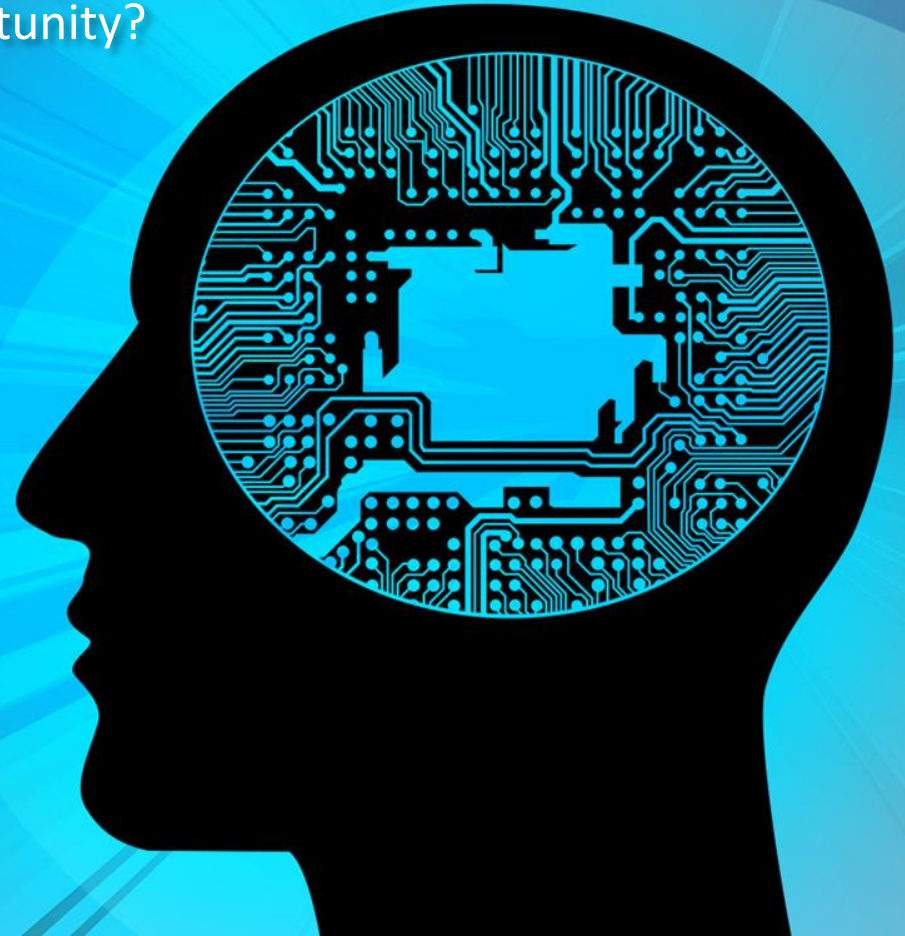


AI & Automation – Disruption or Opportunity?

DeMystifying AI

Dr. Gunjan Mansingh
Department of Computing
U.W.I.

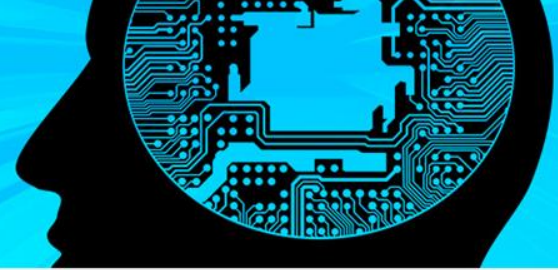


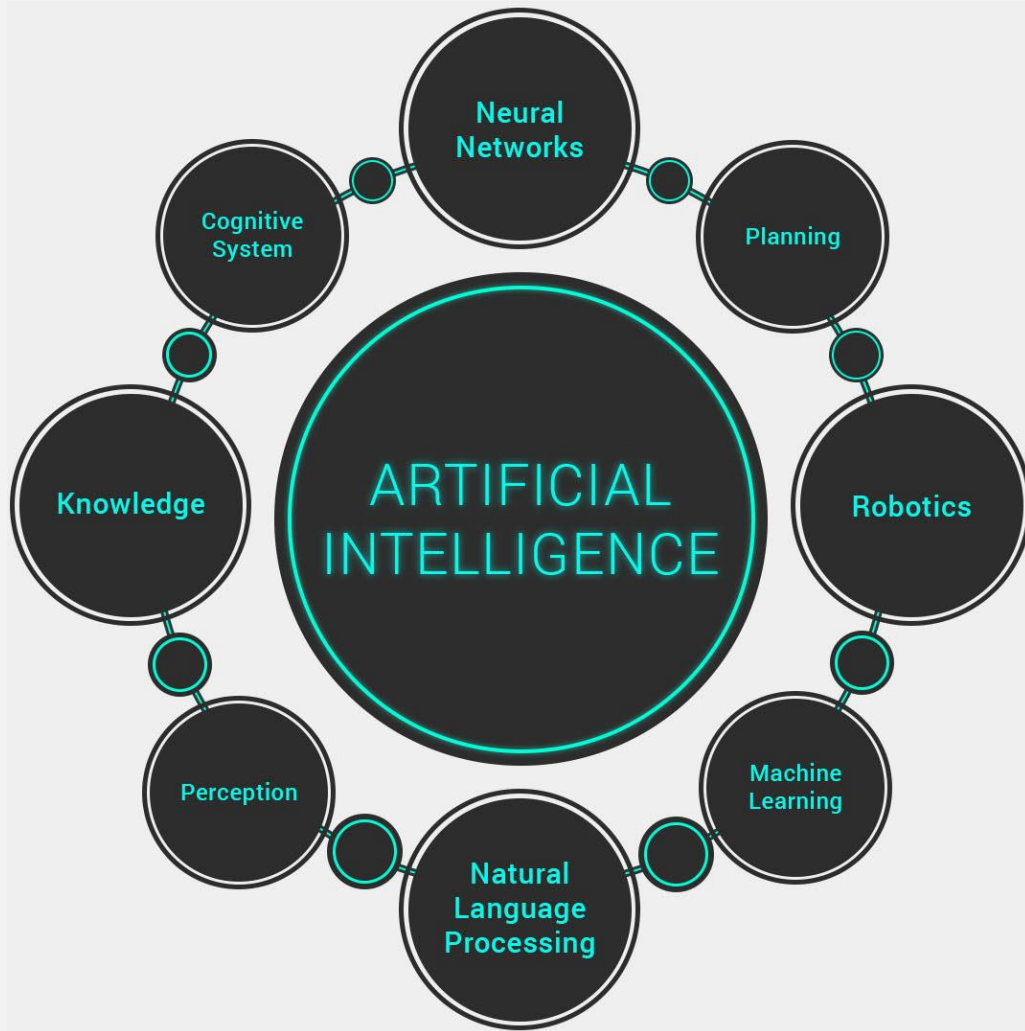


Artificial Intelligence (AI) is the 4th Industrial revolution and it will transform our lives and jobs in next 10 years. This will have a huge impact on the employment landscape in the coming years.

What is AI?

- **John McCarthy** coined the term in 1956
"the science and engineering of making intelligent machines."
- Artificial intelligence (AI) is the simulation of human intelligence processes by machines, especially computer systems.





ARTIFICIAL INTELLIGENCE

A program that can sense, reason,
act, and adapt

MACHINE LEARNING

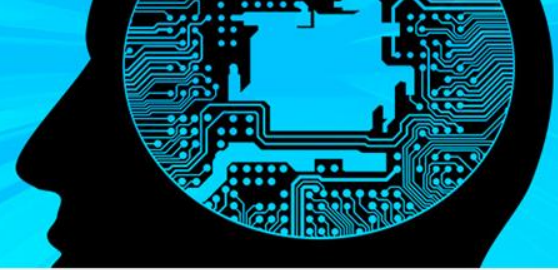
Algorithms whose performance improve
as they are exposed to more data over time

DEEP LEARNING

Subset of machine learning in
which multilayered neural
networks learn from
vast amounts of data



We are drowning in data....



44 ZB

Without analytics Big Data is going to be just a bunch of data

As the amount of *data* increases, the proportion of *information* decreases.

4 ZB

In 2013

By 2020

Data is raw material

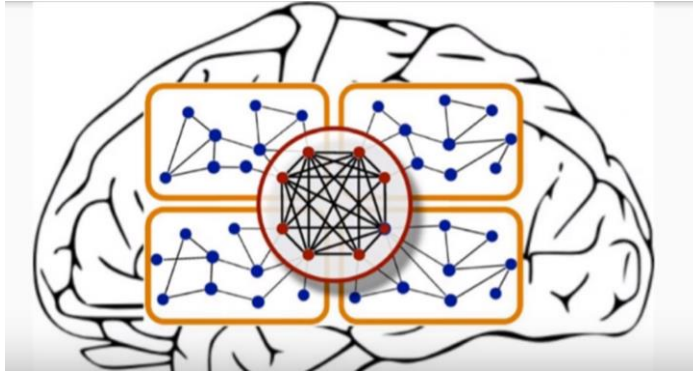


- Andrew Ng from Google X Lab tried to “Identify cats” .
- The experiment used **10 Million** images and the machine taught itself how to identify cats.
- Ng sees AI changing virtually every industry, and any task that takes less than a second of thought will eventually be done by machines.

“free humanity from repetitive mental drudgery”

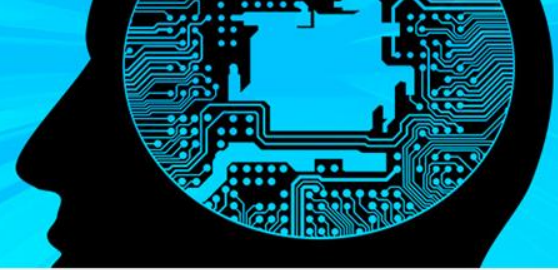
Pattern driven learning

- Humans learn from past **experiences**,
machines learn from past **instances**!



Once there is a pattern the machine can learn it.

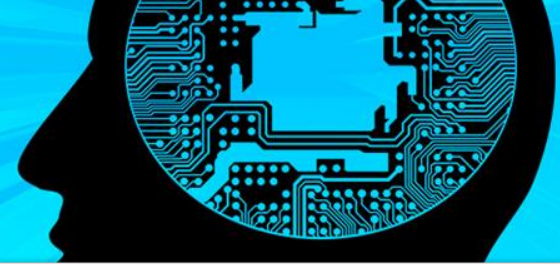
Examples of learning from data



- Discern the wheeze sounds from non-wheeze sounds to assist diagnose respiratory problems.
- Identify which medication will work best on a particular type of patient
- From large collection of unstructured data identify similarities and differences in content e.g. witness report.

Witness Reports

80% of data is Unstructured



“ There was a man wielding a cutlass in the vicinity of the Winchester Business Centre . . He appeared to be taunting a man wearing red , specifically , but the man retreated around a police car that was there . . Eventually , the policeman , presumably an inspector or superintendent , pounced on the man with the cutlass from behind . . Other officers joined in to help restrain the man . . At this time , random people from the crowd stepped in and started hitting the man . . There were many onlookers . . Some of whom , were shouting to the police to shoot the man in his feet . . **No shots were fired , however** . ” .

“ I noticed a mad man was armed with a machete which posed a danger to the society . . He was disarmed by the police team professionally and appropriately ie . . **no shots were fired** . . What is interesting is that the voices heard in the public was asking for the police to shoot the man in the leg . . Another man in plain clothes -LRB- I assume civilian -RRB- also gave the mad mad various hits in the head . ” .

“ There was a mad man on the street . . He was quietly walking around . . He certainly was not wielding a weapon , therefore the police could not take a weapon from him . . **Several shots were fired** into the **air unnecessarily** . . We should call INDECOM . ” .

Pitfalls of AI

The Guardian – April 2017

Artificial intelligence (AI)

AI programs exhibit racial and gender biases, research reveals

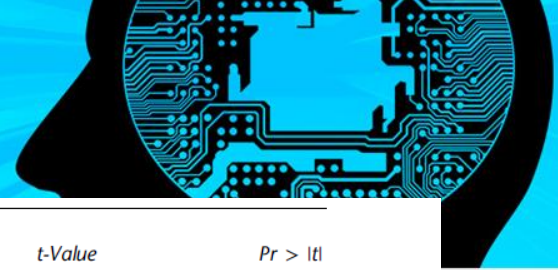
Machine learning algorithms are picking up deeply ingrained race and gender prejudices concealed within the patterns of language use, scientists say



AI has the potential to reinforce existing biases because, unlike humans, algorithms are unequipped to consciously counteract learned biases.

Many models - ML Algorithms

e.g. Quality of Life of sickle cell patients



Regression Parameter		DF	Estimate	Standard Error	t-Value	Pr > t
Intercept		1	99.1398	4.0755	24.33	<.0001
Bone 0		1	4.9042	1.4069	3.49	0.0007
Dep_Score		1	-0.2465	0.0853	-2.89	0.0044
Clinic_visits	1	1	14.8514	4.7905	3.10	0.0023
Clinic_visits	2	1	3.1882	2.4451	1.30	0.1944
Clinic_visits	3	1	-8.4859	3.4137	-2.49	0.0141
Clinic_visits	4	1	-2.0608	5.5187	-0.37	0.7094
LONELY_score		1	-0.5816	0.1782	-3.26	0.0014
Surgery 0		1	3.0465	0.9721	3.13	0.0021

Decision Tree:

IF CLINIC_VISITS \in {3, 4, 5}
THEN QOL : {AVE = 79.8658; SD = 5.77232}
IF LONELY_SCORE < 21.27 AND CLINIC_VISITS \in {1, 2}
THEN QOL : {AVE = 99.2433; SD = 9.15824}
IF 21.27 <= LONELY_SCORE AND CLINIC_VISITS \in {1, 2}
THEN QOL : {AVE = 87.9515; SD = 13.3212}

Regression Splines Model

QOL = 98.6731
- 1.33998*max(0, LONELY_SCORE - 18)
- 0.368776*max(0, DEP_SCORE - 0)
+ 5.01116*(HOSPITAL_ADMISSIONS = 1)
+ 0.0504462*(EDUCATIONin(2, 1))
*max(0, 21 - LONELY_SCORE)
*max(0, DEP_SCORE - 0)
- 0.112928*(HAS_CHILDREN \$ = Y)
*max(0, 28.9007 - AGE)
*max(0, DEP_SCORE - 0)

DECISION
TREES

REGRESSION

REGRESSION
SPLINES

AI - Challenges



Are planes getting more complex or simple

- *“The recent crashes show the limitations of artificial intelligence and it should convince Elon Musk and Tesla to slow down efforts to push down self-driving cars,”* an airline expert, highlighting that the latest crashes occurred due to software problems, not mechanical ones.

How we respond to this could be our defining moment as a species?

Optimization

Creativity or Strategy



Repetitive

Routine

Optimizing

Complex

Creative

Tele-sales

Truck driver

Radiologist

CEO

Columnist

Dishwasher

Hematologist

Reporter

M&A Expert

Scientist

Customer Support

Security Guards

Research Analyst

Economist

Artist

Optimization

Creativity or Strategy



Repetitive

Routine

Optimizing

Complex

Creative

AI
Telemarketing
Sales
Customer support

AI
Travel driver
Human logistics
Security guards

AI
Radiologist
Reporter
Research analyst

CEO
M&A Expert
Economist

Columnist
Scientist
Artist

5

years

10

years

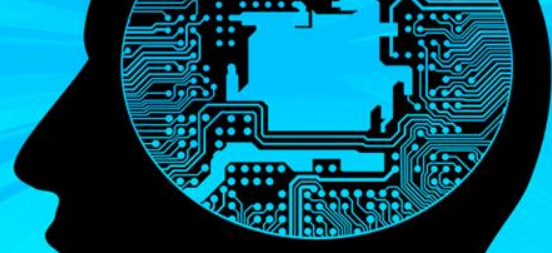
15

years

SAFE

SAFE

AI job opportunities



Operator 10:10 AM 100%

Heather Montgomery
Flora Grubb Gardens

Can you find me a colorful plant that will do well in a room that gets a lot of direct sunlight 🌿🌱



Hi Julie! The Bird of Paradise plant is one of my favorites and does really well in direct light. It also has a beautiful array of colors. Let me know what you think.



FLORA GRUBB
Bird of Paradise
\$45.00

I'LL TAKE IT

Operator 10:10 AM 100%

Discover



Charles Ray
Sit Downtown
1500 Abbot Kinney, LA 90291



3



REQUEST

ZENITH

The Senator Karma Tub Chair
\$388.00

Operator 10:10 AM 100%

Heather Montgomery
Flora Grubb Gardens

Can you find me a colorful plant that will do well in a room that gets a lot of direct sunlight 🌿🌱



Hi Julie! The Bird of Paradise plant is one of my favorites and does really well in direct light. It also has a beautiful array of colors. Let me know what you think.



FLORA GRUBB
Bird of Paradise
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I'LL TAKE IT

Operator 10:10 AM 100%

Discover



Charles Ray
Sit Downtown
1500 Abbot Kinney, LA 90291



3



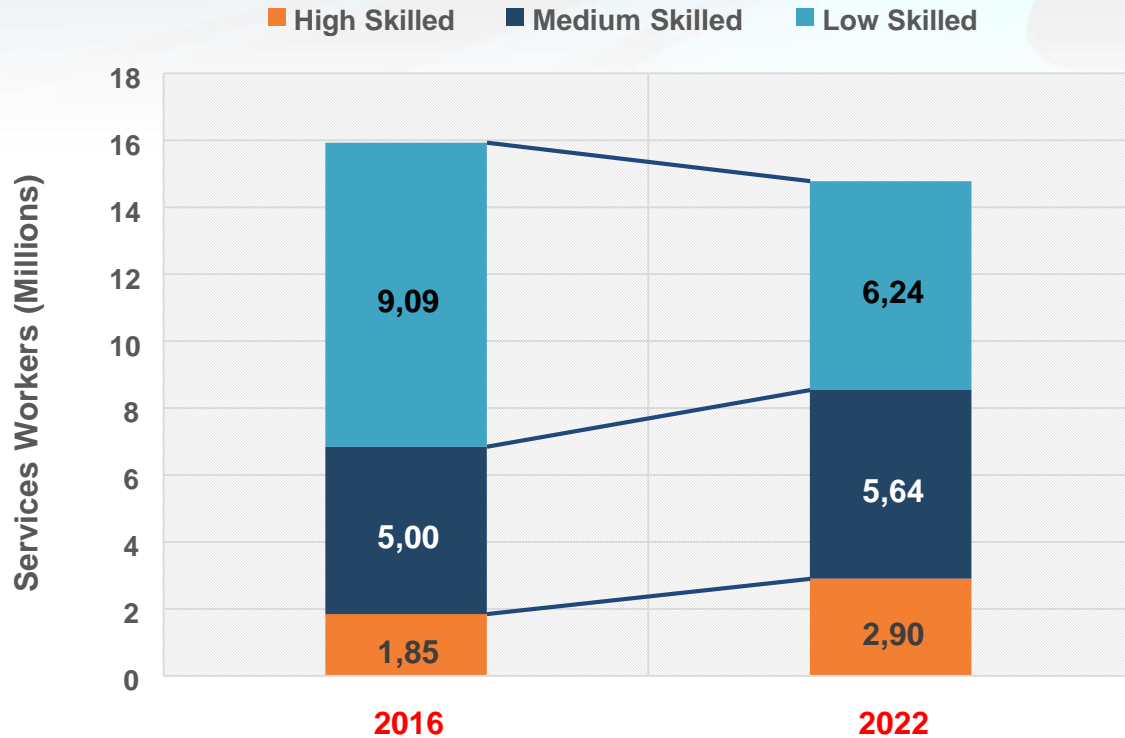
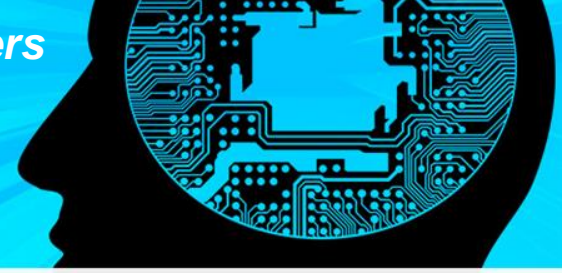
REQUEST

ZENITH

The Senator Karma Tub Chair
\$388.00

Total Impact of Automation and AI on IT/BPO Services Workers across the Global Services Industry

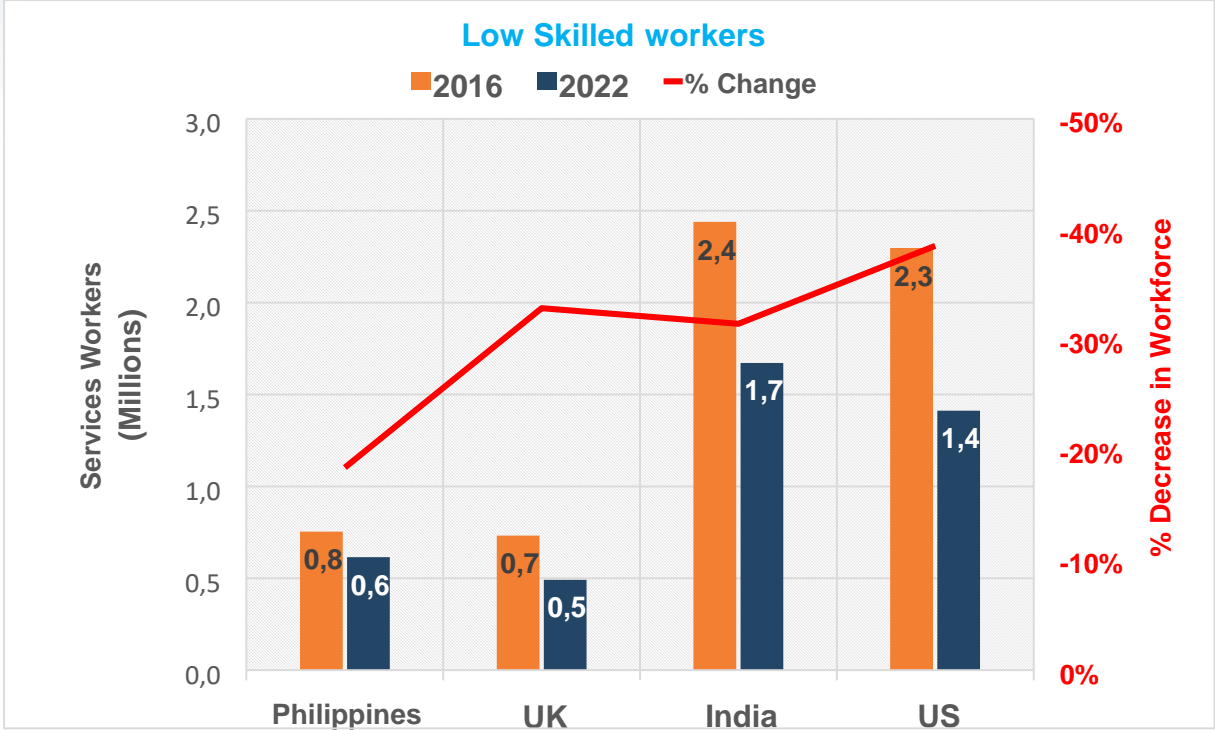
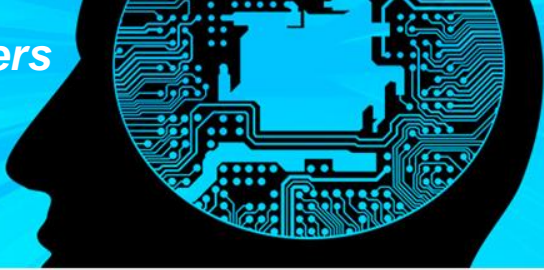
(Source HfS Research)



Total Impact of Automation and AI on IT/BPO Services Workers

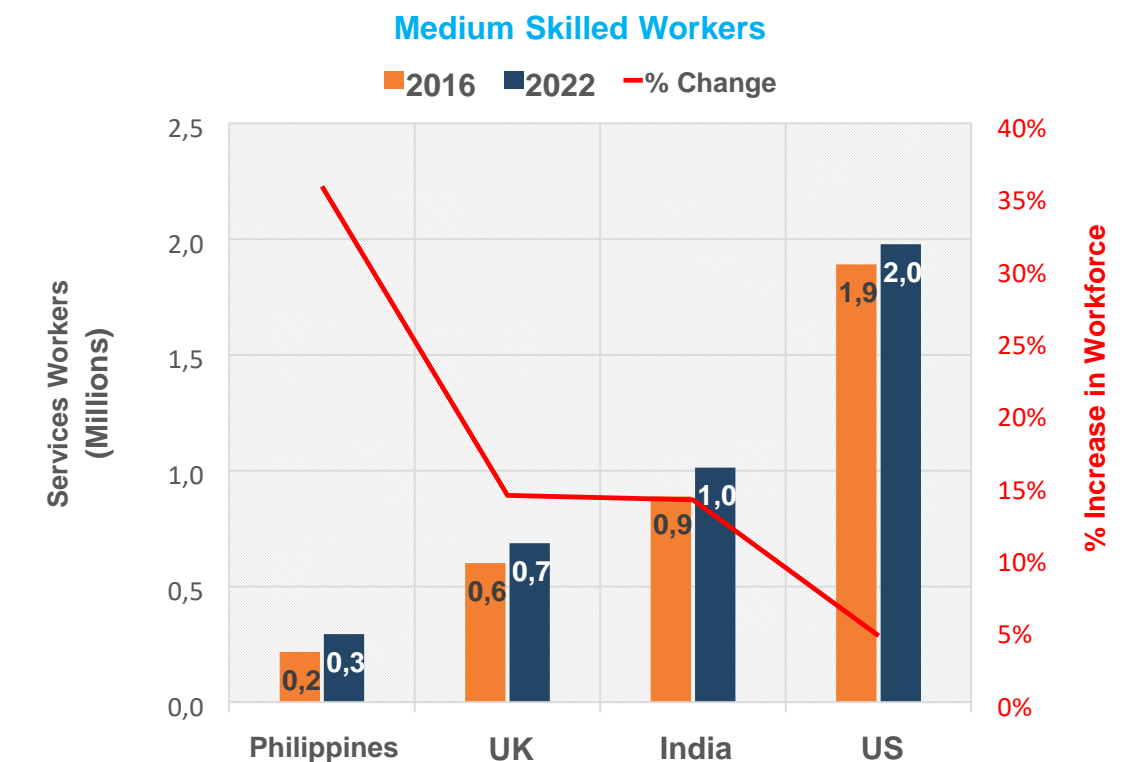
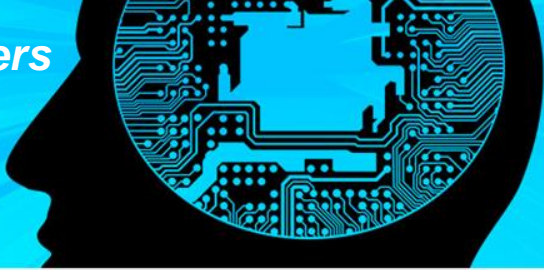
By major country: likely scenario, low-skilled workers

(Source HfS)



Total Impact of Automation and AI on IT/BPO Services Workers

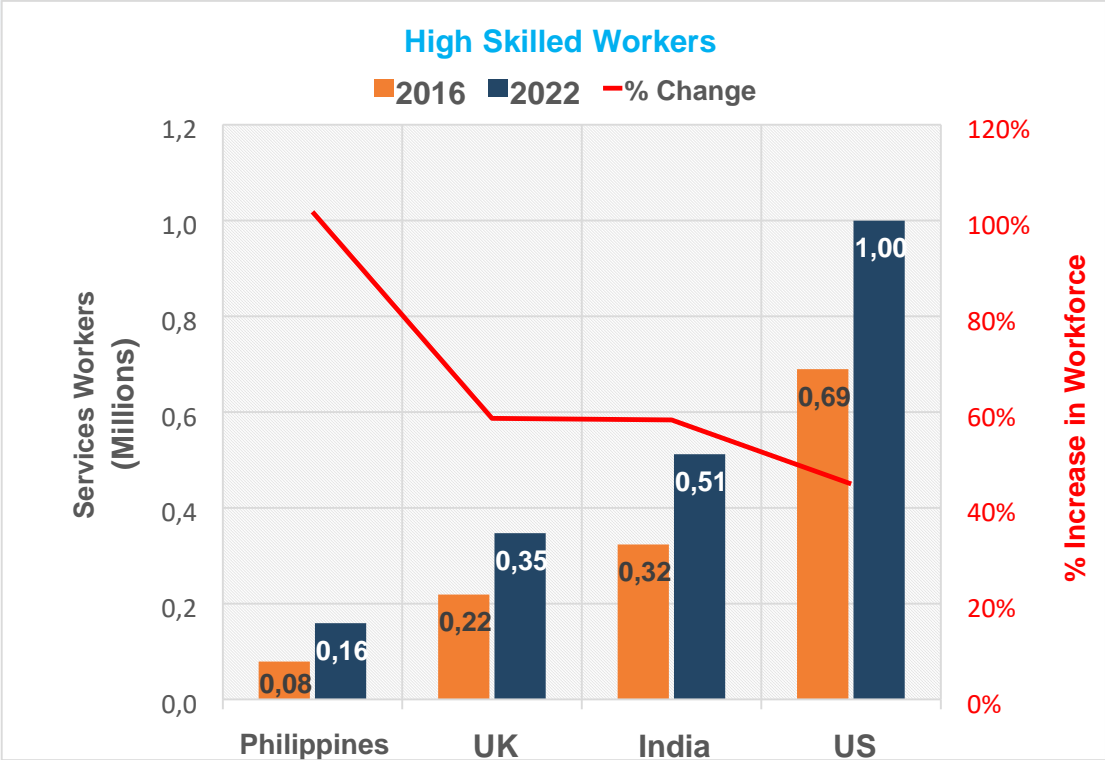
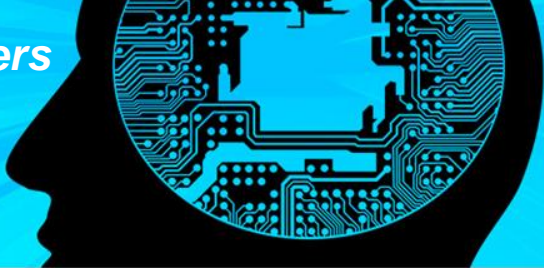
By major country: likely scenario, medium-skilled workers
(Source HfS)



Total Impact of Automation and AI on IT/BPO Services Workers

By major country: likely scenario, high-skilled workers

(Source HfS)

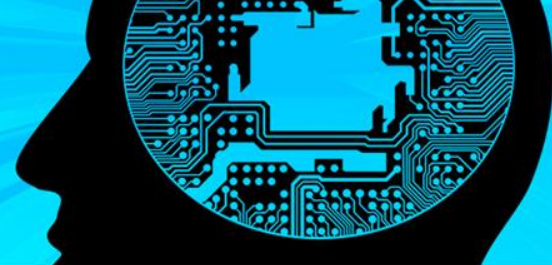




Way forward.....

Societies can choose to transform the coming labour market disruptions into an opportunity rather than a pitfall.

What have we been doing at UWI?



Undergraduate

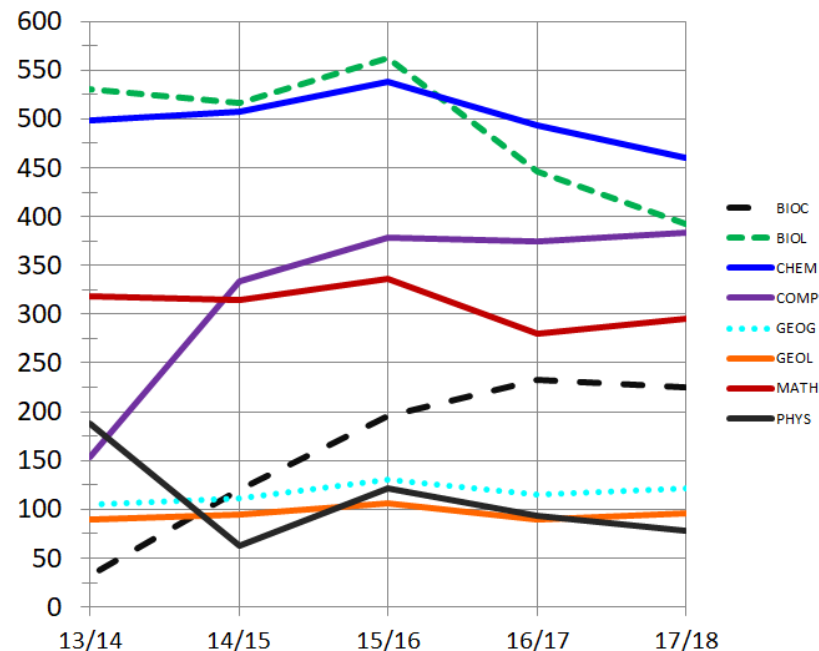
- Computer Science
- Software Engineering (Mona, China)
- Information Technology (Mona and WJC)

Postgraduate

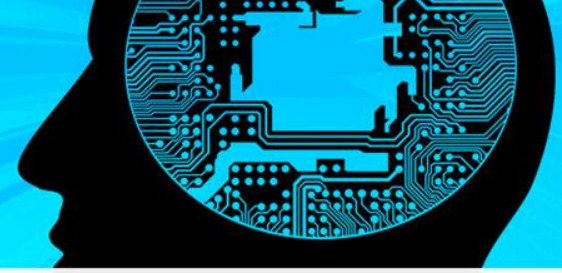
- MSc. Computer Science
- MSc. Information Systems
- Diploma Information Technology

New Postgraduate Programmes in Applied Data Sciences

- Certificates
- Diploma
- Masters

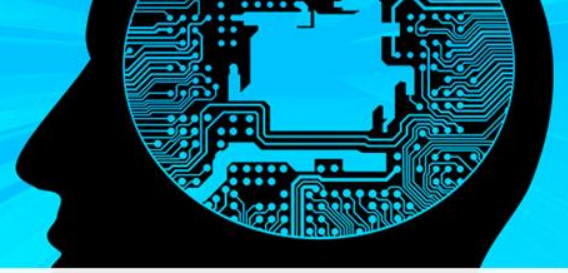


AI Research in the Department



- Optimizing algorithms for domain specific knowledge extraction.
- In security use big data for botnet detection.
- Analyzing big data for Image processing.
- Analyzing big natural language data e.g. witness reports
- Using BI and ML algorithms on various datasets in domains such as agriculture, cricket team selection, financial data, medicine,
- Improving reinforced learning in UAV (drones).
- Learning analytics - using student data from multiple sources to determine the factors that lead to better performance.

Food for thought



Can something be artificial and intelligent?