learning (ML) models in contexts for which transparency is important, where these models could be used to solve analysis (e.g., classification) or synthesis tasks (e.g., planning, design). Indeed, most ML research usually focuses on prediction tasks but rarely on providing explanations/justifications for them. Yet users of many applications (e.g., related to autonomous control, medical, financial, investment) require understanding before committing to decisions with inherent risk. For example, a delivery drone should explain (to its remote operator) why it is operating normally or why it suspends its behavior (e.g., to avoid placing its fragile package on an unsafe location), and an intelligent decision aid should explain its recommendation of an aggressive medical intervention (e.g., in reaction to a patient's recent health patterns). Addressing this challenge has increased in urgency with the increasing reliance of learned models in deployed applications.

The need for interpretable models exists independently of how models were acquired (i.e., perhaps they were hand-crafted, or interactively elicited without using ML techniques). This raises several questions, such as: how should explainable models be designed? How should user interfaces communicate decision making? What types of user interactions should be supported? How should explanation quality be measured? And what can be learned from research on XAI that has not involved ML?

This workshop will provide a forum for sharing and learning about recent research on interactive XAI methods, highlighting and documenting promising approaches, and encouraging further work, thereby fostering connections among researchers interested in ML (and AI more generally), human-computer interaction, cognitive modeling, and

Explainable AI

- Pick a topic about explainable AI from a recent AI conference/workshop
- Understand what is in the scientific article
- Relate the approach to alternative approaches in the literature
- Understand its weaknesses:
 - Can you imagine weaknesses in the explanations provided by the system?
 - Are the results applicable to a limited area?

Ethics in AI

- Concerns within the GDPR: privacy and discrimination
- Consider these explainable classifiers:
 - **If** skin color = black **then** reject customer
 - **If** lives in = Molenbeek **then** reject customer
- These classifiers **discriminate** and are **not fair**

Fairness in AI

Algorithmic bias: from discrimination discovery to fairness-aware data mining - Opera

Menu Algorithmic bias: from +

francescobonchi.com/algorithmic_bias_tutorial.html

Algorithmic bias: from discrimination discovery to fairness-aware data mining

A Tutorial at KDD'16



Abstract
Slides
Instructors
Bibliography

Welcome to the mini-website on the tutorial titled *Algorithmic bias: from discrimination discovery to fairness-aware data mining*, which will take place at **KDD'16** in San Francisco, California

Abstract

Algorithms and decision making based on Big Data have become pervasive in all aspects of our daily (offline and online) lives, as they have become essential tools in personal finance, health care, hiring, housing, education, and policies. Data

Privacy in AI

- AI could reveal private information
- See
<https://www.youtube.com/watch?v=ubmQzN7ytbw>
- The companies that could have access to this data, could abuse it

Privacy in AI

Apple's 'differential privacy' still collects too much specific data, study says - Opera

Menu Apple's 'differential pri X + < > × × appleinsider.com/articles/17/09/15/apples-differential-privacy-still-collects-too-much-specific-data-study-says 10 × ❤️ 🔍

Apple's 'differential privacy' still collects too much specific data, study says

By Roger Fingas
Friday, September 15, 2017, 02:49 pm PT (05:49 pm ET)

Apple's use of "differential privacy" – a method that inserts random noise into data as it's collected en masse – doesn't go far enough to protect personal information, a study suggested this week.

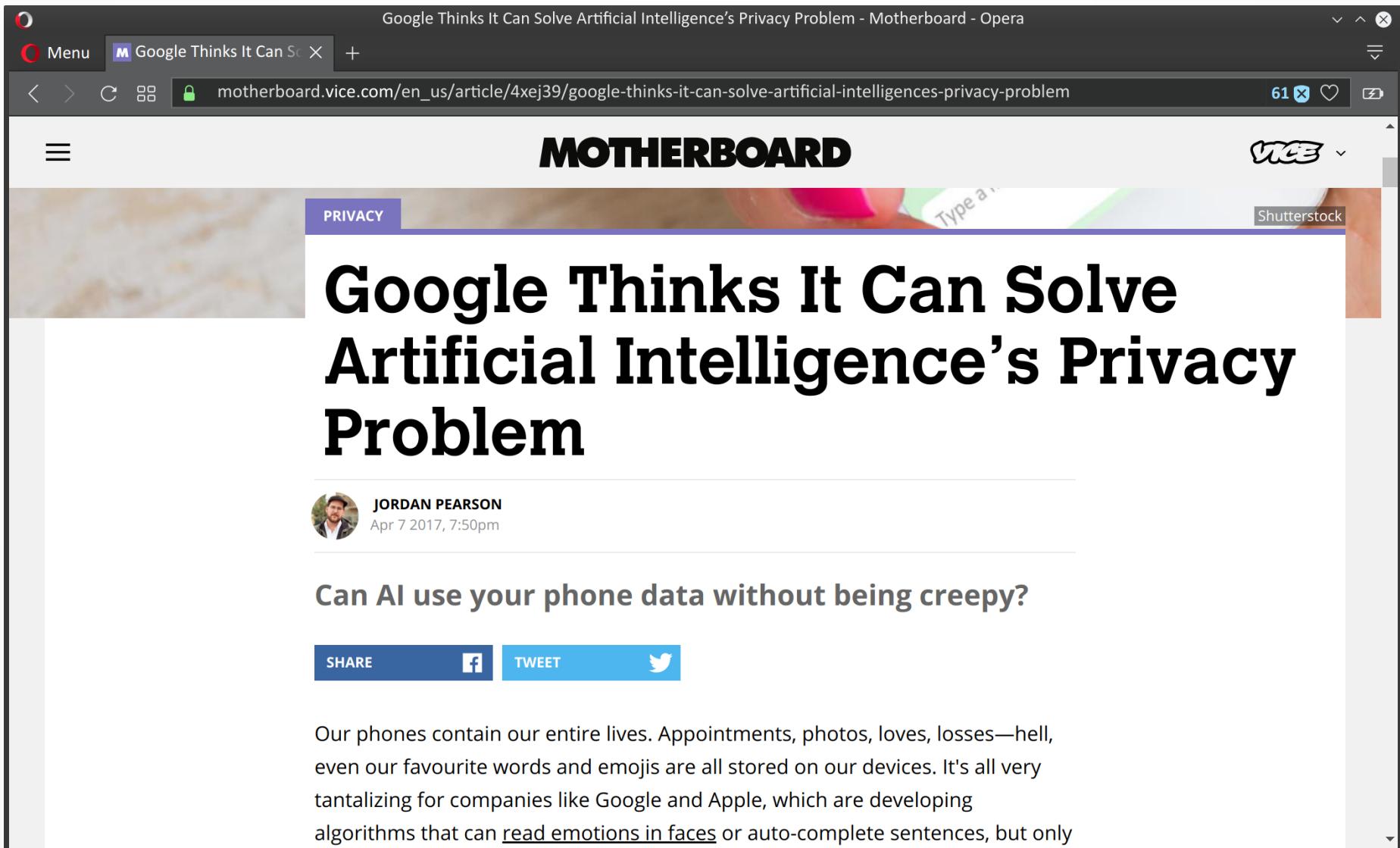


Latest Apple Headlines

-  Boston Red Sox used Fitbit to steal signs, not Apple Watch, reporter claims ~2 hours ago
-  Apple to grow and revamp Century City store in LA with mall's \$1B expansion ~2 hours ago
-  Bluetooth 5 on iPhone 8, iPhone X improves range and speed of BLE iBeacons, IoT sensors ~3 hours ago
-  Apple Watch Series 3 with & without cellular vs. Series 1: Which model is right for you? ~3 hours ago
-  Sprint offers free 64GB iPhone 8 after trade-in to lure subscribers ~4 hours ago

more...

Privacy in AI



The screenshot shows a web browser window with the title "Google Thinks It Can Solve Artificial Intelligence's Privacy Problem - Motherboard - Opera". The URL in the address bar is "motherboard.vice.com/en_us/article/4xej39/google-thinks-it-can-solve-artificial-intelligences-privacy-problem". The page itself is from Vice's Motherboard section, featuring a large image of a hand with pink nail polish. The main headline reads "Google Thinks It Can Solve Artificial Intelligence's Privacy Problem". Below the headline, it says "Can AI use your phone data without being creepy?". There are "SHARE" and "TWEET" buttons at the bottom. A snippet of the article text is visible at the bottom.

Google Thinks It Can Solve Artificial Intelligence's Privacy Problem - Motherboard - Opera

Menu Google Thinks It Can S X +

motherboard.vice.com/en_us/article/4xej39/google-thinks-it-can-solve-artificial-intelligences-privacy-problem 61 X

MOTHERBOARD VICE Shutterstock

Google Thinks It Can Solve Artificial Intelligence's Privacy Problem

JORDAN PEARSON Apr 7 2017, 7:50pm

Can AI use your phone data without being creepy?

SHARE TWEET

Our phones contain our entire lives. Appointments, photos, loves, losses—hell, even our favourite words and emojis are all stored on our devices. It's all very tantalizing for companies like Google and Apple, which are developing algorithms that can read emotions in faces or auto-complete sentences, but only

Ethics in AI

- Other concerns: killer robots

Elon Musk: Artificial intelligence may spark World War III - Opera

Menu Elon Musk: Artificial int +

www.cnet.com/news/elon-musk-artificial-intelligence-world-war-iii-russia-china/

c|net REVIEWS NEWS VIDEO HOW TO SMART HOME CARS DEALS DC

SCI-TECH

Elon Musk: Artificial intelligence may spark World War III

The serial CEO is already fighting the science fiction battles of tomorrow, and he remains more concerned about killer robots than anything else.

BY ERIC MACK / SEPTEMBER 4, 2017 10:00 AM PDT

f t e m



POLITICO

DEFENSE

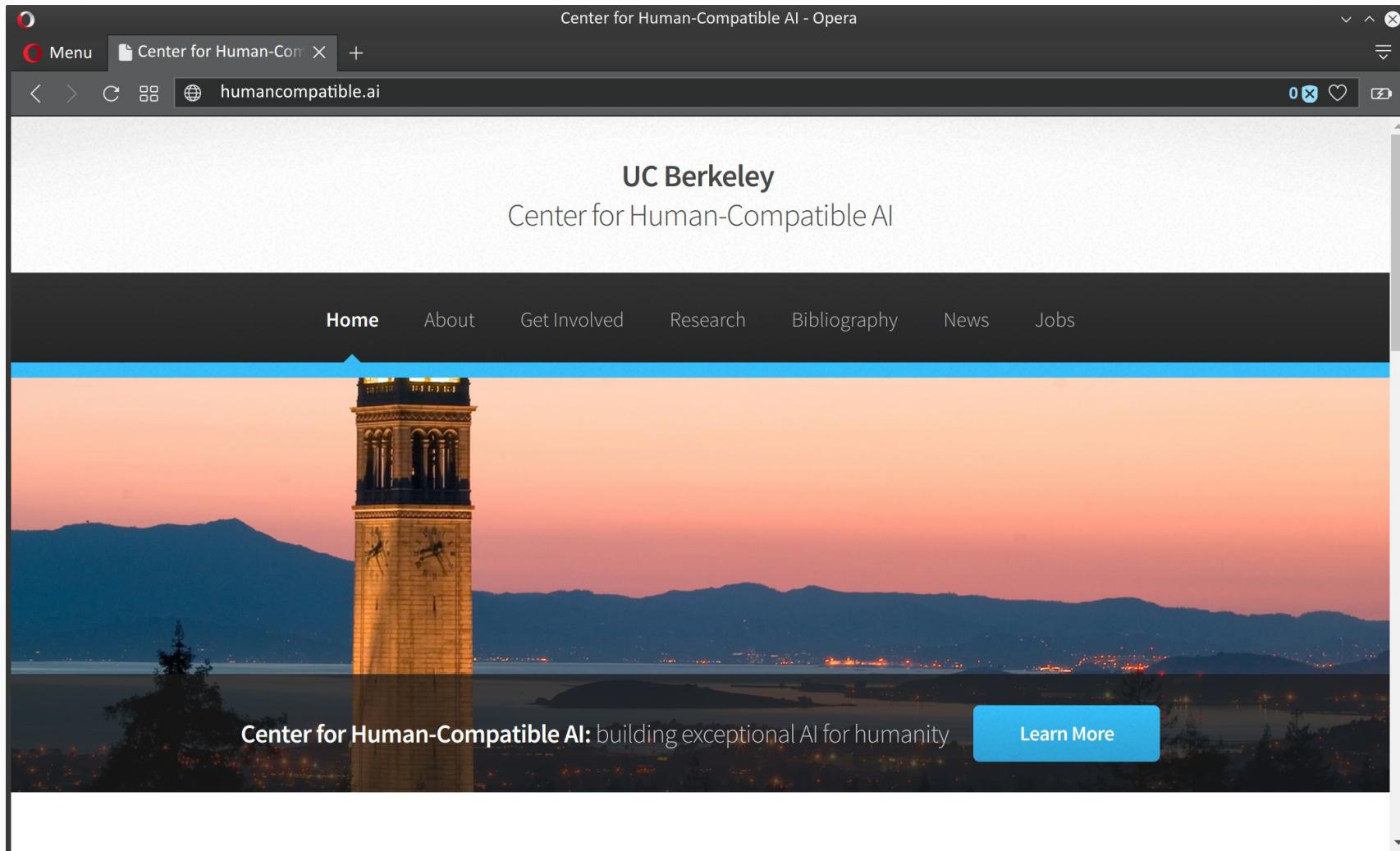
Killer robots await Trump's verdict

The new president will have to decide how aggressively the U.S. pursues military technology that could let machines make life-or-death decisions.

By ANDREW HANNA | 12/25/16 07:38 AM EST



Ethics in AI



Ethics in AI



Cooperative Inverse Reinforcement Learning

Dylan Hadfield-Menell*

Anca Dragan

Pieter Abbeel

Stuart Russell

Electrical Engineering and Computer Science
University of California at Berkeley
Berkeley, CA 94709

Abstract

For an autonomous system to be helpful to humans and to pose no unwarranted risks, it needs to align its values with those of the humans in its environment in such a way that its actions contribute to the maximization of value for the humans. We propose a formal definition of the value alignment problem as *cooperative inverse reinforcement learning* (CIRL). A CIRL problem is a cooperative, partial-information game with two agents, human and robot; both are rewarded according to the human's reward function, but the robot does not initially know what this is. In contrast to classical IRL, where the human is assumed to act optimally in isolation, optimal CIRL solutions produce behaviors such as active teaching, active learning, and communicative actions that are more effective in achieving value alignment. We show that computing optimal joint policies in CIRL games can be reduced to solving a POMDP, prove that optimality in isolation is suboptimal in CIRL, and derive an approximate CIRL algorithm.

1 Introduction

"If we use, to achieve our purposes, a mechanical agency with whose operation we cannot interfere effectively . . . we had better be quite sure that the purpose put into the machine is the purpose which we really desire." So wrote Norbert Wiener (1960) in one of the earliest explanations of the problems that arise when a powerful autonomous system operates with an incorrect objective. This *value alignment* problem is far from trivial. Humans are prone to mis-stating their objectives, which can lead to unexpected implementations. In the myth of King Midas, the main character learns that wishing for 'everything he touches to turn to gold' leads to disaster. In a reinforcement learning context, Russell & Norvig (2010) describe a seemingly reasonable, but incorrect, reward function for a vacuum robot: if we reward the action of cleaning up dirt, the optimal policy causes the robot to repeatedly dump and clean up the same dirt.

A solution to the value alignment problem has long-term implications for the future of AI and its relationship to humanity (Bostrom, 2014) and short-term utility for the design of usable AI systems. Giving robots the right objectives and enabling them to make the right trade-offs is crucial for self-driving cars, personal assistants, and human–robot interaction more broadly.

The field of *inverse reinforcement learning* or IRL (Russell, 1998; Ng & Russell, 2000; Abbeel & Ng, 2004) is certainly relevant to the value alignment problem. An IRL algorithm infers the reward function of an agent from observations of the agent's behavior, which is assumed to be optimal (or approximately so). One might imagine that IRL provides a simple solution to the value alignment problem: the robot observes human behavior, learns the human reward function, and behaves according to that function. This simple idea has two flaws. The first flaw is obvious: we don't want the robot to adopt the human reward function as its own. For example, human behavior (especially in the morning) often conveys a desire for coffee, and the robot can learn this with IRL, but we don't want the robot to want coffee! This flaw is easily fixed: we need to formulate the value

*{dgm,anca,pabbel,russell}@cs.berkeley.edu

Ethics in AI

- Pick a topic
 - In a popular news source, and its corresponding scientific article
 - In a scientific article
- Understand the problem and solution studied in the article
- Relate the solution to the alternative solutions
- Understand the weaknesses of the proposed solution
- (Optional) Relate the scientific article to the popular news story
 - Is the reporting accurate?
 - Which details were left out?

Probabilistic Programming

- How to implement programs in AI that reason over uncertainty?
- One idea is to build programming languages that support reasoning under uncertainty
- See
<https://vimeo.com/131222537>

Probabilistic Programming



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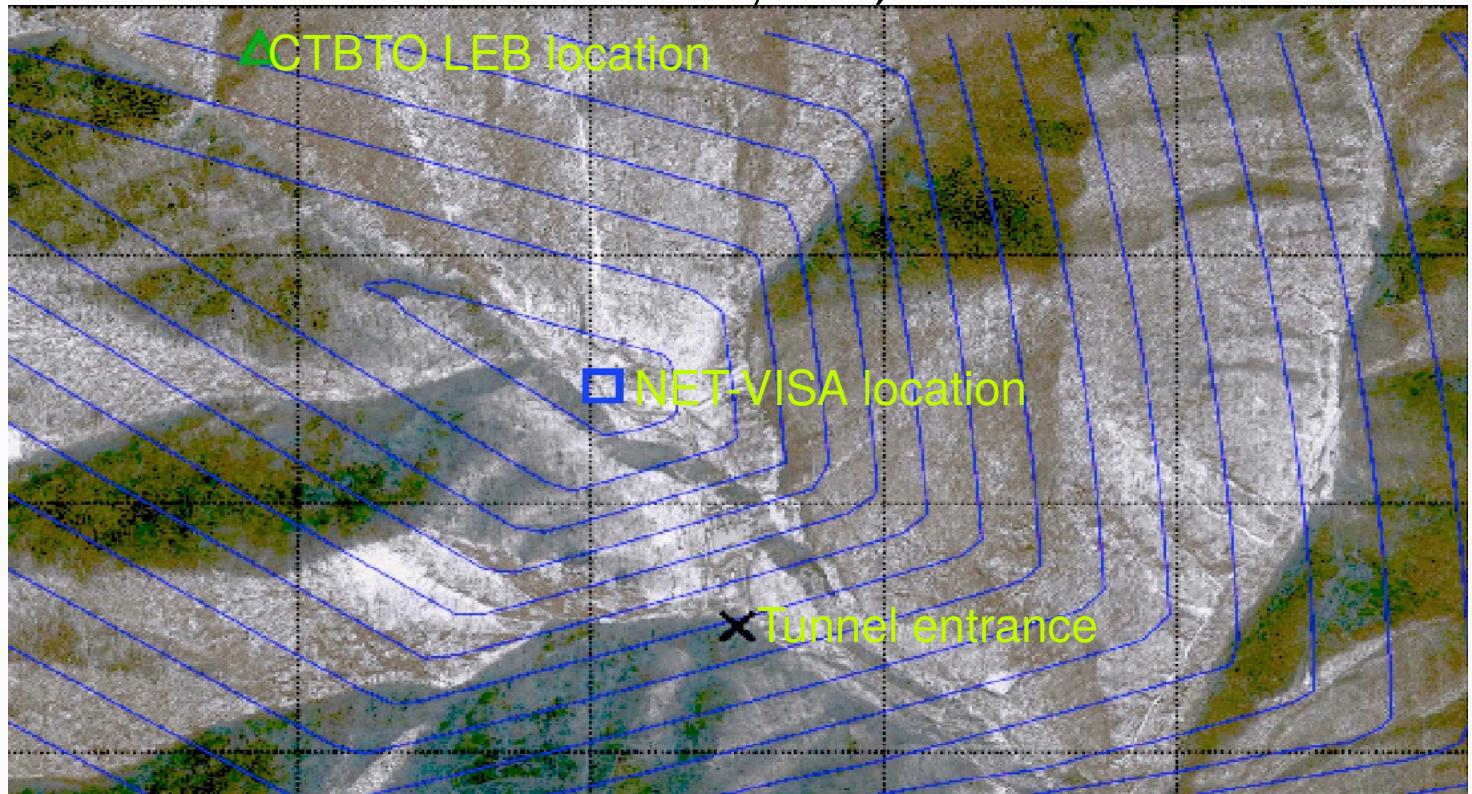
LLNL-TR-416780

Machine Learning and Data
Mining for Comprehensive Test
Ban Treaty Monitoring

S. Russell, S. Vaidya

September 14, 2009

February 12, 2013 DPRK test



Organisation

- October 3: **Register** for a group of 2 students (Moodle)
- October 31: Submit a **report** on the chosen topic (Moodle)
- November 14 -: **Presentations**

Choice of Topics

- Choose from one of the directions listed earlier
- List of possible papers available on Moodle
- You may choose another paper within one of the directions listed earlier

Report on Topic

- **October 31: Submit a 2 page report**
- This report contains:
 - **References** for the article(s) that you will discuss during your presentation
 - This may include articles in popular news sources, but you should list at least one scientific publication
 - Lists of **additional materials** (videos, demo, ...)
 - An **outline** of the presentation
 - An **abstract** (pitch) for the presentation
 - **3 Questions** that you plan to address to the audience; they should be able to answer these questions after your presentation

Outline for the Presentation

- You are free to organize your presentation
- However, make sure to include:
 - An intuitive problem **description (what)**
 - A **motivation** for the problem setting (**why**)
 - Specific properties of a proposed **solution (how)**
 - **Results** presented in the paper
 - **Related** work
 - (Optional) How the work was reported upon in the **popular literature**

Presentations

- A **schedule** will be announced soon after the reports have been received
- Not later than the last Sunday before your presentation you should **uploaded** your materials to Moodle
- Your presentation should take
 - 20 minutes for the presentation
 - 10 minutes for interactions/questions
- Your presentation should encourage interaction with the audience

Grading

- **20% active participation**
 - Homework 1: a report of 2 pages
 - Homework 2: submission of talk material in time
 - Attendance and pro-activity in all seminars
- **80% quality of the presentation**
 - Structure of the presentation
 - Quality of the slide design
 - Level of interaction with the audience
 - Scientific quality (including references)
 - Level of comprehension: don't present things you don't understand!
 - Level of creativity (additional references, new insights)
- Second session: talk will be replaced by a report (20 pages) to be submitted not later than the first day of the session