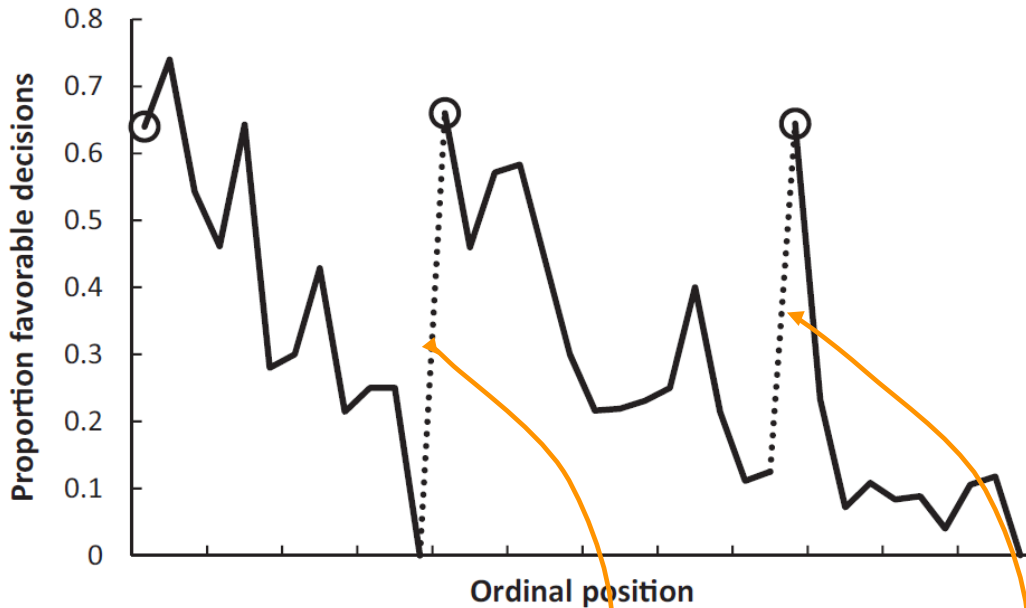


# THE FUTURE OF EMPLOYMENT

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**Machine Learning** is the study of algorithms that can learn and act.



Israeli judges are significantly more lenient after a food break (Danziger et al 2011).

Morning snack

Lunch

Algorithms offer decisions free from **human heuristics and biases**.

Algorithms are also **scalable**: you can fit more processors than humans into a room.



‘Computer’  
c1949

Cheap computing and data is leading to algorithms for increasingly sophisticated tasks, including **translation**.



Google  
Translate

Break through language barriers.

Big data analysis is automating **paralegal, contract law and patent law** tasks.



*“a lot of people who used to be allocated to conduct document review are no longer able to be billed out,” [NYTimes, 2011].*

Existing mass-production cars possess computers, sensor networks and safety systems: automation just **requires supplying the right algorithm.**



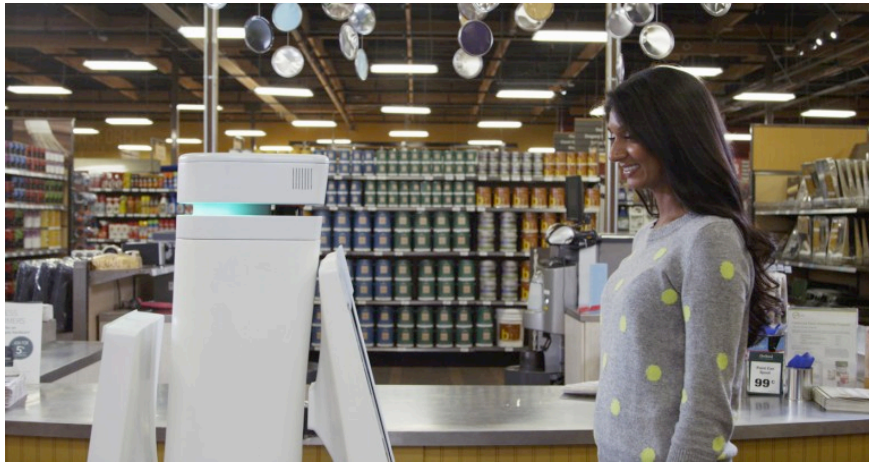
```
module GPyFITC
import PyCall
PyCall.@pyimport GPy
export FITCModel, observe!, infer!, predict
type FITCModel
    model
    n::Int
    X::Array{Float64, 2}
    y::Array{Float64, 1}
end
function FITCModel(lb, ub, n=10)
    u = linspace(lb, ub, n)
end

function observe!(m::FITCModel, X, y)
    if size(m.X) == (0,0)
        m.X = X
        m.y = y
    else
        m.X = vcat(m.X, X)
        m.y = vcat(m.y, y)
    end
    n = size(m.X, 1)
    m.model = GPy.models[:SparseGPRRegression](m.X, reshape(m.y, (n, 1)),
        num_inducing=m.n)
end

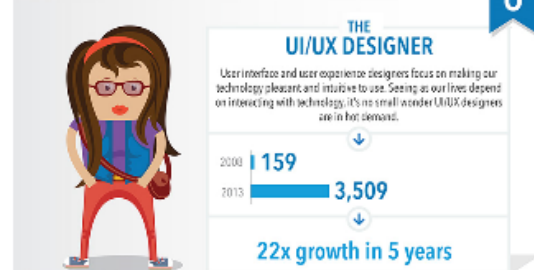
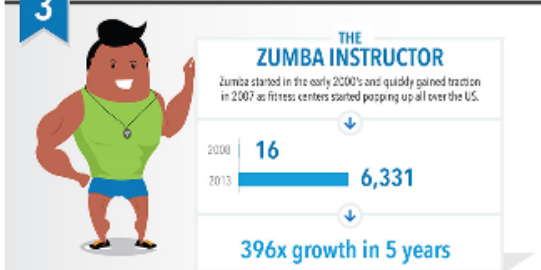
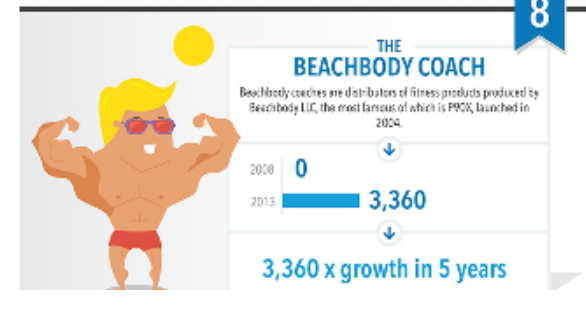
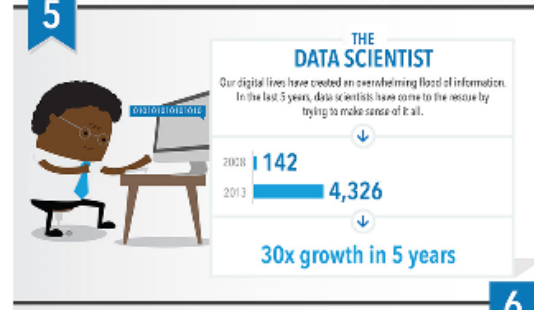
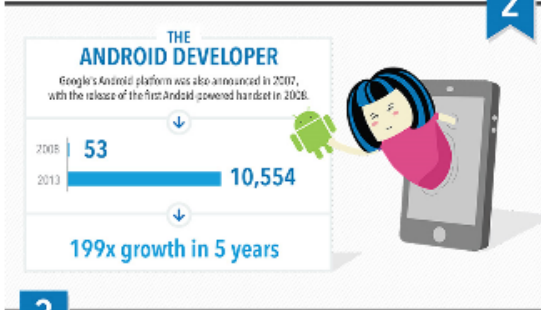
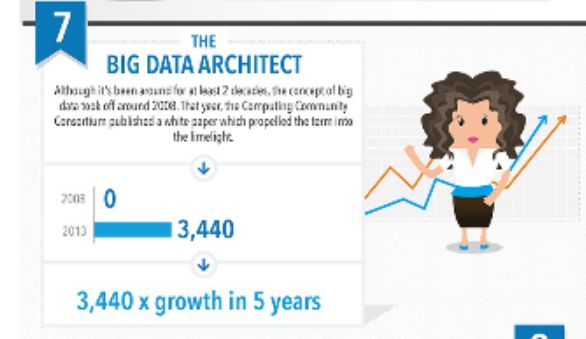
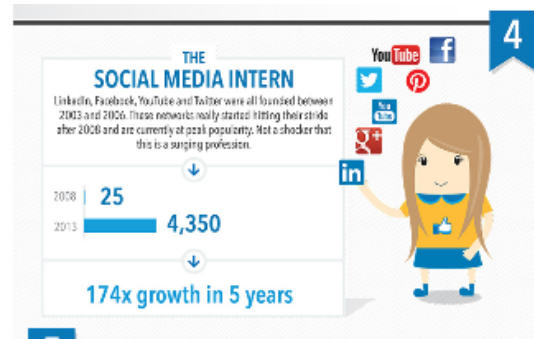
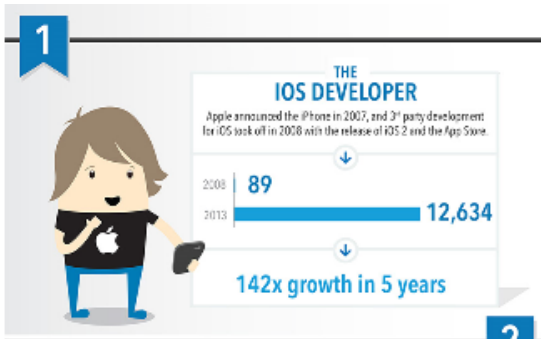
function infer!(m::FITCModel)
    m.model[:constrain_positive](" ")
    m.model[:optimize]("tnc", max_f_eval=1000)
end

function predict(m::FITCModel, Xp)
    mean, variance = m.model[:predict](Xp)
    variance = max(variance, 0)
    mean, variance
end
end
```

Many **logistics tasks** are now being automated with the use of machine learning and mobile robotics technologies.



So, if machines can drive, serve customers, and look through data, **what are humans still good for?** We suggest: **creativity, social intelligence and manipulation.**

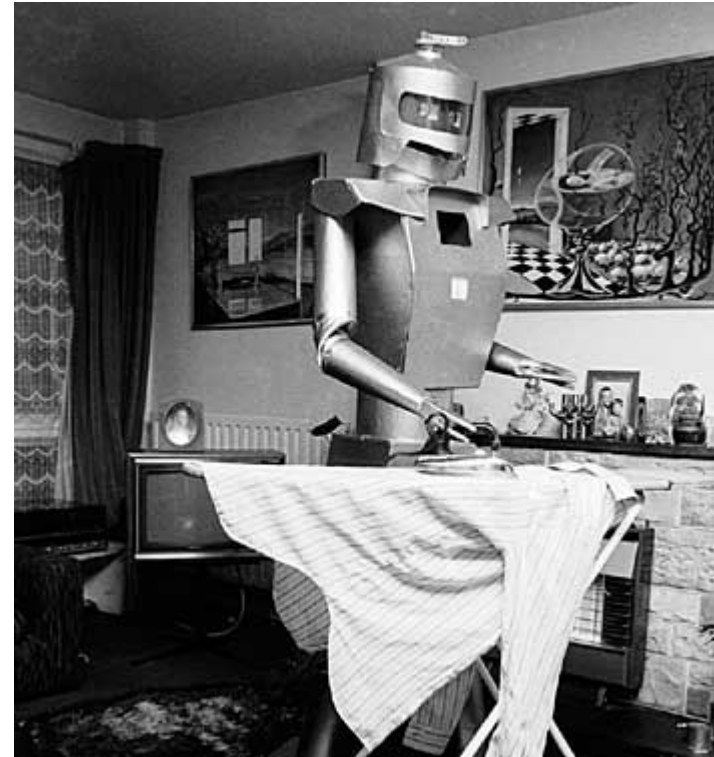




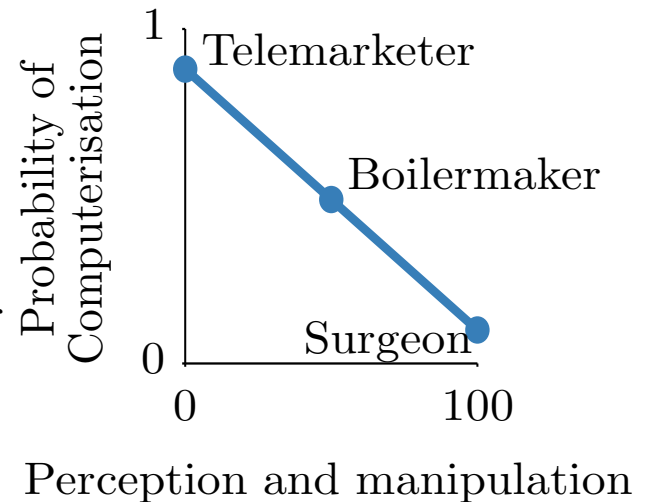
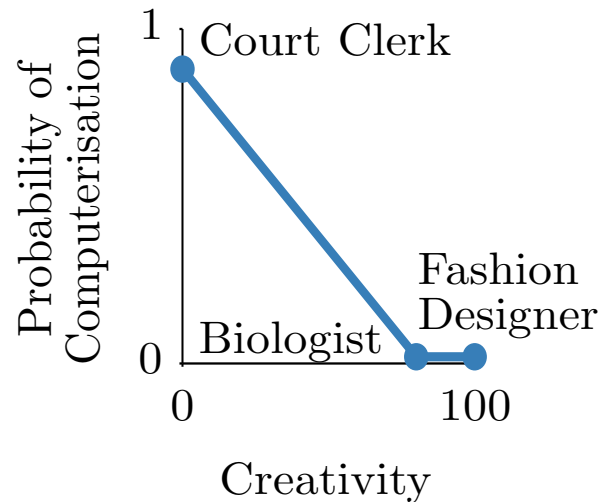
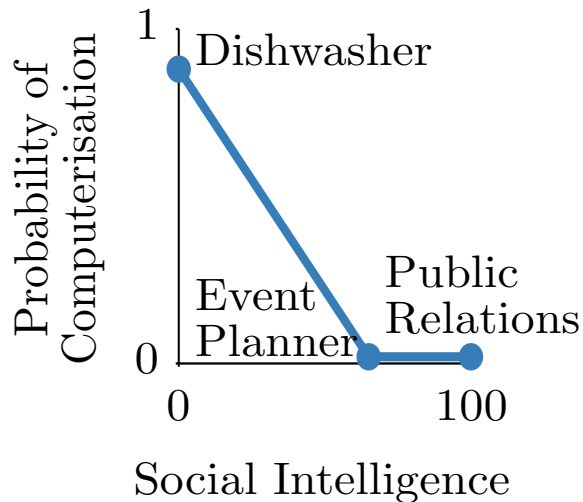
Precisely, autonomous manipulation in unstructured environments is difficult to automate.



**amazon.com**<sup>®</sup>

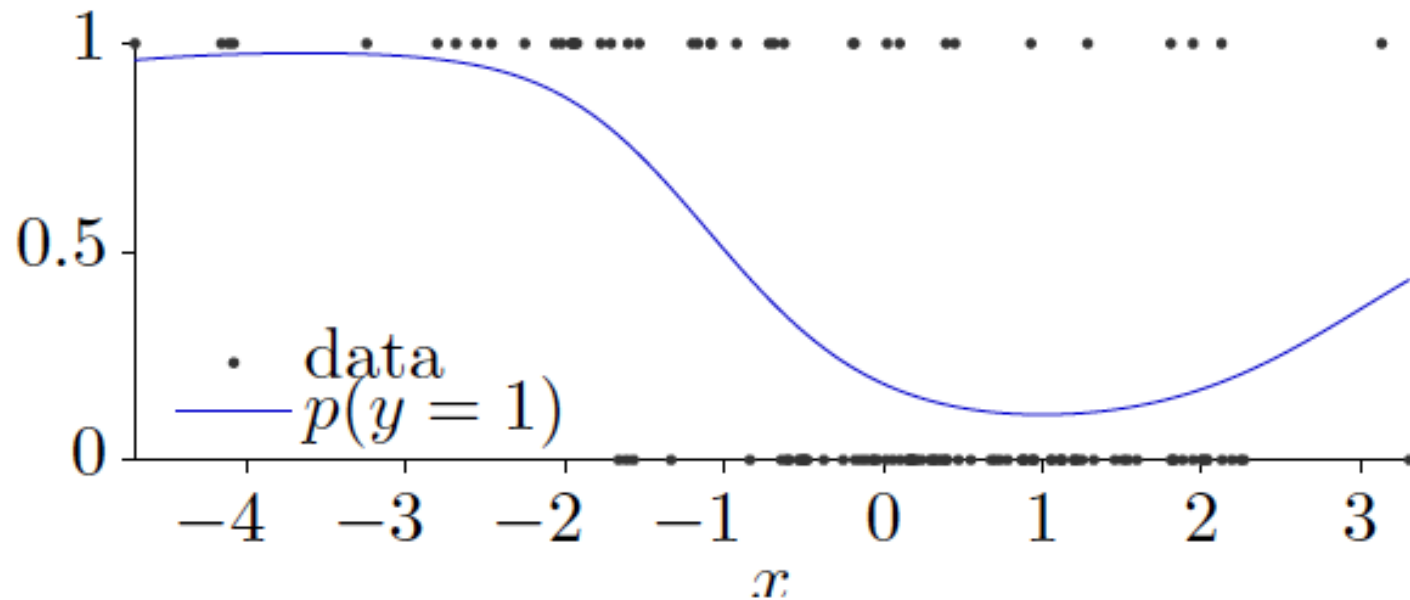


We take a job's automatability to be a function of the skills required to complete the task.



We used a **dataset of 702 occupations**, for which we have employment, income and skills related to automatability (e.g. finger dexterity, originality and persuasion).

We hand-labelled 70 occupations as being automatable or not. Then we classified the automatability of all occupations.

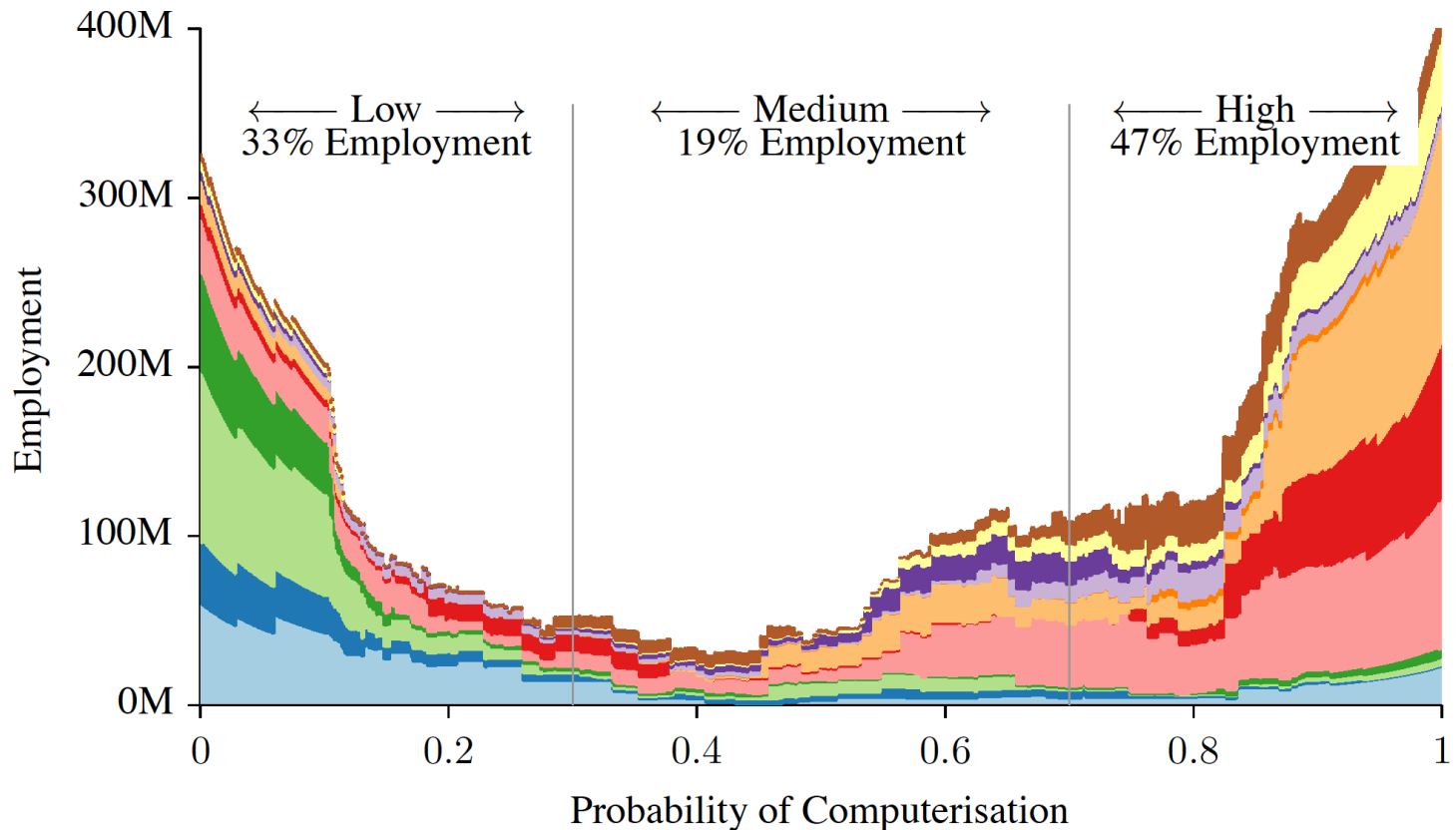


Over 100 random splits, 35 of these occupations were able to predict the other 35 with high accuracy: suggesting insensitivity to the choice of the 70.

<b>Occupation</b>	<b>Label</b>	<b>Probability</b>
Data Entry Keyers	1	0.99
Tax Preparers		0.99
Umpires and Referees		0.98
Industrial Truck Operators	1	0.94
Waiters and waitresses	0	0.94
Slaughterers		0.60
Economists	0	0.43
Judicial Law Clerks	1	0.41
Clergy	0	0.01
Choreographers		0.00

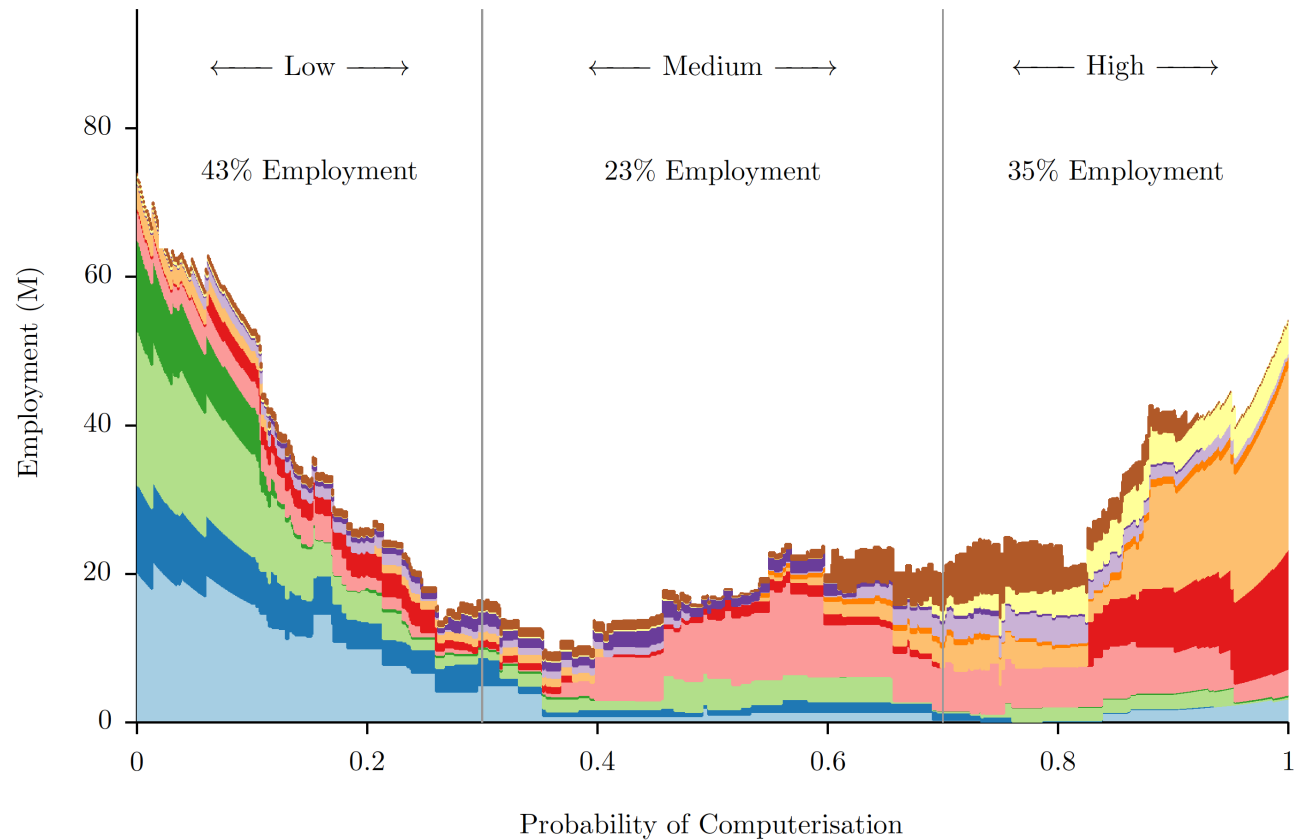
# USA

- Management, Business, and Financial
- Computer, Engineering, and Science
- Education, Legal, Community Service, Arts, and Media
- Healthcare Practitioners and Technical
- Service
- Sales and Related
- Office and Administrative Support
- Farming, Fishing, and Forestry
- Construction and Extraction
- Installation, Maintenance, and Repair
- Production
- Transportation and Material Moving



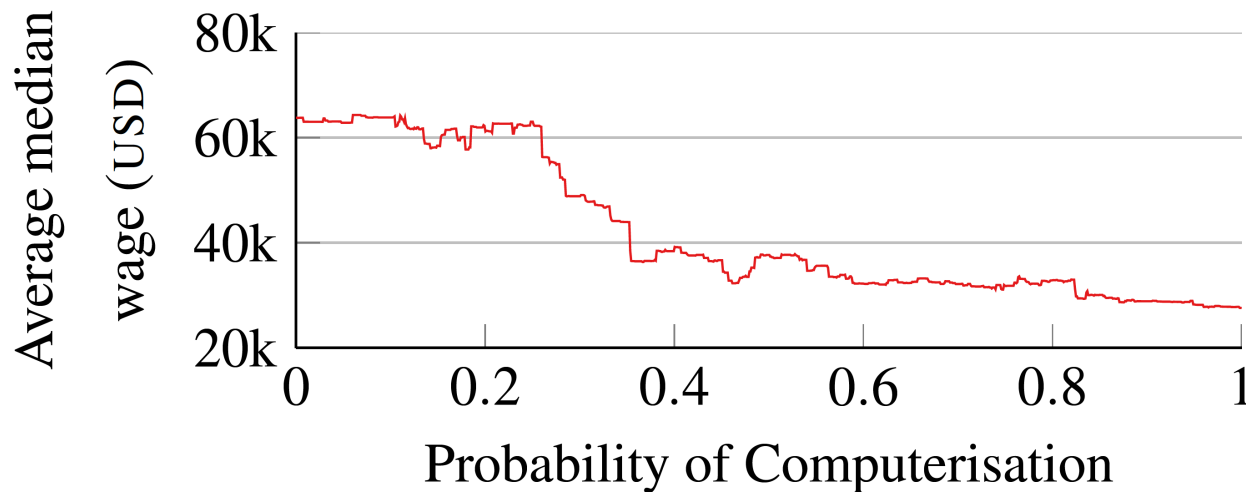
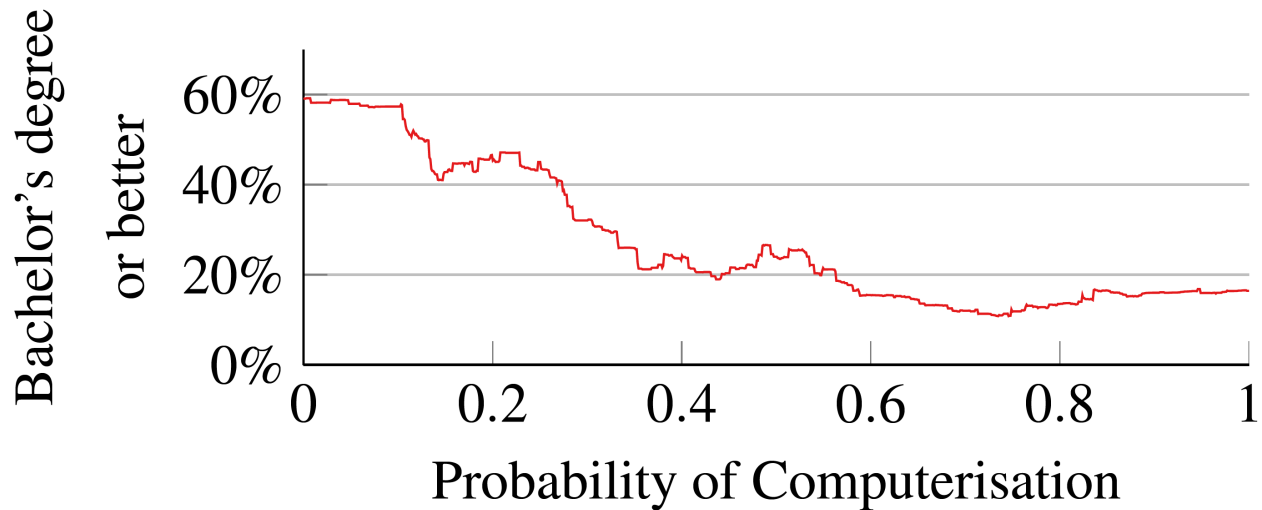
# UK

- Management, Business, and Financial
- Computer, Engineering, and Science
- Education, Legal, Community Service, Arts, and Media
- Healthcare Practitioners and Technical
- Service
- Sales and Related
- Office and Administrative Support
- Farming, Fishing, and Forestry
- Construction and Extraction
- Installation, Maintenance, and Repair
- Production
- Transportation and Material Moving





We predict that **high-skilled jobs are relatively resistant to computerisation.**





We must ensure that **all can share** in the great prosperity promised by new technologies.

*This is the way we wash the clothes... wash the clothes... wash the clothes... wash the clothes...*

# with the THOR AUTOMAGIC WASHER



**THOR REVOLUTIONIZES RINSING with the Wonderful New AGITATOR ACTION OVERFLOWING RINSE**

**Loosens soap and dirt by Agitator Action**  
... just the way it washes! Of course clothes come clean!

**Soap Curds rise to the top and float away**  
... they never are forced down thru the clothes!

**Rinse is continuous with constantly changing water**  
... equal to eight ordinary rinses. And you can use cold water!

*It's all done with your fingertips... No Wringer... No Rinse Tubs... No Hard Work!*

All you'll do is flip a switch and your Thor will take over the whole wet, miserable job of washing, rinsing—everything. And your clothes will have such a sparkling freshness! Only Thor's famous Agitator Action could get them quite so clean... only Thor's exclusive OVERFLOWING RINSE plus Thor Spin Drying could leave them quite so soft, so fluffy. Today, for sure, see the new Automagic Thor Washer at your dealer's!

**NEW LOW PRICE**  
Formerly \$229.50—now only **\$199.50**  
SAVE \$30

Price Includes normal installation. NO BOLTING DOWN. No permanent installation necessary. Put it anywhere, upstairs or down. EASY TERMS.

**And for Only \$79.95 You Can Add This Thor Automagic DISHWASHER**

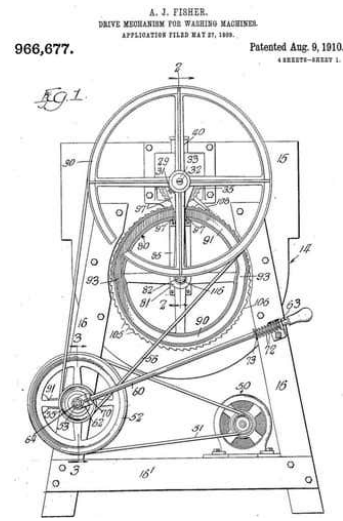
- \* Washes, rinses, sanitizes and dries your dishes better than by hand
- \* Saves at least an hour a day
- \* Uses less hot water than any other dishwasher

Dishwasher is beautiful Stainless Steel Tub that slips into machine in place of the wash tub. Dishes never touched by anything used in clothes washing. Switching Tubs takes only 1½ minutes.

**SINGLE TUB SPIN-DRYING** gets out 25% more water than a wringer. Faster, easier on clothes!

**THOR AGITATOR ACTION** means world's finest washing. Gentle... but gets clothes really clean!

THOR CORPORATION, Chicago 30, Illinois • Thor-Canadian Company, Ltd., Toronto, Canada  
Branches in Chicago, Waukegan, Bloomington, Winnetka, El Monte, Calif., Toronto, Canada, London, England  
\*Pat. 2,917,097.



## Wash by Electricity

At our expense



The Thor Electric Washer and Wringer reduces cost of washing to 2 cents—the time to 1 hour—and does away with all the usual health destroying work of wash-day.

The Thor Electric washes and wrings everything—from delicate laces to heavy blankets—beautifully. Water heated by self attached heater.

Anyone who can insert an electric bulb into its socket can operate the Thor Electric. There is no installing to do—simply put the clothes into the machine—snap on the current—the Thor does all the work. Costs 2 cents a week.

Send today for our 30 Days' Free Trial Offer and booklet. If you have no electric current ask us about our Thor Washer operated by gas or gasoline engine—waterpower or hand.

We Pay the Freight.

**HURLEY MACHINE COMPANY,**  
102 So. Clinton Street, Chicago, Illinois