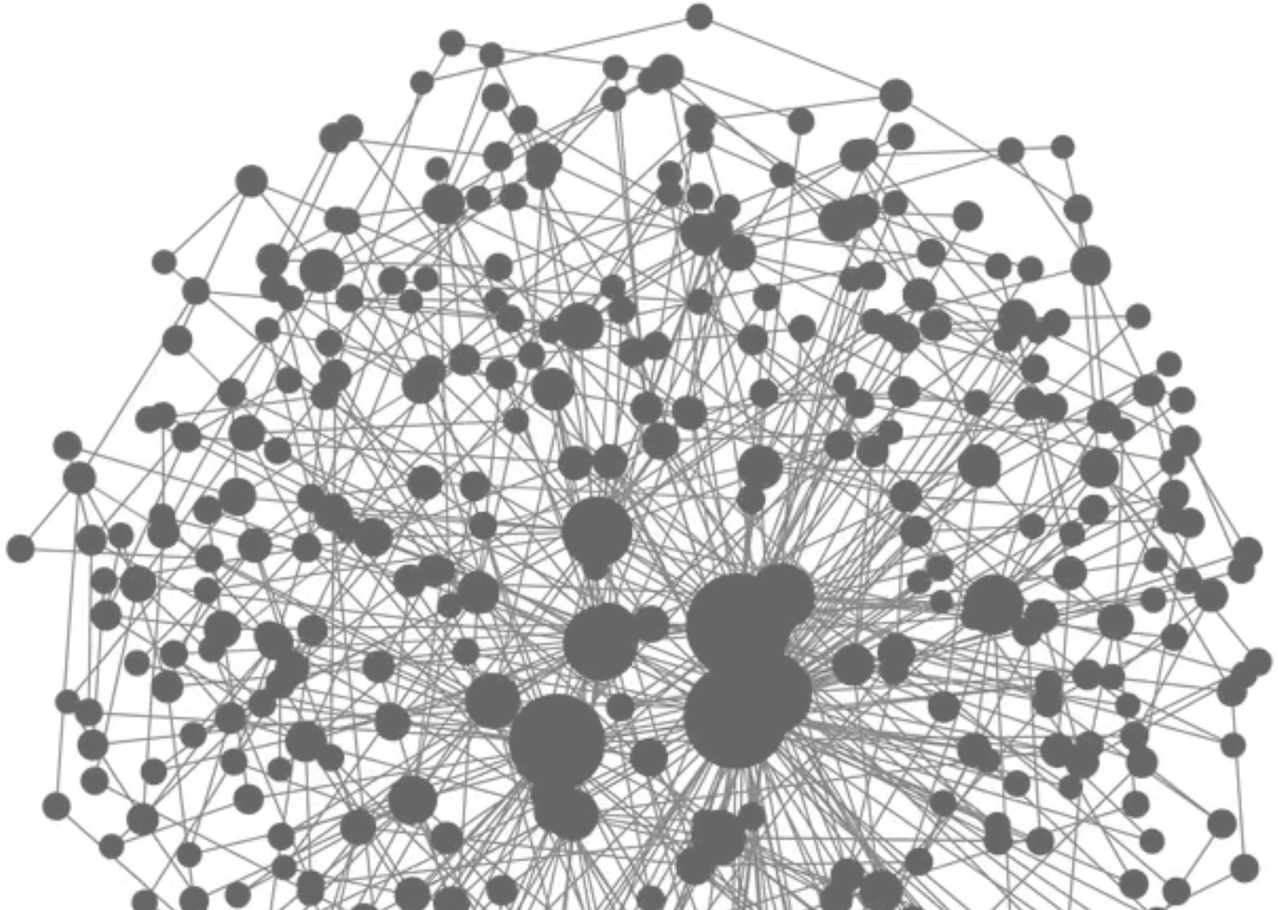
DS2001 Practicum

Outline for today:

1. A few words about me…
2. …and what I use Python for
3. Installing Python on your computers.
4. Running your first program!

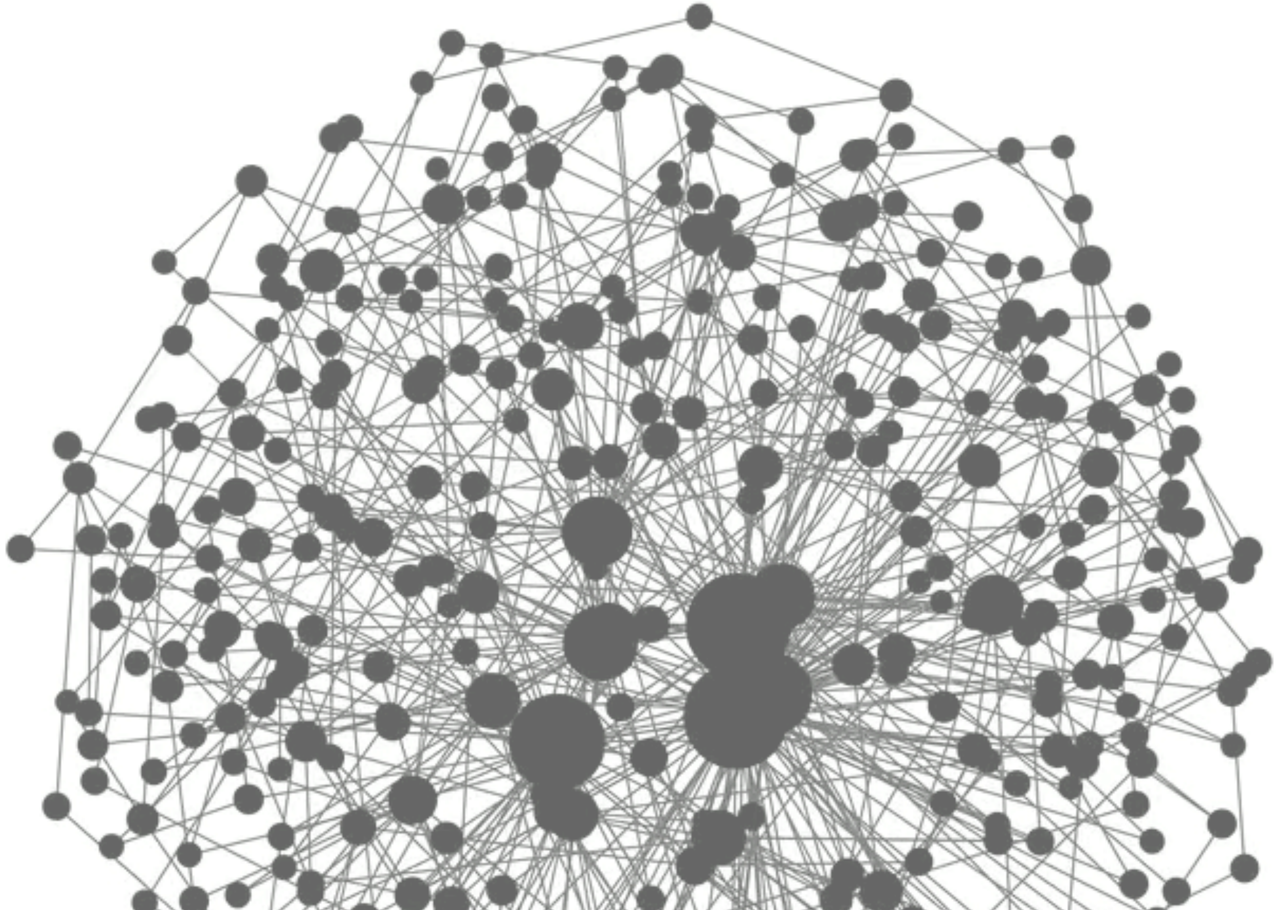


yes, this is generated in Python!

DS2001 Practicum

Outline for today:

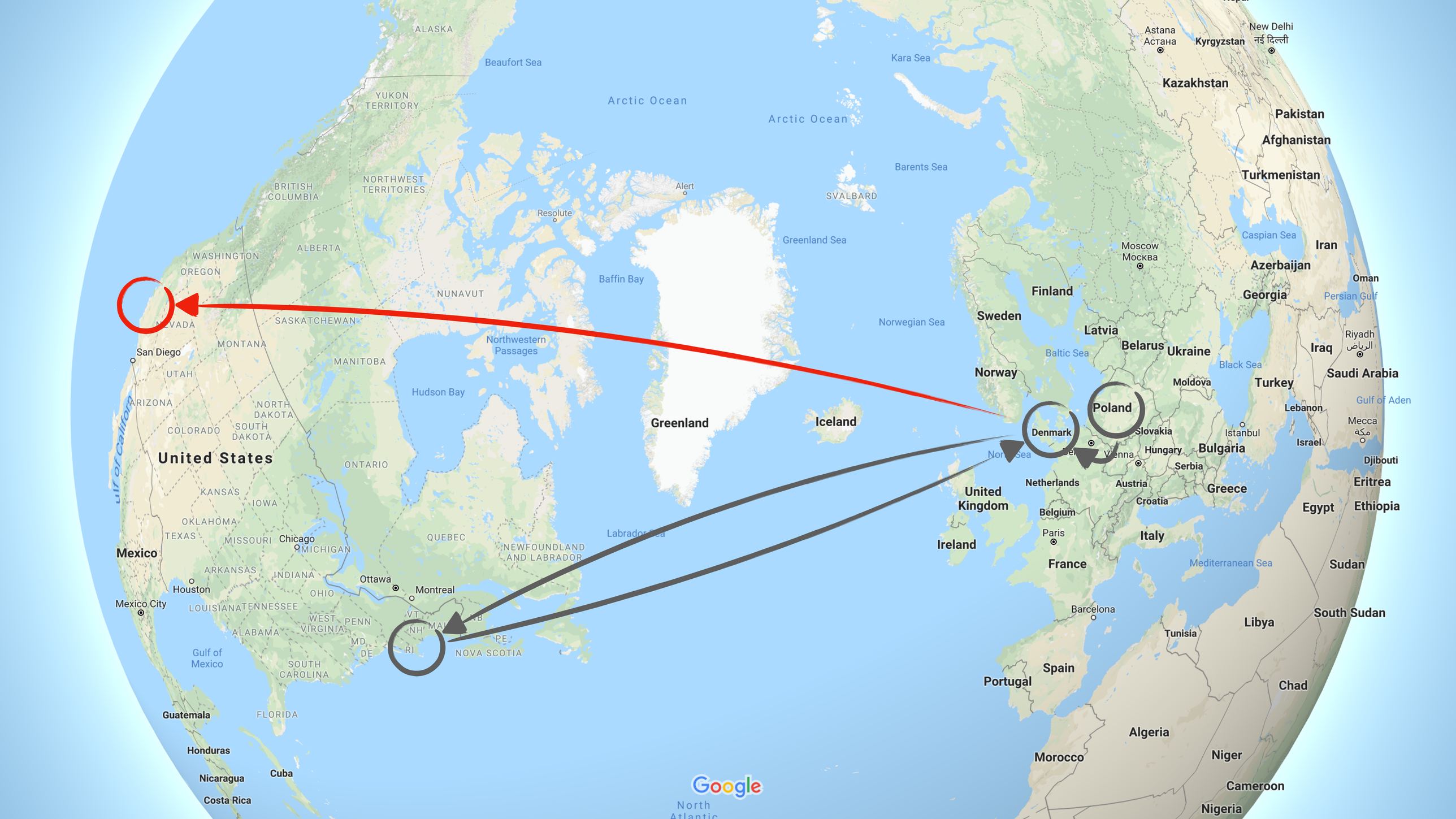
1. A few words about me…
2. …and what I use Python for
3. Installing Python on your computers.
4. Running your first program!

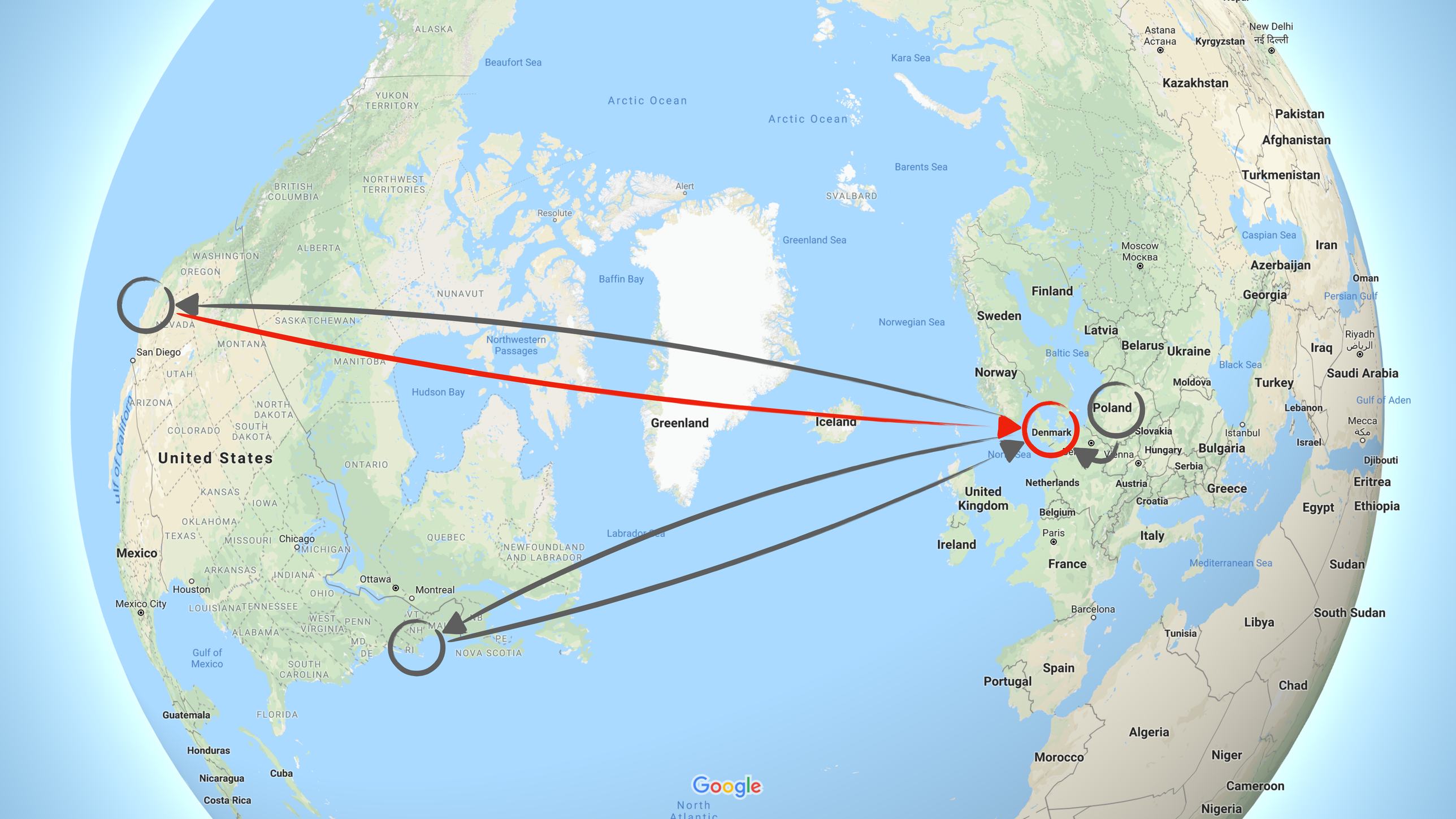



ALASKA
Beaufort Sea
Arctic Ocean
Kara Sea
Arctic Ocean
Barents Sea
SVALBARD
Alert
Resolute
Greenland Sea
Baffin Bay
Northwestern Passages
Hudson Bay
Greenland
Iceland
Labrador Sea
Norwegian Sea
YUKON TERRITORY
BRITISH COLUMBIA
NORTHWEST TERRITORIES
ALBERTA
NUNAVUT
SASKATCHEWAN
MANITOBA
ONTARIO
QUEBEC
NEWFOUNDLAND AND LABRADOR
WASHINGTON
OREGON
NEVADA
MONTANA
UTAH
COLORADO
ARIZONA
NORTH DAKOTA
SOUTH DAKOTA
KANSAS
IOWA
OKLAHOMA
TEXAS
MISSOURI
ARKANSAS
LOUISIANA
INDIANA
OHIO
TENNESSEE
MICHIGAN
WEST VIRGINIA
PENN
VT
NH
MAINE
NB
PE
NOVA SCOTIA
MD
DE
RI
ALABAMA
SOUTH CAROLINA
FLORIDA
Gulf of California
Gulf of Mexico
United States
Mexico
San Diego
Chicago
Houston
Mexico City
Ottawa
Montreal
Guatemala
Honduras
Nicaragua
Costa Rica
Cuba
Astana
Астана
Kyrgyzstan
New Delhi
नई दिल्ली
Kazakhstan
Pakistan
Afghanistan
Turkmenistan
Caspian Sea
Moscow
Москва
Iran
Azerbaijan
Georgia
Oman
Persian Gulf
Finland
Sweden
Latvia
Belarus
Ukraine
Baltic Sea
Black Sea
Norway
Moldova
Turkey
Riyadh
الرياض
Iraq
Saudi Arabia
Gulf of Aden
Lebanon
Mecca
مكة
Israel
Djibouti
Eritrea
Ethiopia
Egypt
Sudan
South Sudan
Libya
Chad
Niger
Cameroon
Nigeria
Poland
Denmark
Slovakia
Istanbul
Hungary
Bulgaria
Serbia
Greece
Vienna
North Sea
Netherlands
Austria
Croatia
Belgium
Paris
Italy
United Kingdom
Ireland
France
Mediterranean Sea
Barcelona
Tunisia
Spain
Portugal
Algeria
Morocco
Google
North Atlantic


ALASKA
Beaufort Sea
Arctic Ocean
Kara Sea
Arctic Ocean
Barents Sea
YUKON TERRITORY
BRITISH COLUMBIA
NORTHWEST TERRITORIES
Alert
SVALBARD
Resolute
Greenland Sea
ALBERTA
WASHINGTON
OREGON
Baffin Bay
NUNAVUT
NEVADA
SASKATCHEWAN
Northwestern Passages
Norwegian Sea
MONTANA
MANITOBA
San Diego
UTAH
Hudson Bay
ARIZONA
NORTH DAKOTA
COLORADO
SOUTH DAKOTA
Greenland
Iceland
United States
ONTARIO
KANSAS
IOWA
OKLAHOMA
TEXAS
MISSOURI
Chicago
MICHIGAN
QUEBEC
NEWFOUNDLAND AND LABRADOR
Mexico
ARKANSAS
INDIANA
Ottawa
Montreal
Houston
OHIO
Mexico City
LOUISIANA
TENNESSEE
WEST VIRGINIA
PENN
VT
NH
ME
NB
ALABAMA
MD
DE
RI
PE
NOVA SCOTIA
Gulf of Mexico
SOUTH CAROLINA
Guatemala
FLORIDA
Honduras
Nicaragua
Cuba
Costa Rica
Google
North Atlantic
Astana
Астана
Kyrgyzstan
New Delhi
नई दिल्ली
Kazakhstan
Pakistan
Afghanistan
Turkmenistan
Caspian Sea
Iran
Moscow
Москва
Azerbaijan
Oman
Finland
Georgia
Persian Gulf
Sweden
Latvia
Riyadh
الرياض
Belarus
Ukraine
Iraq
Baltic Sea
Black Sea
Norway
Saudi Arabia
Moldova
Turkey
Gulf of Aden
Poland
Lebanon
Mecca
مكة
Denmark
Slovakia
Istanbul
Israel
North Sea
Vienna
Hungary
Bulgaria
Djibouti
Serbia
Netherlands
Austria
Greece
Eritrea
United Kingdom
Croatia
Egypt
Ethiopia
Belgium
Paris
Italy
Ireland
France
Mediterranean Sea
Sudan
Barcelona
South Sudan
Libya
Tunisia
Spain
Portugal
Chad
Algeria
Morocco
Niger
Cameroon
Nigeria

ALASKA
Beaufort Sea
YUKON TERRITORY
Arctic Ocean
Arctic Ocean
Kara Sea
Astana
Астана
Kyrgyzstan
New Delhi
नई दिल्ली
Kazakhstan
Pakistan
Afghanistan
Turkmenistan
BRITISH COLUMBIA
NORTHWEST TERRITORIES
Alert
Resolute
SVALBARD
Barents Sea
Greenland Sea
ALBERTA
WASHINGTON
OREGON
Baffin Bay
NUNAVUT
Caspian Sea
Iran
Moscow
Москва
Azerbaijan
Oman
Persian Gulf
Georgia
Finland
Sweden
Norwegian Sea
NEVADA
SASKATCHEWAN
MONTANA
Northwestern Passages
San Diego
UTAH
MANITOBA
Latvia
Belarus
Ukraine
Baltic Sea
Black Sea
Riyadh
الرياض
Iraq
Saudi Arabia
Norway
Moldova
Turkey
Hudson Bay
ARIZONA
NORTH DAKOTA
SOUTH DAKOTA
COLORADO
Greenland
Iceland
Poland
Lebanon
Gulf of Aden
Mecca
مكة
Denmark
Slovakia
Istanbul
Israel
Vienna
Hungary
Bulgaria
North Sea
Djibouti
Serbia
United States
ONTARIO
Netherlands
Austria
Eritrea
United Kingdom
Greece
KANSAS
IOWA
Croatia
Egypt
Ethiopia
Belgium
OKLAHOMA
TEXAS
MISSOURI
Chicago
MICHIGAN
QUEBEC
Labrador Sea
Paris
Italy
Mexico
NEWFOUNDLAND AND LABRADOR
Ireland
ARKANSAS
France
Mediterranean Sea
Sudan
INDIANA
Ottawa
Houston
OHIO
Montreal
Mexico City
LOUISIANA
TENNESSEE
VT
NB
Barcelona
South Sudan
WEST VIRGINIA
PENN
NH
MA
Tunisia
Libya
ALABAMA
PE
MD
Gulf of Mexico
DE
RI
NOVA SCOTIA
SOUTH CAROLINA
Spain
Portugal
Chad
Guatemala
FLORIDA
Algeria
Honduras
Morocco
Niger
Cuba
Nicaragua
Cameroon
Costa Rica
Google
North Atlantic
Nigeria


ALASKA
Beaufort Sea
Arctic Ocean
Kara Sea
Arctic Ocean
Barents Sea
SVALBARD
Alert
Resolute
Greenland Sea
Baffin Bay
Norwegian Sea
Northwestern Passages
Hudson Bay
Greenland
Iceland
YUKON TERRITORY
BRITISH COLUMBIA
NORTHWEST TERRITORIES
ALBERTA
WASHINGTON
OREGON
NUNAVUT
SASKATCHEWAN
MANITOBA
NEVADA
MONTANA
UTAH
ARIZONA
COLORADO
NORTH DAKOTA
SOUTH DAKOTA
San Diego
United States
ONTARIO
KANSAS
IOWA
OKLAHOMA
TEXAS
MISSOURI
Chicago
MICHIGAN
QUEBEC
NEWFOUNDLAND AND LABRADOR
Mexico
ARKANSAS
INDIANA
Ottawa
Montreal
Houston
OHIO
Mexico City
LOUISIANA
TENNESSEE
WEST VIRGINIA
PENN
VT
NH
MA
NB
PE
NOVA SCOTIA
ALABAMA
MD
DE
RI
SOUTH CAROLINA
Gulf of Mexico
FLORIDA
Guatemala
Honduras
Nicaragua
Cuba
Costa Rica
Google
North Atlantic
Astana
Астана
Kyrgyzstan
New Delhi
नई दिल्ली
Kazakhstan
Pakistan
Afghanistan
Turkmenistan
Caspian Sea
Iran
Moscow
Москва
Azerbaijan
Oman
Persian Gulf
Finland
Georgia
Sweden
Latvia
Belarus
Ukraine
Riyadh
الرياض
Iraq
Baltic Sea
Black Sea
Norway
Moldova
Turkey
Saudi Arabia
Gulf of Aden
Lebanon
Mecca
مكة
Poland
Denmark
Slovakia
Istanbul
Israel
Hungary
Bulgaria
Djibouti
Serbia
Netherlands
Austria
Greece
Eritrea
United Kingdom
Croatia
Egypt
Ethiopia
Belgium
Paris
Italy
Ireland
France
Mediterranean Sea
Sudan
Barcelona
South Sudan
Libya
Tunisia
Spain
Portugal
Chad
Algeria
Morocco
Niger
Cameroon
Nigeria


ALASKA
Beaufort Sea
Arctic Ocean
Kara Sea
Arctic Ocean
Barents Sea
SVALBARD
Alert
Resolute
Greenland Sea
Baffin Bay
Norwegian Sea
Northwestern Passages
Hudson Bay
Greenland
Iceland
YUKON TERRITORY
NORTHWEST TERRITORIES
BRITISH COLUMBIA
ALBERTA
WASHINGTON
OREGON
NUNAVUT
SASKATCHEWAN
MANITOBA
ONTARIO
QUEBEC
NEWFOUNDLAND AND LABRADOR
Labrador Sea
NOVA SCOTIA
San Diego
United States
Mexico
Mexico City
Houston
Chicago
Ottawa
Montreal
Gulf of Mexico
Gulf of California
Guatemala
Honduras
Nicaragua
Costa Rica
Cuba
FLORIDA
Astana
Астана
Kyrgyzstan
New Delhi
नई दिल्ली
Kazakhstan
Pakistan
Afghanistan
Turkmenistan
Moscow
Москва
Caspian Sea
Iran
Azerbaijan
Georgia
Oman
Persian Gulf
Finland
Sweden
Latvia
Belarus
Ukraine
Baltic Sea
Black Sea
Norway
Moldova
Turkey
Riyadh
الرياض
Iraq
Saudi Arabia
Gulf of Aden
Lebanon
Mecca
مكة
Israel
Djibouti
Eritrea
Ethiopia
Egypt
Sudan
South Sudan
Libya
Chad
Niger
Nigeria
Cameroon
Algeria
Morocco
Tunisia
Spain
Portugal
Barcelona
Mediterranean Sea
France
Paris
Italy
Ireland
United Kingdom
Netherlands
Belgium
Austria
Croatia
Serbia
Hungary
Bulgaria
Greece
Slovakia
Istanbul
Vienna
Poland
Denmark
Google


ALASKA
Beaufort Sea
Arctic Ocean
Kara Sea
Arctic Ocean
Barents Sea
YUKON TERRITORY
BRITISH COLUMBIA
NORTHWEST TERRITORIES
Alert
SVALBARD
Resolute
Greenland Sea
ALBERTA
WASHINGTON
OREGON
Baffin Bay
NUNAVUT
SASKATCHEWAN
Norwegian Sea
Northwestern Passages
San Diego
MONTANA
MANITOBA
UTAH
Hudson Bay
ARIZONA
NORTH DAKOTA
COLORADO
SOUTH DAKOTA
Greenland
Iceland
United States
ONTARIO
KANSAS
IOWA
OKLAHOMA
TEXAS
MISSOURI
Chicago
MICHIGAN
QUEBEC
NEWFOUNDLAND AND LABRADOR
Mexico
ARKANSAS
INDIANA
Ottawa
Montreal
Houston
OHIO
Mexico City
LOUISIANA
TENNESSEE
WEST VIRGINIA
PENN
VT
NH
ALABAMA
MD
DE
RI
PE
Gulf of Mexico
SOUTH CAROLINA
Guatemala
FLORIDA
Honduras
Nicaragua
Cuba
Costa Rica
Google
North Atlantic
Astana
Астана
Kyrgyzstan
New Delhi
नई दिल्ली
Kazakhstan
Pakistan
Afghanistan
Turkmenistan
Caspian Sea
Iran
Moscow
Москва
Azerbaijan
Oman
Finland
Georgia
Persian Gulf
Sweden
Latvia
Riyadh
الرياض
Belarus
Ukraine
Iraq
Baltic Sea
Black Sea
Norway
Saudi Arabia
Moldova
Turkey
Poland
Lebanon
Gulf of Aden
Denmark
Slovakia
Istanbul
Mecca
مكة
Israel
Hungary
Bulgaria
Djibouti
Serbia
Netherlands
Austria
Greece
Eritrea
United Kingdom
Croatia
Egypt
Ethiopia
Belgium
Paris
Italy
Ireland
France
Mediterranean Sea
Sudan
Barcelona
South Sudan
Libya
Tunisia
Spain
Portugal
Chad
Algeria
Morocco
Niger
Cameroon
Nigeria

examples of how and where I use python

Discrimination through optimization:
How Facebook's ad delivery can lead to biased outcomes

Muhammad Ali, Piotr Sapiezynski, Miranda Bogen, Aleksandra Korolova, Alan Mislove, Aaron Rieke

We used **python** to:

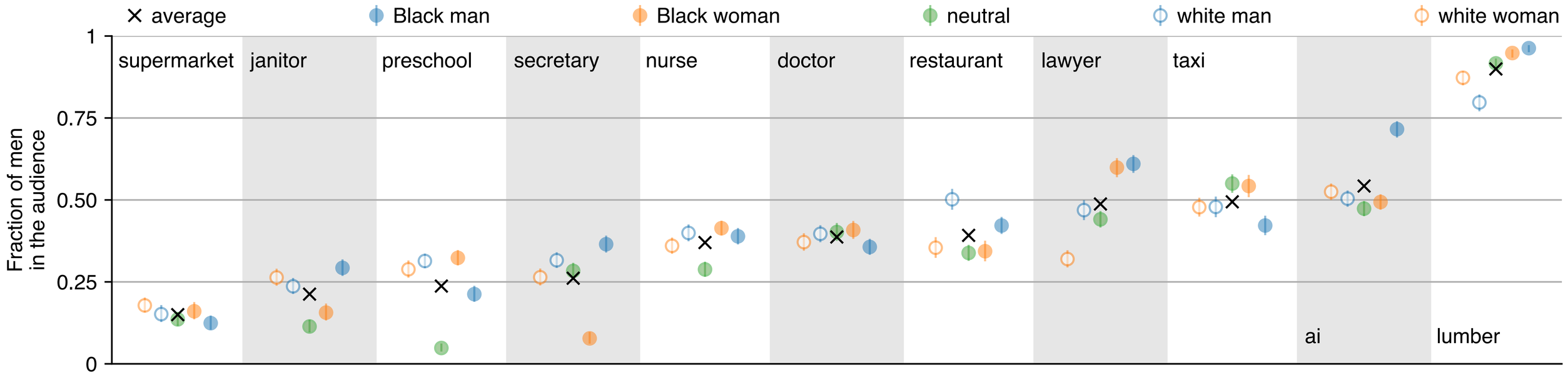
- launch ads on Facebook and collect data about who Facebook shows them to
- analyze the data to show that Facebook shows different job ads to men and women, and different housing ads to white and Black people

Discrimination through optimization: How Facebook's ad delivery can lead to biased outcomes

Muhammad Ali, Piotr Sapiezynski, Miranda Bogen, Aleksandra Korolova, Alan Mislove, Aaron Rieke

We used **python** to:

- launch ads on Facebook and collect data about who Facebook shows them to
- analyze the data to show that Facebook shows different job ads to men and women, and different housing ads to white and Black people



yes, this is generated in Python!

Quantifying the Impact of User Attention on Fair Group Representation in Ranked Lists

P. Sapiezynski, W. Zeng, R. Robertson, A. Mislove, C. Wilson

We used **python** to:

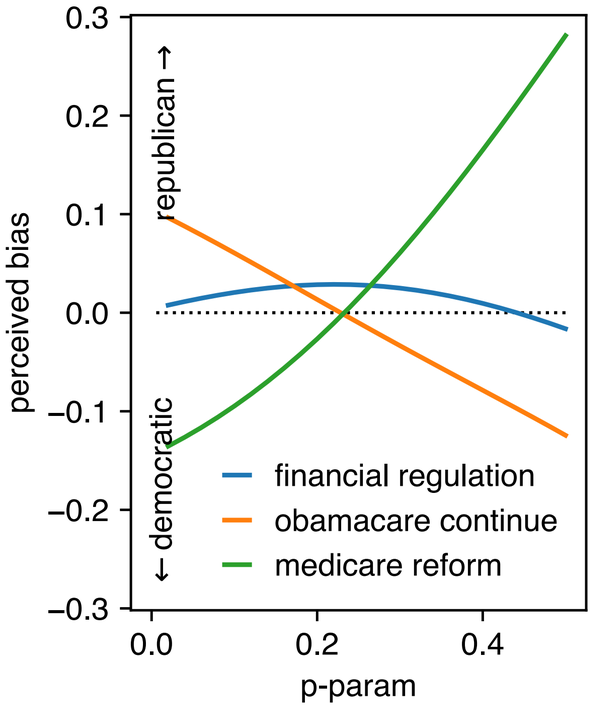
- access data from a dating service, google, twitter, and hiring sites.
- analyze the data and show potential bias against women in hiring sites and against POC in a dating service.

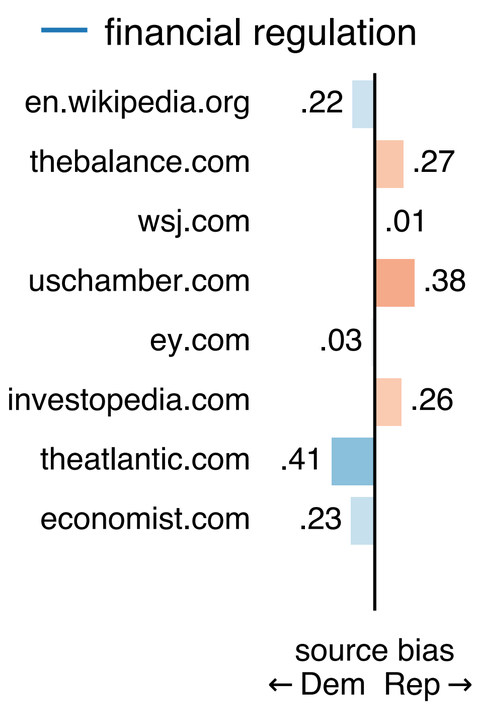
Quantifying the Impact of User Attention on Fair Group Representation in Ranked Lists

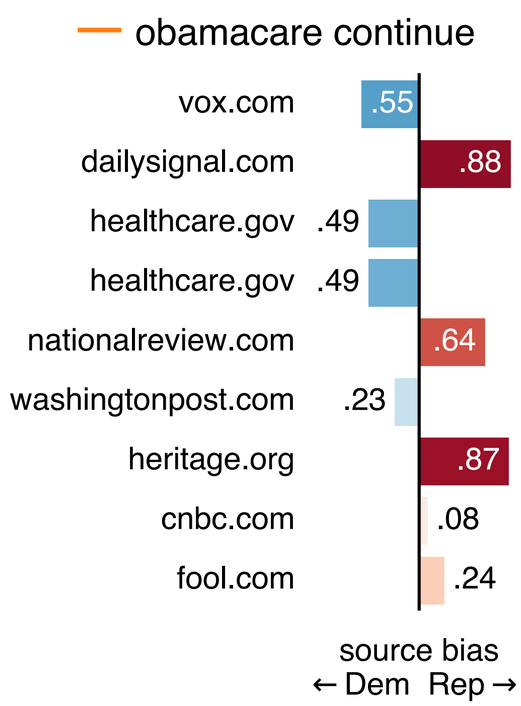
P. Sapiezynski, W. Zeng, R. Robertson, A. Mislove, C. Wilson

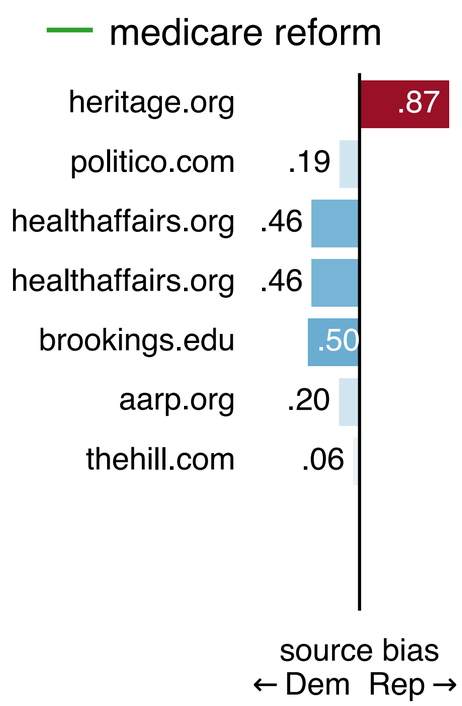
We used **python** to:

- access data from a dating service, google, twitter, and hiring sites.
- analyze the data and show potential bias against women in hiring sites and against POC in a dating service.







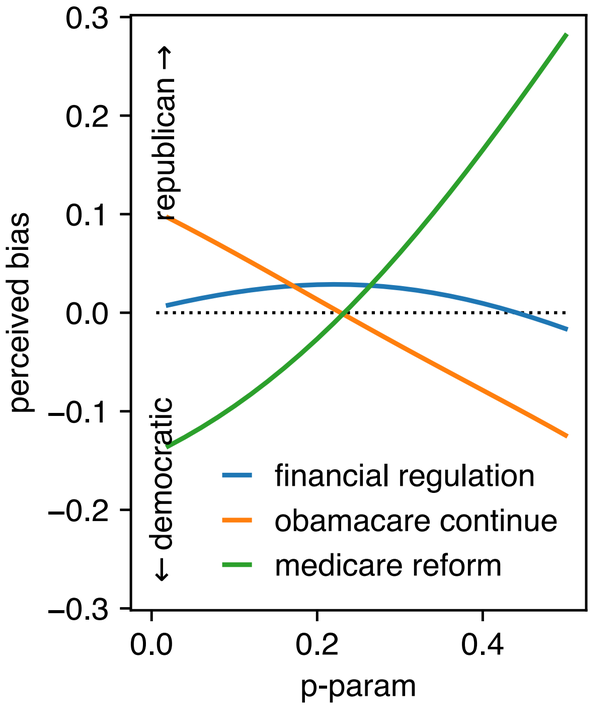


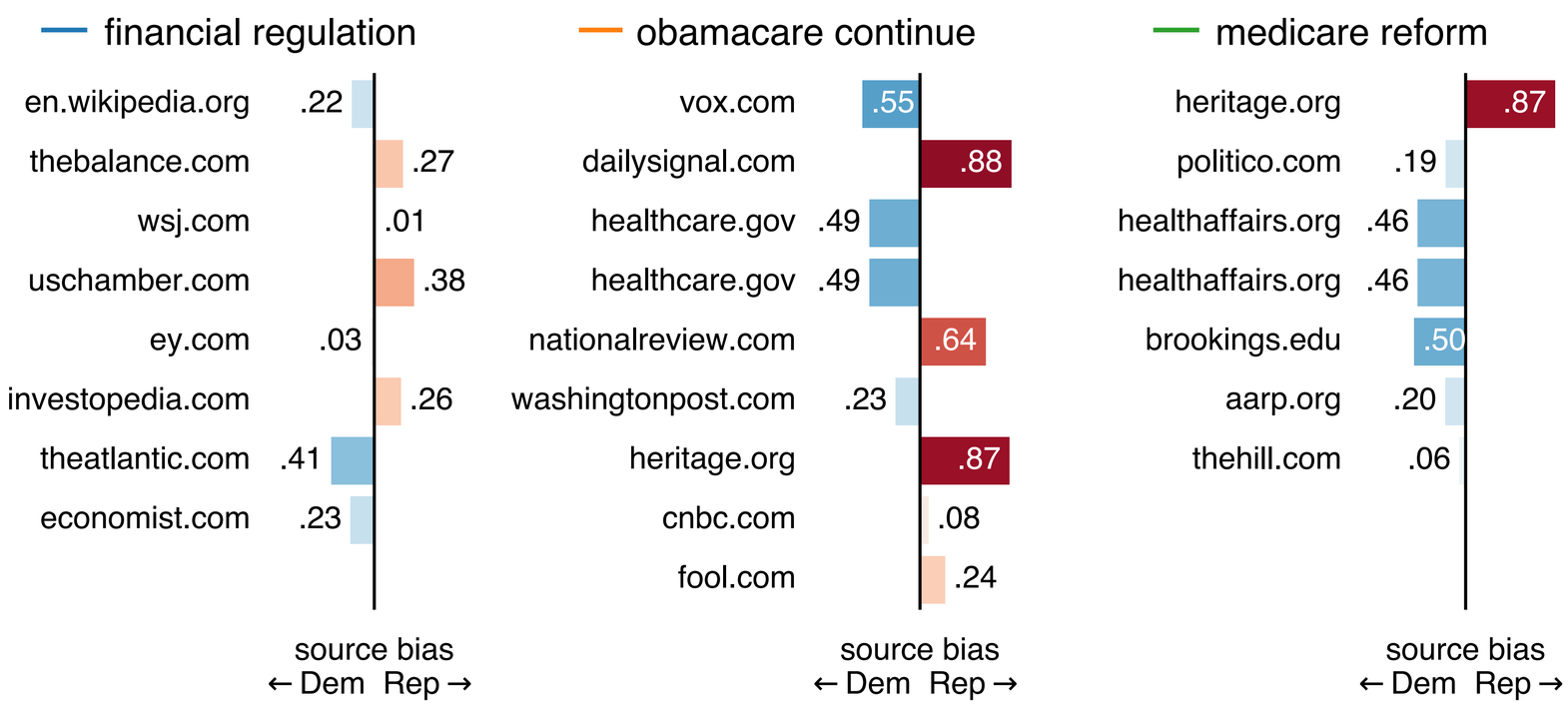
Quantifying the Impact of User Attention on Fair Group Representation in Ranked Lists

P. Sapiezynski, W. Zeng, R. Robertson, A. Mislove, C. Wilson

We used **python** to:

- access data from a dating service, google, twitter, and hiring sites.
- analyze the data and show potential bias against women in hiring sites and against POC in a dating service.





yes, this is also generated in Python!

Evidence of Complex Contagion of Information in Social Media: An Experiment Using Twitter Bots

Bjarke Monsted, Piotr Sapiezynski, Emilio Ferrara, Sune Lehmann

We used **python** to:

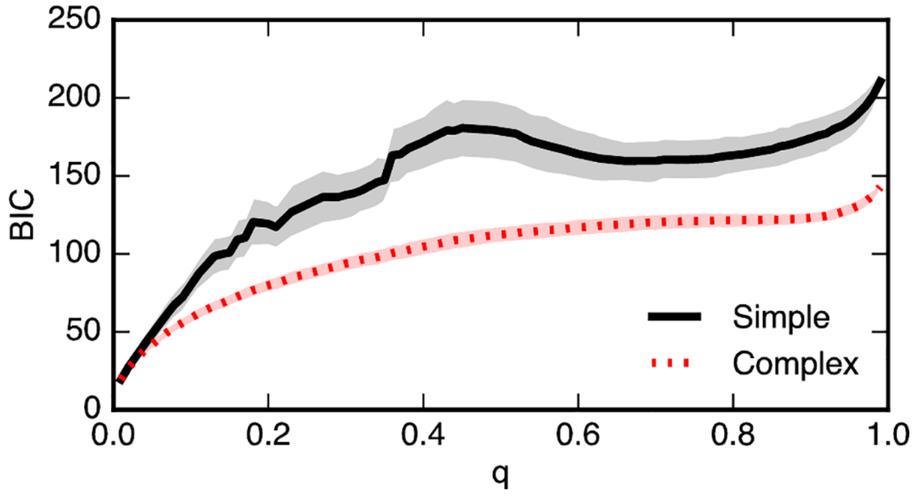
- control Twitter bots and have them create and disseminate content
- analyze the data to show that people are more likely to adopt a behavior if the see it **from many different sources** rather than **from the same source but many times**

Evidence of Complex Contagion of Information in Social Media: An Experiment Using Twitter Bots

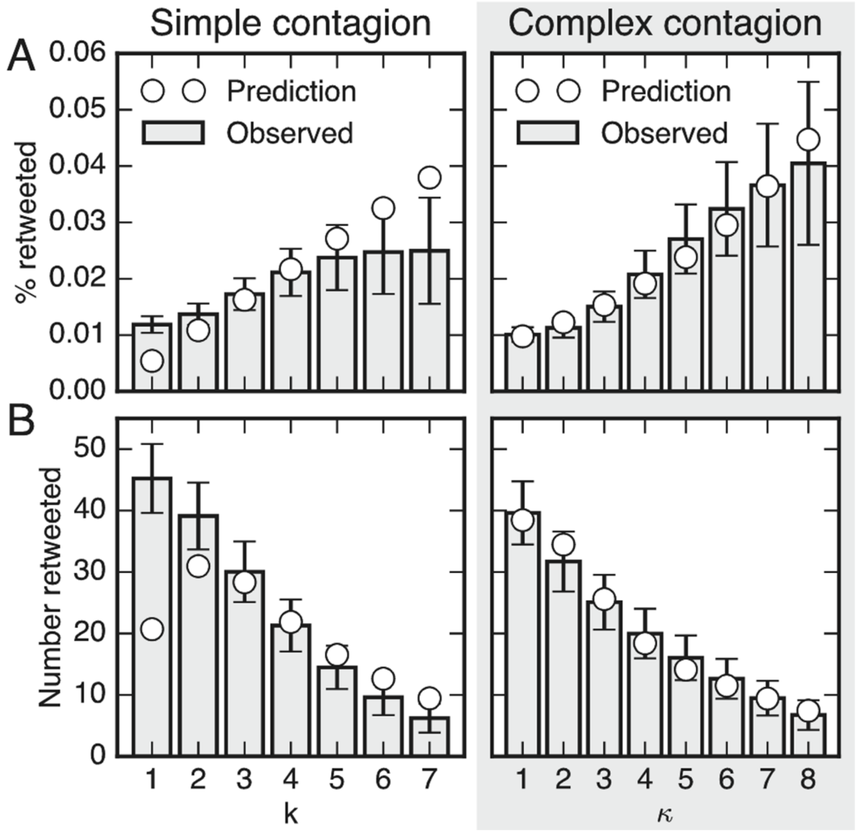
Bjarke Monsted, Piotr Sapiezynski, Emilio Ferrara, Sune Lehmann

We used **python** to:

- control Twitter bots and have them create and disseminate content
- analyze the data to show that people are more likely to adopt a behavior if the see it **from many different sources** rather than **from the same source but many times**



yes, this is also generated in Python!

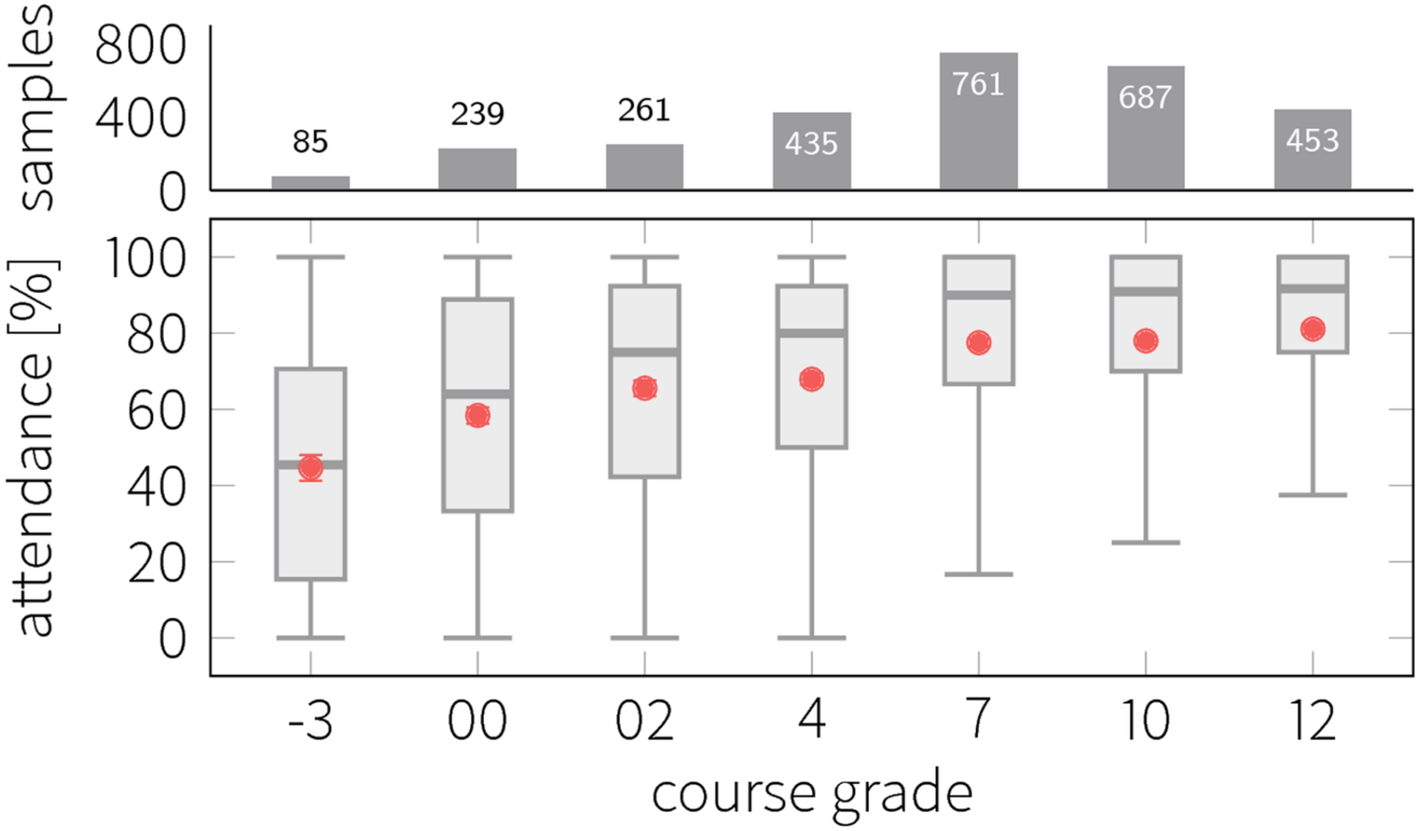


Class attendance, peer similarity, and academic performance in a large field study

Valentin Kassarnig, Andreas Bjerre-Nielsen, Enys Mones, Sune Lehmann, David Dreyer Lassen

We used **python** to:

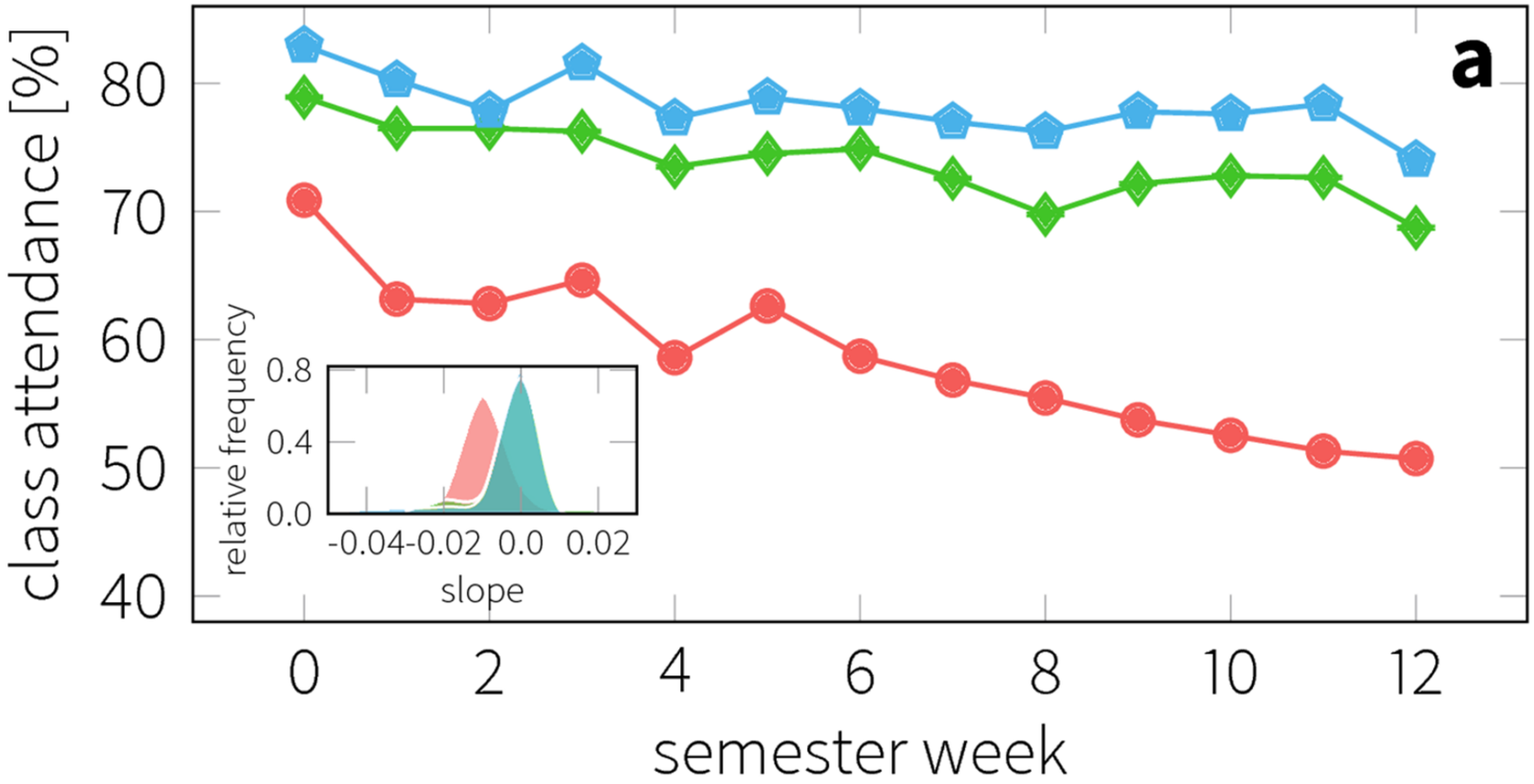
- obtain, encrypt, and store data from thousands of smartphones.
- analyze the data and show that successful students show up for class and make friends there

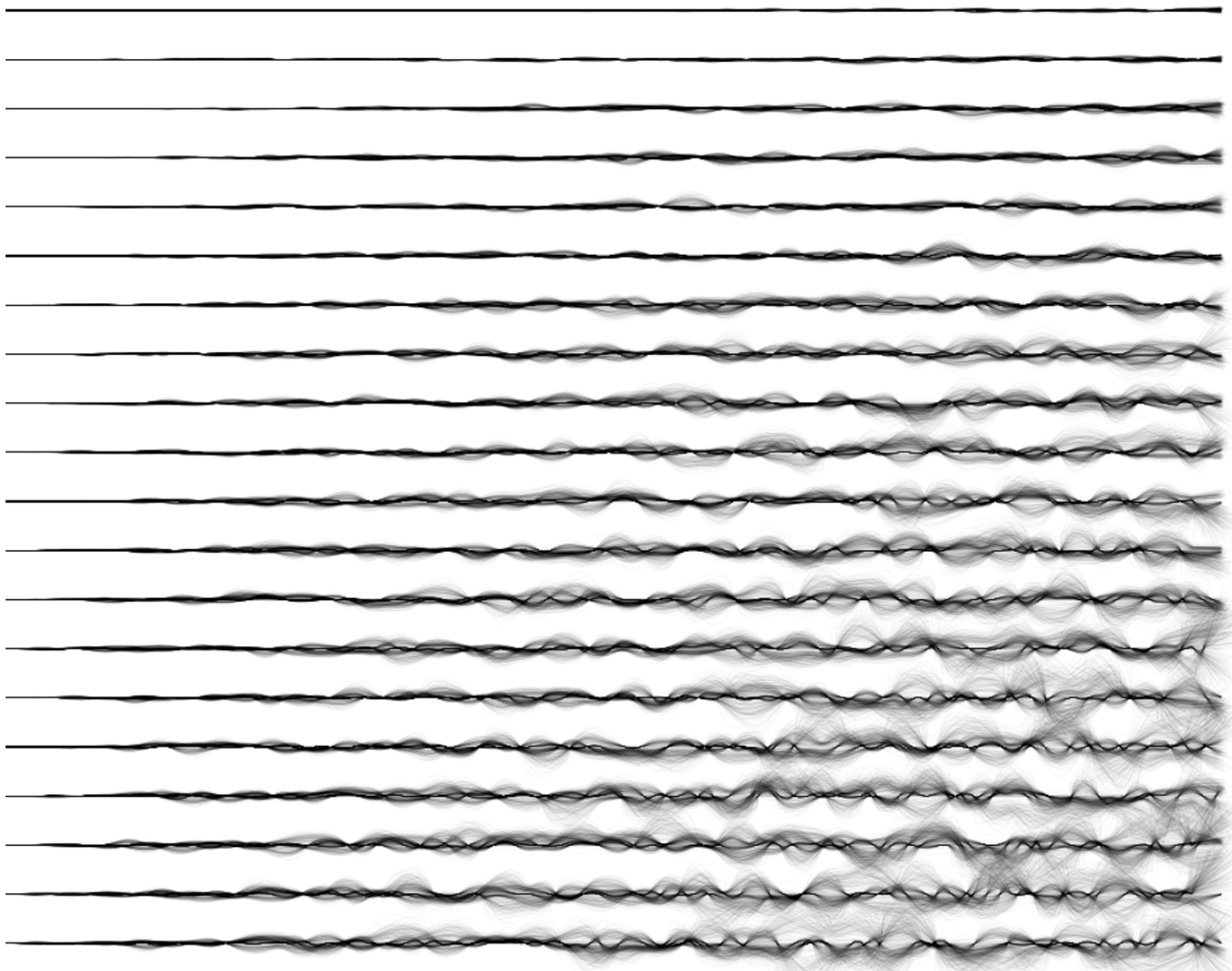


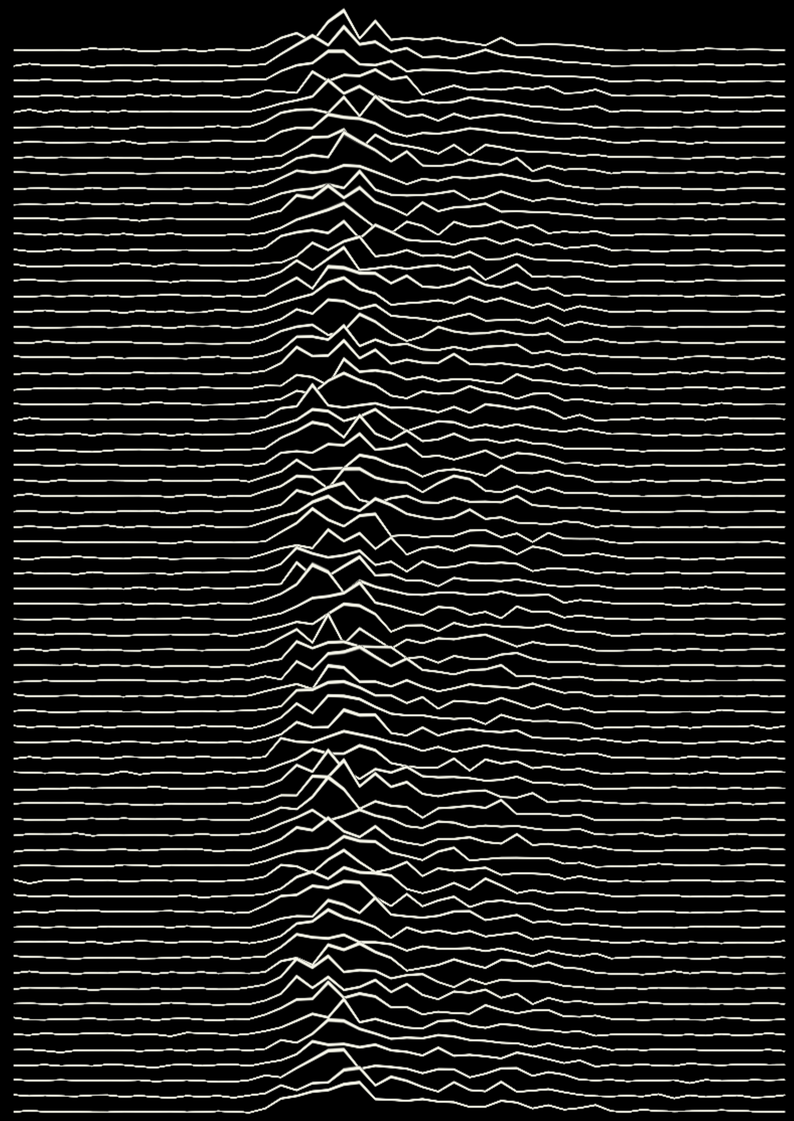
Class attendance, peer similarity, and academic performance in a large field study

Valentin Kassarnig, Andreas Bjerre-Nielsen, Enys Mones, Sune Lehmann, David Dreyer Lassen

We used **python** to:
- obtain, encrypt, and store data from thousands of smartphones.
- analyze the data and show that successful students show up for class and make friends there







https://github.com/sapiezynski/generative-art-spline

ethics in Computer Science
the law, privacy, implications

grading

attending exercises and submitting the results (50%)

final project in groups of two or three includes:

- project proposal (10%)
- project report (15%)
- final presentation in front of the class (25%)

before we get started

1. As you program, you will make mistakes, just like everybody else does.
2. The mistakes will (usually) lead to error messages.
3. Read the error messages carefully and try to understand what's wrong.
4. If you're stuck and in class, ask me or the TAs, we'll be delighted to help!
5. If you're stuck and on your own, google your error message:

   somebody already had and solved this problem.
6. Always only make small changes in the code and then run it before making more changes!

before we get started

1. As you program, you will make mistakes, just like everybody else does.
2. The mistakes will (usually) lead to error messages.
3. Read the error messages carefully and try to understand what's wrong.
4. If you're stuck and in class, ask me or the TAs, we'll be delighted to help!
5. If you're stuck and on your own, google your error message:

   somebody already had and solved this problem.
6. Always only make small changes in the code and then run it before making more changes!

Now, follow the instructions on

https://sapiezynski.com/ds2000/

and ask whenever you run into any problems!