

FairWare 2018

FairWare 2018

International Workshop on Software Fairness

May 29, 2018

Gothenburg, Sweden

Collocated with ICSE 2018

<http://fairware.cs.umass.edu>



UMass **Amherst**

Welcome from the organizers



Brittany Johnson



Alexandra Meliou



Yuriy Brun

<http://fairware.cs.umass.edu>

FairWare 2018 Schedule

Schedule

| | | |
|---------------|---|---|
| 08:45 – 09:00 | Welcome (pdf) Yuriy Brun (University of Massachusetts Amherst) | |
| 09:00 – 09:45 | Keynote: Follow the data! Algorithms and systems for responsible data science Julia Stoyanovich (Drexel University) | + |
| 09:50 – 10:10 | A roadmap for ethics-aware software engineering (pdf) Fatma Başak Aydemir and Fabiano Dalpiaz (Utrecht University) | + |
| 10:10 – 10:30 | Classification with probabilistic fairness guarantees Philip Thomas and Stephen Giguere (University of Massachusetts Amherst) | + |
| 10:30 – 11:00 | Break | |
| 11:00 – 11:45 | Keynote: Program fairness through the lens of formal methods Aws Albarghouthi (University of Wisconsin—Madison) | + |
| 11:50 – 12:10 | Integrating social values into software design patterns (pdf) Waqar Hussain, Davoud Mougouei, and Jon Whittle (Monash University) | + |
| 12:10 – 12:30 | Fairness definitions explained (pdf) Sahil Verma (IIT Kanpur India) and Julia Rubin (University of British Columbia) | + |
| 12:30 – 13:50 | Lunch | |

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FairWare 2018 Schedule

| | |
|---------------|---|
| 12:30 – 13:50 | Lunch |
| 14:00 – 14:45 | Keynote: Counterfactual reasoning in algorithmic fairness + Ricardo Silva (University College London) |
| 14:50 – 15:10 | Model-based discrimination analysis: A position paper (pdf) + Qusai Ramadan, Amir Shayan Ahmadian, Daniel Strüber, Jan Jürjens, and Steffen Staab (University of Koblenz-Landau) |
| 15:10 – 15:30 | Avoiding the intrinsic unfairness of the trolley problem (pdf) + Tobias Holstein (Mälardalen University) and Gordana Dodig Crnkovic (Chalmers University of Technology) |
| 15:30 – 16:00 | Break |
| 16:00 – 17:00 | Panel: Ansgar Koene (University of Nottingham), Julia Stoyanovich (Drexel University), and Yuriy Brun (University of Massachusetts Amherst) + IEEE P7003 standard for algorithmic bias considerations (pdf) + Ansgar Koene (University of Nottingham), Liz Dowthwaite (University of Nottingham), and Suchana Seth (Harvard University) |
| 17:00 – 17:15 | Closing remarks |
| 17:30 – 20:00 | Reception (Congress Foyer): Mingle to the future: Automotive evening |

Keynotes



Julia Stoyanovich
Drexel University



Aws Albarghouthi
University of Wisconsin-Madison



Ricardo Silva
University College London

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Machine Bias

There's software used across the country to predict future criminals. And it's biased against blacks.

by Julia Angwin, Jeff Larson, Surya Mattu and Lauren Kirchner, ProPublica

May 23, 2016

**Software can make bad decisions.
Software can discriminate!**

Just as the 18-year-old girls were realizing they were too big for the tiny conveyances — which belonged to a 6-year-old boy — a woman came running after them saying, “That’s my kid’s stuff.” Borden and her friend immediately dropped the bike and scooter and walked away.

But it was too late — a neighbor who witnessed the heist had already called the police. Borden and her friend were arrested and charged with burglary and petty theft for the items, which were valued at a total of \$80.

area, as well as the ability of our various carrier partners to deliver up to 9:00 pm every single day, even Sunday .

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Up



English Spanish French Detect language ▾

He is a babysitter.
She is a doctor.



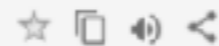
36/5000



English Spanish Turkish ▾

Translate

O bir bebek bakıcısıdır.
O bir doktor.



Suggest an edit

English Spanish Turkish Detect language ▾

O bir bebek bakıcısıdır.
O bir doktor.



38/5000



English Spanish Turkish ▾

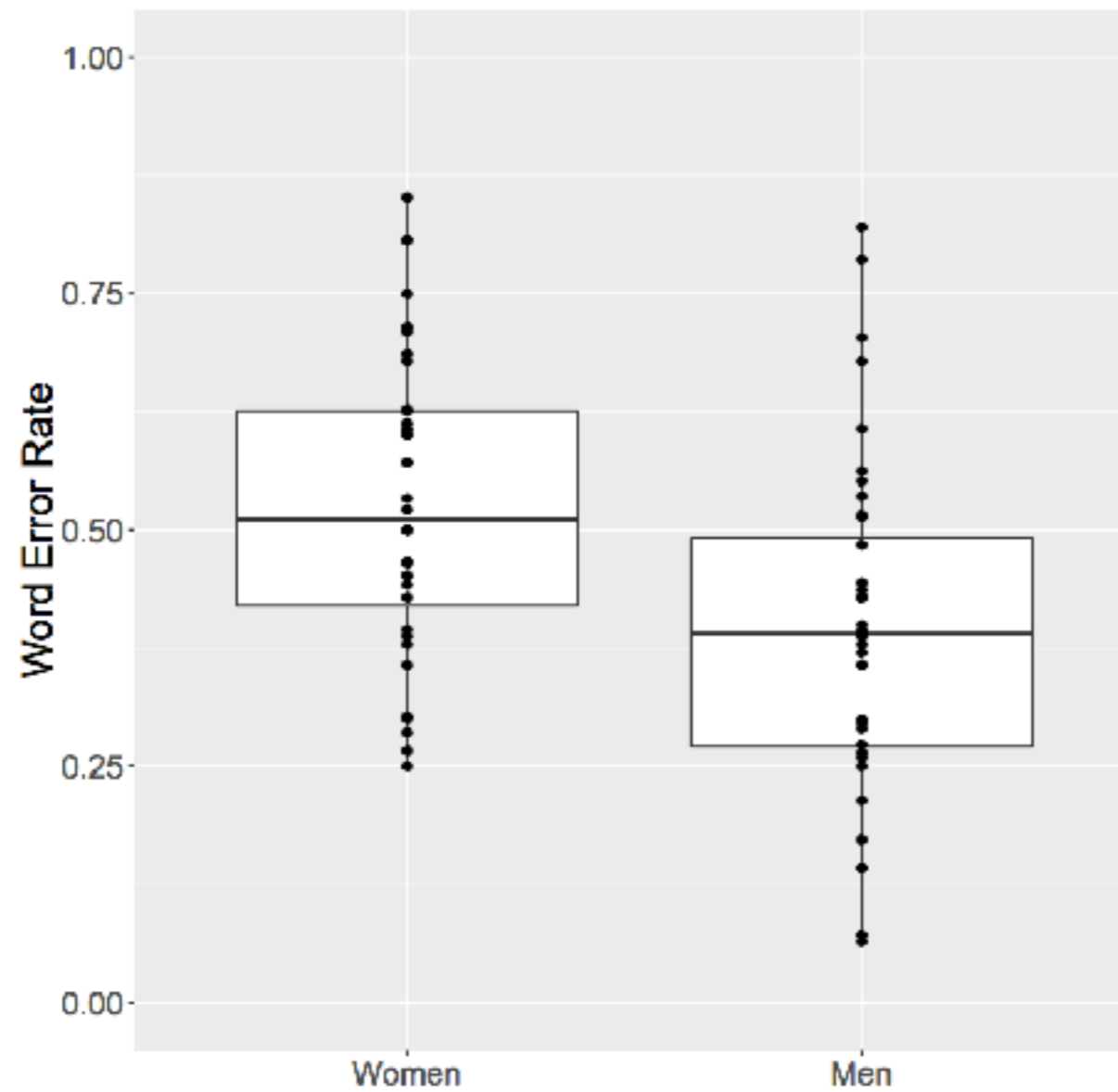
Translate

She's a babysitter.
He is a doctor.

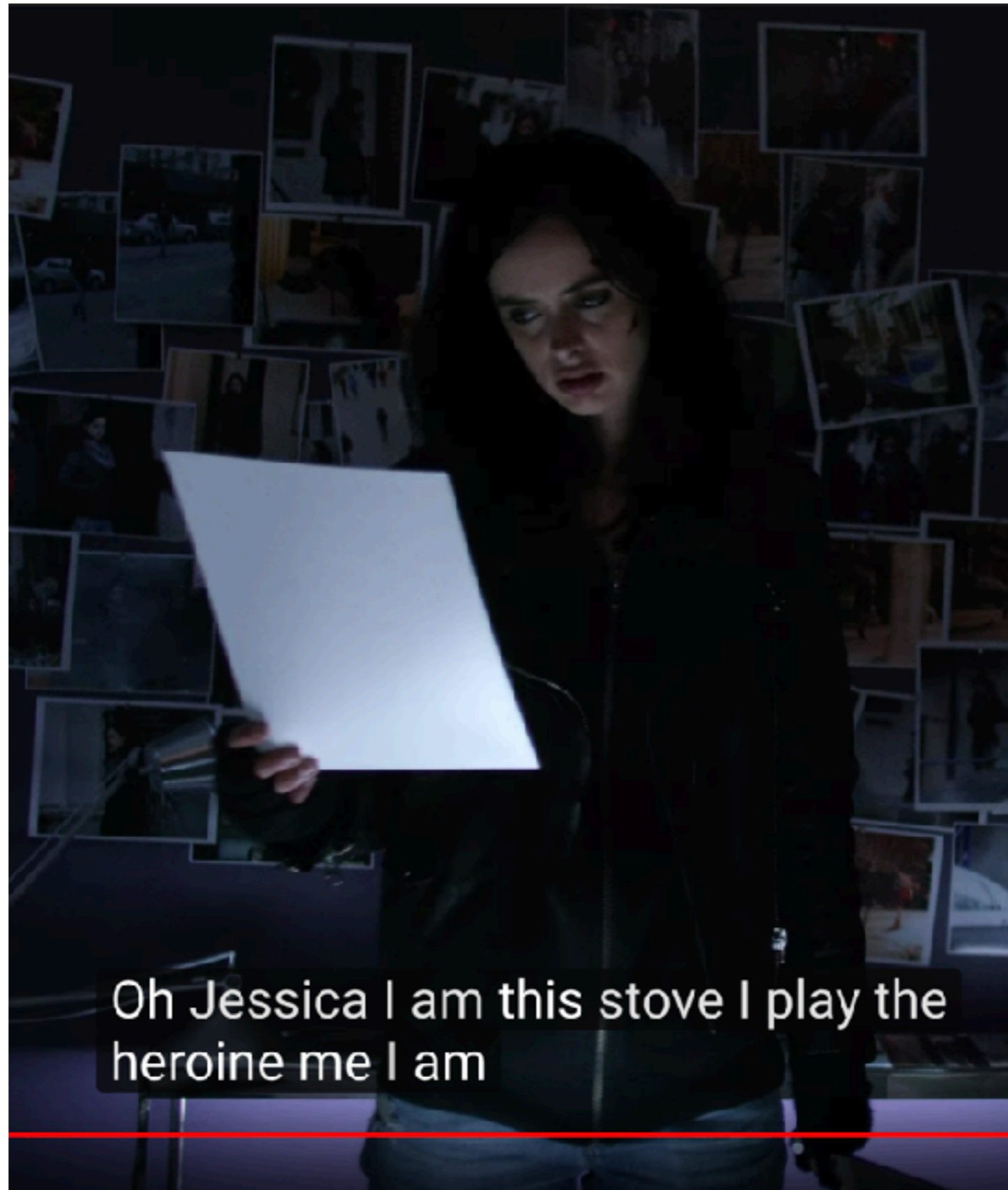


Suggest an edit

YouTube Automatic captions



YouTube Automatic captions



Oh Jessica I am this stove I play the
heroine me I am



BUOLAMWINI

ow I'm fighting bias in algorithms

Joy Buolamwini

https://www.ted.com/talks/joy_buolamwini_how_i_m_fighting_bias_in_algorithms

fairness in machine learning

2011 11th International Conference on Data Mining

Call for Papers

5th Workshop on Fairness, Accountability, and Transparency in Machine Learning (FAT/ML 2018)

Co-located with [35th International Conference on Machine Learning \(ICML 2018\)](#)

15 July 2018, Stockholm, Sweden

Conference on Fairness, Accountability, and Transparency (FAT*)

A multi-disciplinary conference that brings together researchers and practitioners interested in fairness, accountability, and transparency in socio-technical systems.

FAT* 2018 occurred on February 23-24. Recordings are available [on YouTube!](#)
And start planning for paper and tutorial submissions for 2019!

... cause discrimination
... all by the results in
... 2018 years of working
... since the gender and
... we assume this not
... is already divided up
... by attributes, which
... is larger to justify
... (3), simply removing
... data does not work,
... with the supposed
... here tend to pick up

arXiv:1507.05259v5 [stat.ML] 23 N

INIRIC
Algorithmic decision making and
... (e.g., spam filtering, online
... (e.g., search engines) settings
... in replace the
... the scale of the
... 2017, 2018, 2019, and
... 2017 by

systems work in fairness

Discovering Unwarranted Associations in Data-Driven Applications with the FairTest Testing Toolkit

Florian Tramèr¹, Vaggelis Atlidakis², Roxana Geambasu², Daniel Hsu²,
Jean-Pierre Hubaux¹, Mathias Humbert⁴, Ari Juels³, and Huang Lin¹

¹École Polytechnique

Fédérale de Lausanne — ²Columbia University — ³Cornell Tech — ⁴Saarland University

Abstract

In today's data-driven world, programmers routinely incorporate user data into complex algorithms. Heuristics stores led to consistently higher prices for low-income customers, who (as it turns out) generally live farther from these stores. Staples' intentions aside, the difficulty

- AWS Albarghouthi, Loris D'Antoni, Samuel Drews, and Aditya V. Nori, FairSquare: Probabilistic Verification for Program Fairness, <https://doi.org/10.1145/3133904>
<http://pages.cs.wisc.edu/~aws/papers/oopsla17.pdf>

- Julia Stoyanovich, Ke Yang, and HV Jagadish, Online Set Selection with Fairness and Diversity Constraints, <http://dx.doi.org/10.5441/002/edbt.2018.22>
<https://openproceedings.org/2018/conf/edbt/paper-98.p>

- Florian Tramèr, Vaggelis Atlidakis, Roxana Geambasu, Daniel Hsu, Jean-Pierre Hubaux, Mathias Humbert, Ari Juels, and Huang Lin, FairTest: Discovering Unwarranted Associations in Data-Driven Applications, in EuroS&P 2017. <https://doi.org/10.1109/EuroSP.2017.29>
<https://www.youtube.com/watch?v=IZIpbXtDYT4>

- Sainyam Galhotra, Yuriy Brun, and Alexandra Meliou, Fairness Testing: Testing Software for Discrimination, in ESEC/FSE, <http://dx.doi.org/10.1145/3106237.3106277>
<https://tinyurl.com/FairnessPaper>
<https://tinyurl.com/FairnessVideo>

FairSquare: Probabilistic Verification of Program Fairness

AWS ALBARGHOUTH, University of Wisconsin-Madison, USA
LORIS D'ANTONI, University of Wisconsin-Madison, USA
SAMUEL DREWS, University of Wisconsin-Madison, USA
ADITYA V. NORI, Microsoft Research, UK

As the range and sensitivity of algorithmic decisions expands at a break-neck speed, it is imperative that we actively investigate fairness and bias in decision-making programs. First, we show that a number of proposed formal definitions of fairness can be encoded as probabilistic program properties. Second, to achieve our goal of enabling rigorous reasoning about fairness, we design a novel technique for verifying probabilistic properties that admits a wide class of decision-making programs. Third, we present FairSquare, a verification tool for automatically certifying that a program meets a given fairness property. We evaluate FairSquare on a range of decision-making programs. Our evaluation demonstrates FairSquare's ability to verify fairness for a range of different programs, which we show are out-of-reach for state-of-the-art analysis techniques.

Subjects: Mathematics of computing → Probabilistic inference problems; Software and its engineering → Automated static analysis;

Additional Key Words and Phrases: Algorithmic Fairness, Probabilistic Programming, Probabilistic Inference

ACM Reference Format:

Albarghouthi, Loris D'Antoni, Samuel Drews, and Aditya V. Nori. 2017. FairSquare: Probabilistic Verification of Program Fairness. Proc. ACM Program. Lang. 1, OOPSLA, Article 50 (October 2017), 30 pages.



Online Set Selection with Fairness and Diversity Constraints

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ABSTRACT

Selection algorithms usually score individual items in isolation, and then select the top scoring items. However, often there is an

we develop algorithms that decide whether to accept, reject or defer an item in an online manner, as the items are presented. We refer to this variant as the Diverse K -choice Secretary Problem.

Fairness Testing: Testing Software for Discrimination

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ABSTRACT

This paper defines software fairness and discrimination and develops a testing-based method for measuring (and how much software

1 INTRODUCTION

Software has become ubiquitous in our society and the importance of its quality has increased. Today, automation, advances in ma-

systems problems

- Specifying fairness requirements
- Generating tests to verify fairness
- Validating and verifying fairness
- Maintaining fairness
- ... and all other aspects of the software engineering lifecycle

oh, and transparency, accountability, and explainability too!

FairWare goals

- Cutting edge systems work
- Connect with ML, policy, etc. research
- Identify challenges and research directions
- Enable collaborations
- Discuss standards