BASAVESHWAR ENGINEERING COLLEGE (AUTONOMOUS)

[Government Aided Institution and Permanently Affiliated to Visvesvaraya Technological University, Belagavi]

Bagalkot, Karnataka

Career in Artificial Intelligence and Machine Learning (AI & ML)

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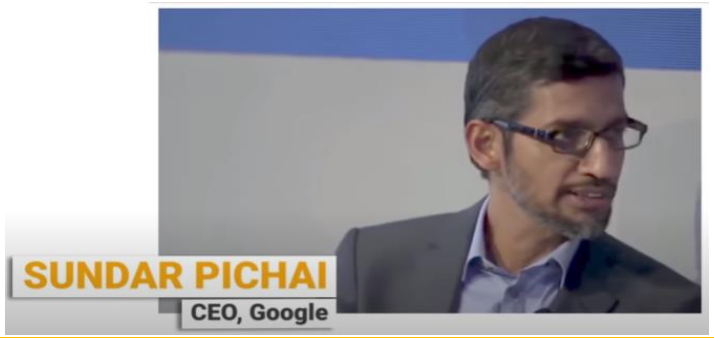
I . Introduction to AI

- AI is a branch of Science and assist machines to find solutions to complex problems in a more human-like fashion.
- Artificial Intelligence is the future of Next Generation Technology.
- It encompasses variety of disciplines like Medical, Finance, Engineering.



AI is the main tool behind new-age innovation and discoveries like driverless cars or disease detecting algorithm

Generalized AI is worth thinking about because it stretches our imaginations and it gets us to think about our core values and issues of choice

Artificial Intelligence will be ‘vastly smarter’ than any human and would overtake us by 2025.

We are now solving problems with machine learning and AI that were…in the realm of science fiction for the last several decades

Artificial Intelligence and Machine Learning

Artificial Intelligence

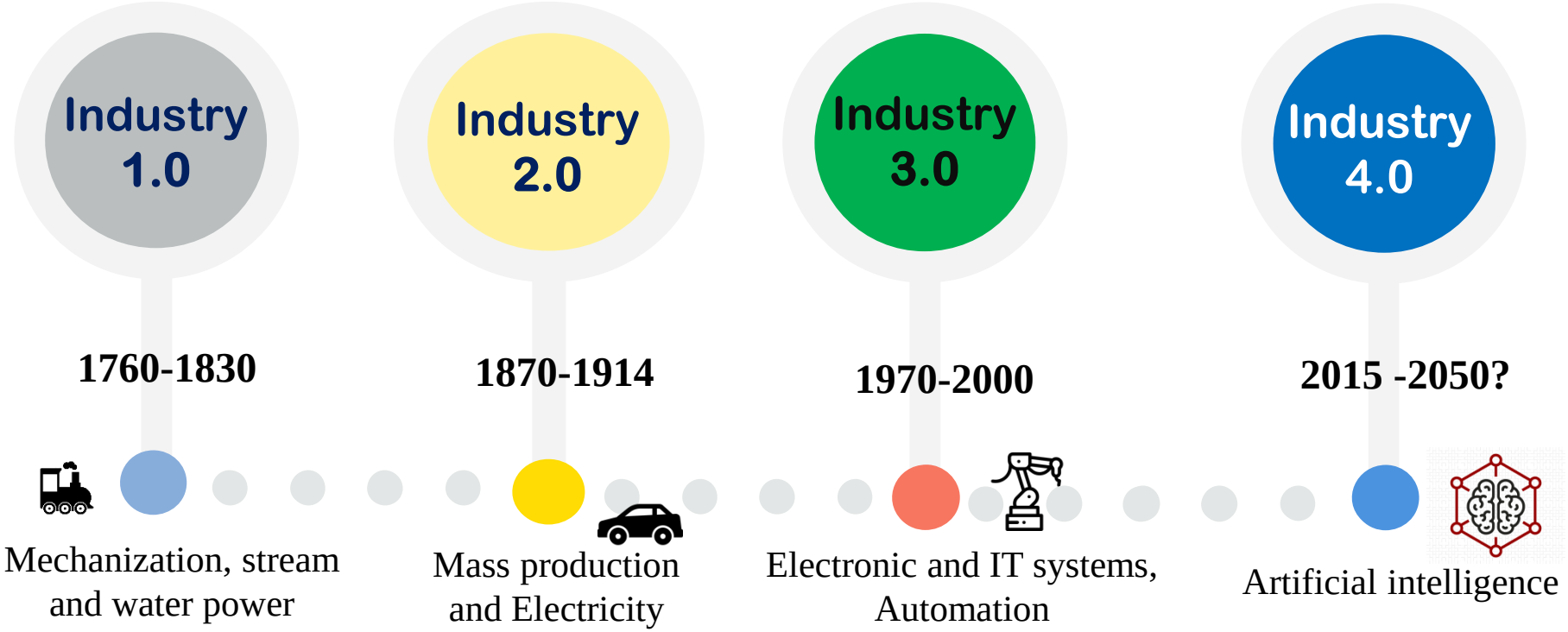
AI is trained final output machine which mimic like human brain
Ex: Amazon Alexa

Machine Learning

ML is a subset of AI. It is a technique to achieve AI. Ex: Spam Detection

Artificial Intelligence and Machine Learning in Industry 4.0

Breakdowns of industrial development and the great changes in related categories



Applications of AI & ML

1. Automated Customer Support

- Online shopping experience has been greatly enhanced by chatbots because of the following reasons:
  - They increase user retention by sending reminders and notifications
  - They offer instant answers compared to human assistants, thus reducing response time
  - Chatbots provide upselling opportunities through personalized approach

2. Personalized Shopping Experience

- Implementation of artificial intelligence makes it possible for online stores to use the smallest piece of data about every followed link or hover to personalize your experience on a deeper level.

- This personalization results into timely alerts, messages, visuals that should be particularly interesting to you, and dynamic content that modifies according to users' demand and supply.

3. Healthcare

- AI-enabled workflow assistants are aiding doctors free up their schedules, reducing time and cost by streamlining processes and opening up new avenues for the industry.

- In addition, AI-powered technology helps pathologists in analyzing tissue samples and thus, in turn, making more accurate diagnosis.

4. Finance

- Automated advisors powered by AI, are capable of predicting the best portfolio or stock based on preferences by scanning the market data.
- Actionable reports based on relevant financial data is also being generated by scanning millions of key data points, thus saving analysts numerous hours of work.

5. Smart Cars and Drones

- With autonomous vehicles running on the roads and autonomous drones delivering the shipments, a significant amount of transportation and service related issues can be resolved faster and more effectively.

6. Travel and Navigation

- With **AI**-enabled mapping, it scans road information and utilizes algorithms to identify the optimal route to take, be it in a bike, car, bus, train, or on foot.

7. Social media

- Face book uses advanced machine learning to do everything from serving content to you and to recognize your face in photos to target users with advertising.
- Instagram (owned by Facebook) uses AI to identify visuals.
- LinkedIn uses AI to offer job recommendations, suggest people you might like to connect with, and serving you specific posts in your feed.

8. Smart Home Devices

- The connected devices of smart homes provide the data and the AI learns from that data to perform certain tasks without human intervention.

9. Creative Arts

- **AI**-powered technologies can help musicians create new themes.

10. Security and Surveillance

- AI is making possible for humans to constantly monitor multiple channels with feeds coming in from a huge number of cameras at the same time.

Sophia is a first AI humanoid robot developed by Hong Kong-based company Hanson Robotics

India welcomes Robot Sophia for the first-ever interactive session in Kolkata

Sophia introduced herself and spoke to the students appearing for their exams.

YouTube Link :
https://www.youtube.com/watch?v=WATLfjRHySU

II. Career in AI & ML

- There is a scope in developing the machines in game playing, Speech recognition, language detection machine, computer vision, expert systems, robotics, and many more

- As per International Data Corporation (IDC) Worldwide AI Guide, spending on AI systems will accelerate over the next several years as organizations deploy AI as part of their digital transformation efforts & to remain competitive in the digital economy

- Global spending on AI is forecast to double over the next 4 years, $50.1 billion in 2020 to more than $110 billion in 2024.

Avenues

- Hospital and Medicine
- Game Playing
- Speech Recognition
- Understanding Natural Language
- Computer Vision
- Cyber Security
- Face Recognition
- Transport
- Marketing & Advertising

Avenues

India

- AI covers many areas like medical diagnosis, stock trading, robot control, scientific discovery.
- If you have the B.E / M. Tech degree in AI and ML, you have the job opportunities in ISRO.
- You also have option to go in various top level microchip manufacturer companies like Intel.
- Indian institute of Biology offers research in AI and robotics
- Some AI job includes machine learning engineer, data scientist, business intelligence developer, research Scientists, and AI engineer.

AI

Abroad

- Intel offers job for AI and Robotics specialist.
- NASA is the best place to get job in AI in space science.
- US tech companies are prepared to spend over $1 billion by 2020 in the process of poaching AI talent from wherever they can get it.
- UK's demand for AI skills has been growing much faster than that in the US, Canada and Australia.

World's biggest companies heavily relying on AI & ML

amazon web services
IBM Cloud
phrasee
salesforce
Alibaba Cloud
sift
Microsoft Azure
ANDURIL
Google Cloud Platform
people.ai
nauto
certis
Applied Cloud
SIEMENS
DATAVISOR
AUTOMATION ANYWHERE
Rev
AEYE
AlphaSense
VERKADA
TEMPUS
SenSat
Suki
freenome
intel
NVIDIA
Orbital Insight
IRIS.AI

zebra
MEDICAL.VISION

clarifai

pymetrics

tamr

flatiron

defined
crowd

Tencent 腾讯

xnor.ai

next IT

ViSENZE
Simplifying the Visual Web

bigpanda

bossanova

DEEP 6 AI

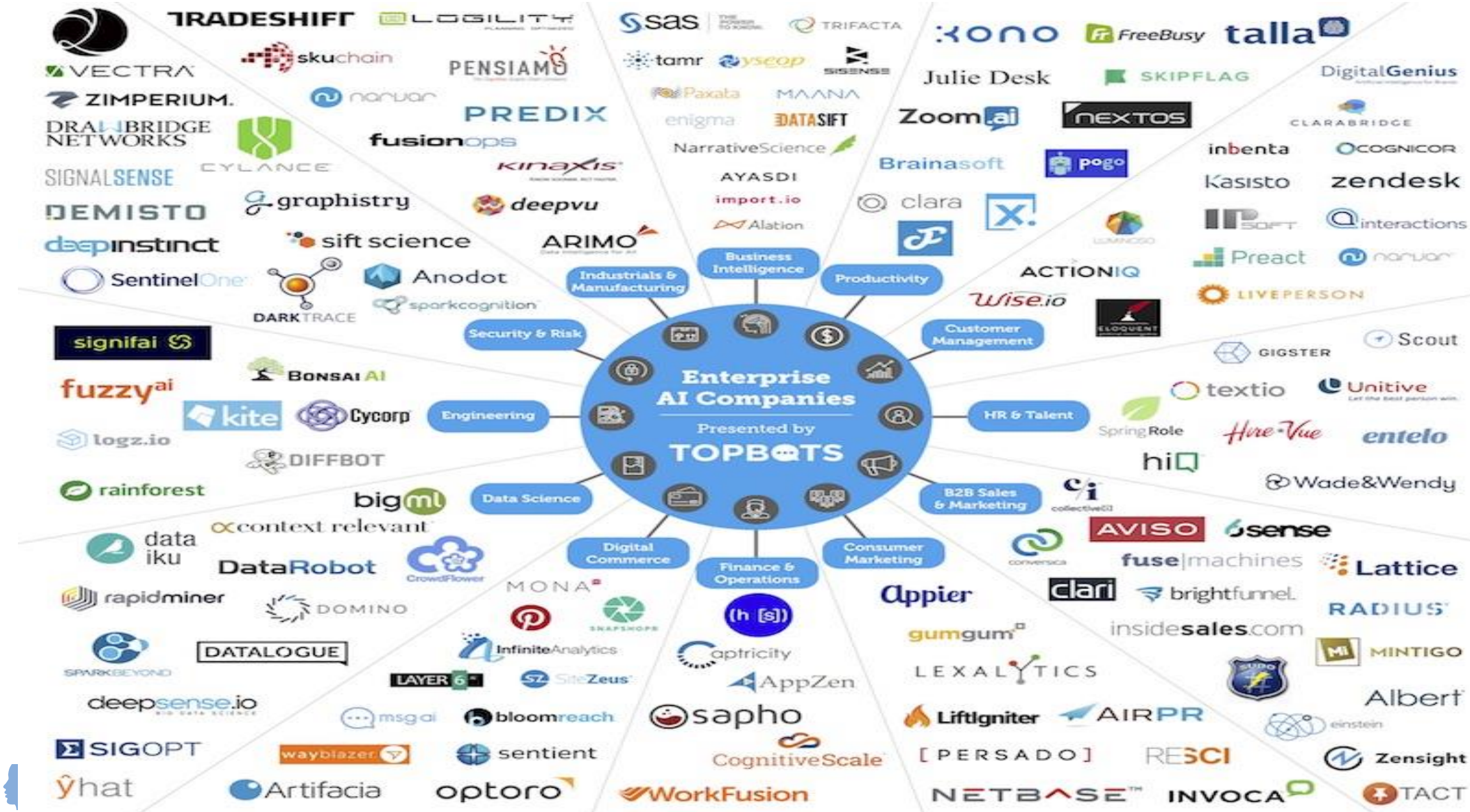
pony.ai

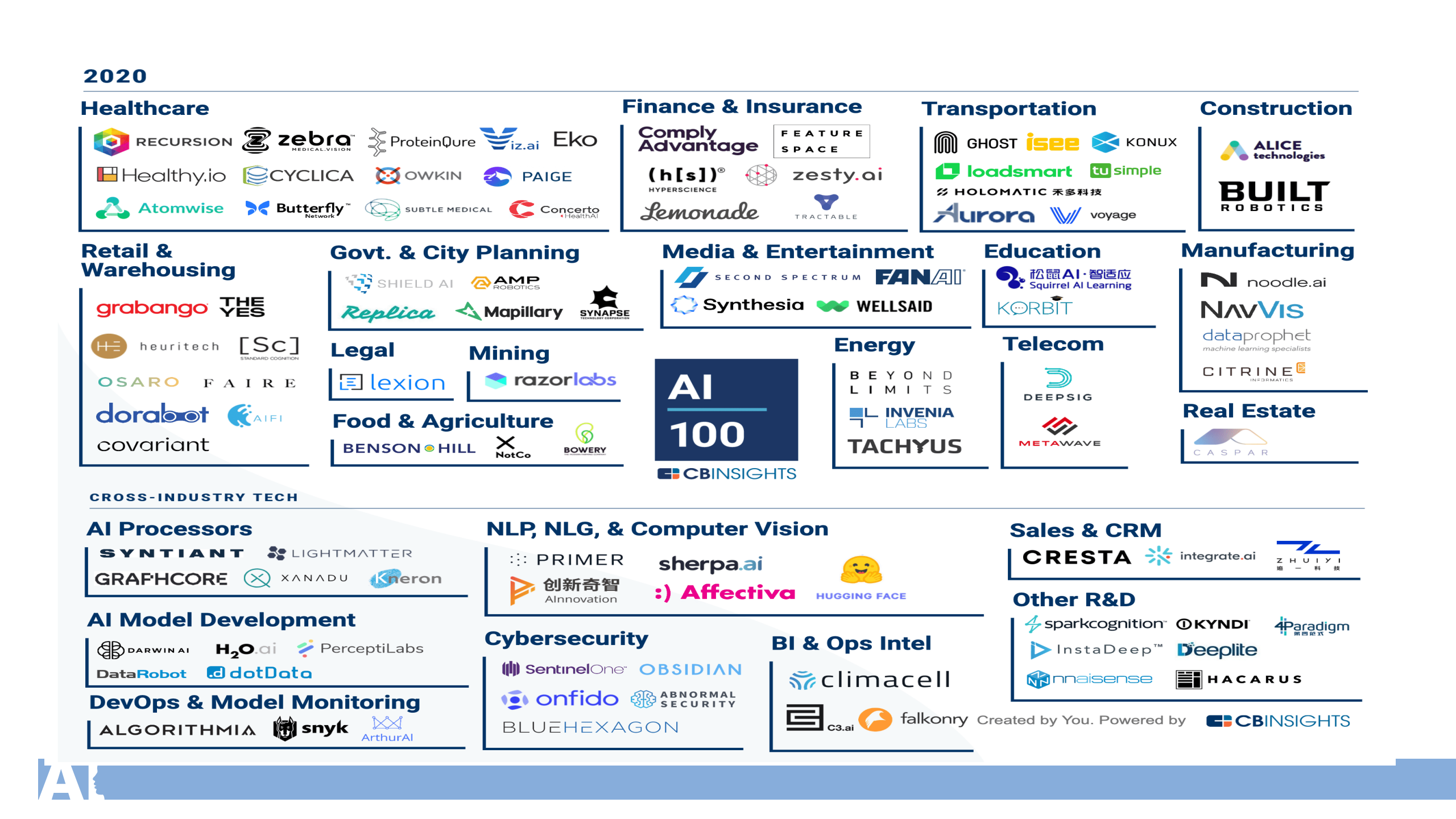
商汤
sensetime

ELEMENT AI

C3.ai

directly

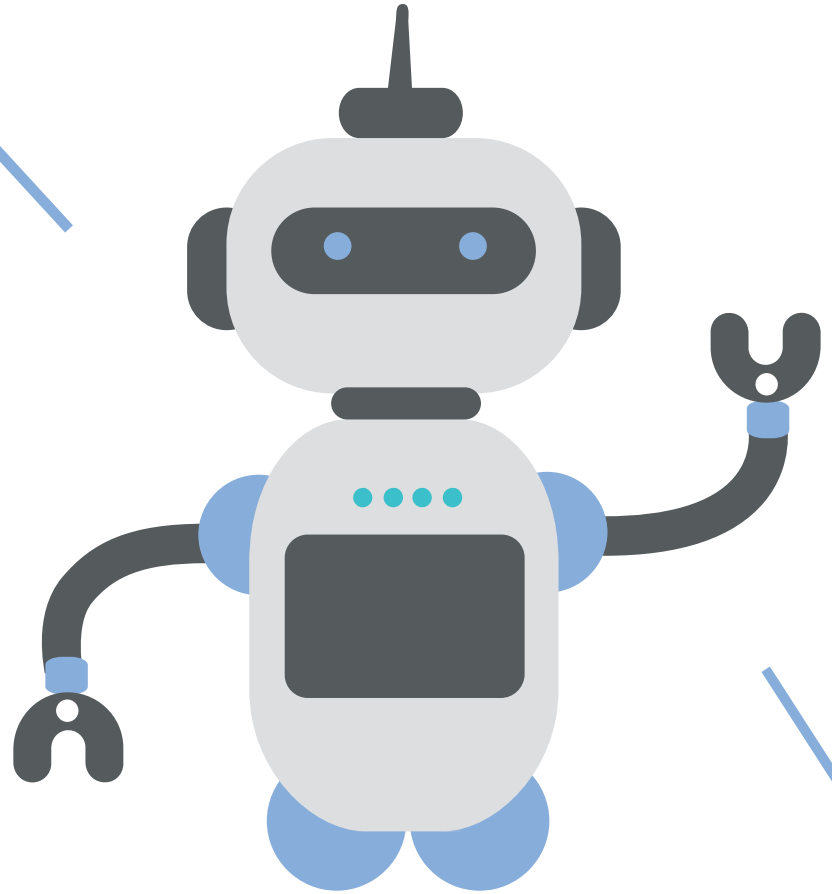

Enterprise AI Companies
Presented by
TOPBOTS
Business Intelligence
Productivity
Customer Management
HR & Talent
B2B Sales & Marketing
Consumer Marketing
Finance & Operations
Digital Commerce
Data Science
Engineering
Security & Risk
Industrials & Manufacturing
TRADESHIFT
LOGILITY
VECTRA
skuchain
PENSIAMO
ZIMPERIUM.
narvar
PREDIX
DRAWBRIDGE NETWORKS
fusionops
CYLANCE
SIGNALSENSE
kinaxis
DEMISTO
graphistry
deepvu
deepinstinct
sift science
ARIMO
SentinelOne
DARKTRACE
Anodot
sparkcognition
signifai
BONSAI AI
fuzzyai
kite
Cycorp
logz.io
DIFFBOT
rainforest
bigml
context relevant
data iku
DataRobot
CrowdFlower
rapidminer
DOMINO
SPARKBEYOND
DATALOGUE
deepsense.io
SIGOPT
yhat
MONA
SNAPSHOPS
InfiniteAnalytics
LAYER 6
SiteZeus
msg.ai
bloomreach
wayblazer
sentient
Artifacia
optoro
sas
TRIFACTA
tamr
yseop
SISENSE
Paxata
MAANA
enigma
DATASIFT
NarrativeScience
AYASDI
import.io
Alation
Julie Desk
SKIPFLAG
Zoom.ai
NEXTOS
Brainasoft
pogo
clara
ACTIONIQ
Wise.io
ELOQUENT
DigitalGenius
CLARABRIDGE
inbenta
COGNICOR
Kasisto
zendesk
interactions
Preact
narvar
LIVEPERSON
GIGSTER
Scout
textio
Unitive
SpringRole
Hire-Vue
entelo
hiQ
Wade&Wendy
collectiveCI
AVISO
6sense
conversica
fuse|machines
Lattice
clari
brightfunnel
RADIUS
insidesales.com
MINTIGO
Appier
gumgum
LEXALYTICS
Albert
LiftIgniter
AIRPR
einstein
[PERSADO]
RESCI
Zensight
NETBASE
INVOCA
TACT
(h [s])
aptricity
AppZen
sapho
CognitiveScale
WorkFusion


2020
Healthcare
RECURSION
zebra MEDICAL VISION
ProteinQure
iz.ai
Eko
Healthy.io
CYCLICA
OWKIN
PAIGE
Atomwise
Butterfly Network
SUBTLE MEDICAL
Concerto HealthAI
Finance & Insurance
Comply Advantage
FEATURE SPACE
(h[s]) HYPERSCIENCE
zesty.ai
Lemonade
TRACTABLE
Transportation
GHOST
isee
KONUX
loadsmart
tusimple
HOLOMATIC 禾多科技
Aurora
voyage
Construction
ALICE technologies
BUILT ROBOTICS
Retail & Warehousing
grabango
THE YES
heuritech
[Sc] STANDARD COGNITION
OSARO
FAIRE
dorabot
AIFI
covariant
Govt. & City Planning
SHIELD AI
AMP ROBOTICS
Replica
Mapillary
SYNAPSE TECHNOLOGY CORPORATION
Legal
lexion
Mining
razorlabs
Food & Agriculture
BENSON HILL
NotCo
BOWERY
Media & Entertainment
SECOND SPECTRUM
FANAI
Synthesia
WELLSAID
AI 100
CBINSIGHTS
Education
松鼠AI·智适应 Squirrel AI Learning
KORBIT
Energy
BEYOND LIMITS
INVENIA LABS
TACHYUS
Telecom
DEEPSIG
METAWAVE
Manufacturing
noodle.ai
NAVVIS
dataprophet machine learning specialists
CITRINE INFORMATICS
Real Estate
CASPAR
CROSS-INDUSTRY TECH
AI Processors
SYNTIANT
LIGHTMATTER
GRAPHCORE
XANADU
Kneron
AI Model Development
DARWIN AI
H2O.ai
PerceptiLabs
DataRobot
dotData
DevOps & Model Monitoring
ALGORITHMIA
snyk
ArthurAI
NLP, NLG, & Computer Vision
PRIMER
sherpa.ai
创新奇智 AInnovation
Affectiva
HUGGING FACE
Cybersecurity
SentinelOne
OBSIDIAN
onfido
ABNORMAL SECURITY
BLUEHEXAGON
BI & Ops Intel
climacell
C3.ai
falkonry
Sales & CRM
CRESTA
integrate.ai
ZHUIYI 追一科技
Other R&D
sparkcognition
KYNDI
4Paradigm 第四范式
InstaDeep™
Deeplite
nnaisense
HACARUS
Created by You. Powered by
CBINSIGHTS

III. AI & ML to drive growth of Start ups

- Startups ecosystem, has been nourished with the advent of technology, and has given rise to more evolved business processes.

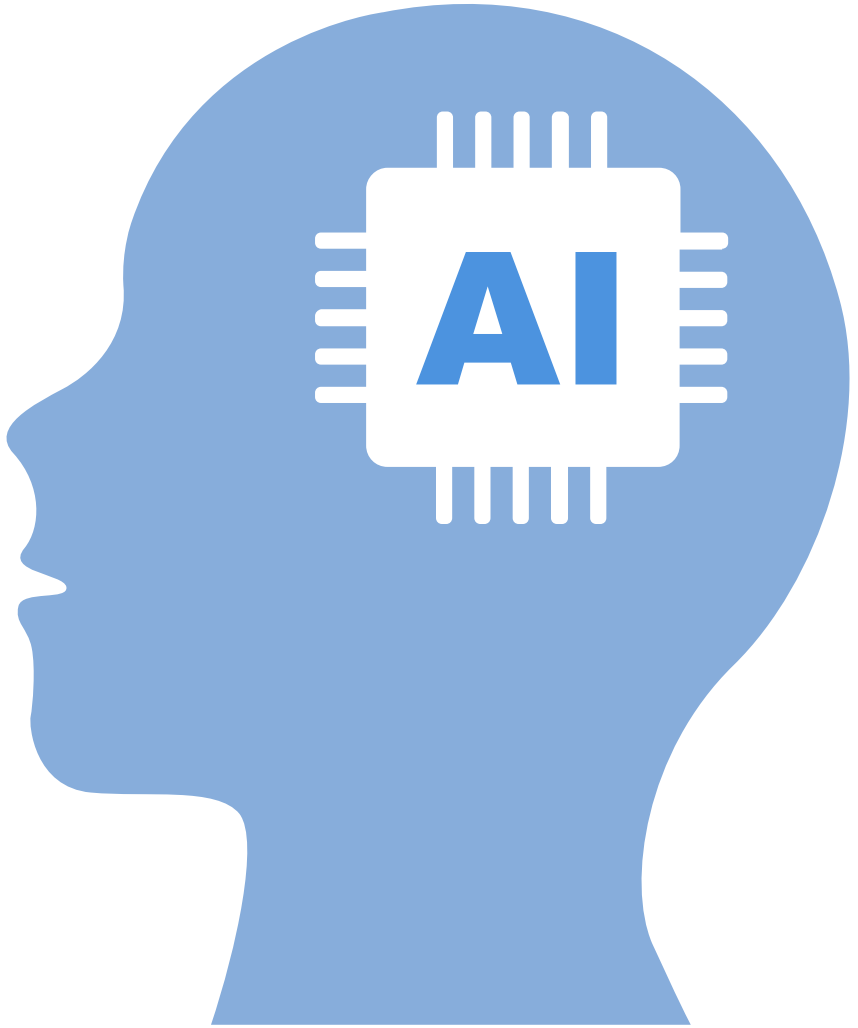
- These days Logistics, accounts, marketing and team performance & HR have all been supported by AI technology.



- With the rising technologies like AI, IoT and ML, its interesting to watch the changing face of Indian SMEs and startups.

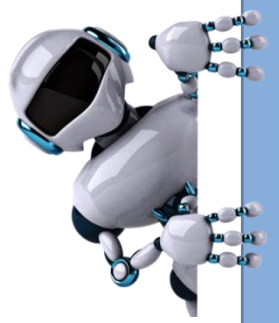
IV. Skills for success in AI & ML

- Working with AI requires an analytical thought process and the ability to solve problems with cost effective and efficient solutions.
- Professionals need technical skills to design, maintain and repair technology and software programs.
- Those interested in becoming AI professionals need a education qualification based on foundations of maths, technology, logic and engineering prospective.
- Cognitive Science skills.



Draft Scheme of Syllabus (2020-21)

1st Semester



- Engineering Mathematics – I
- Engineering Physics
- Elements of Mechanical Engineering
- Basic Electrical Engineering
- Programming with C
- Constitution of India
- Engineering Physics Laboratory
- C Programming Laboratory

2nd Semester

- Engineering Mathematics – II
- Engineering Chemistry
- Basic Electronics
- Engineering Mechanics
- Environmental Studies
- Computer Aided Engineering Graphics
- Engineering Chemistry Laboratory
- Basic Engineering Laboratory
- English for Engineers

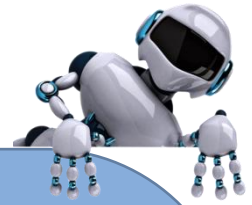
3rd Semester

- Computational Methods in Computer Science
- Data Structures and Applications
- Digital Electronics and Microcontroller
- Computer Organization
- Discrete Mathematical Structures
- Introduction to Drones and its Applications
- Digital Electronics and Microcontroller Laboratory
- Data Structures Laboratory
- OOPS with Java Laboratory
- Environmental Studies
- Bridge Course Maths –I

4th Semester

- Statistics and Probability Theory
- Design and Analysis of Algorithms
- Operating Systems
- Introduction to AI and ML
- Software Engineering Approach using Agile Technology
- Computer Networks
- Design and Analysis of Algorithms Laboratory
- Project Based Learning
- Fundamentals of Quantitative Aptitude and Soft Skills
- Bridge Course Maths –II
- Constitution of India
- Vyavaharika Kannada (Kannada for communication) /Aadalitha Kannada (Kannada for Administration)

Draft Scheme of Syllabus (2020-21)



5th Semester

- Management and Entrepreneurship for IT Industry
- Automata Languages and Artificial Intelligence
- Professional Elective - I
- Machine Learning with Python
- Open Elective - I
- Database Management Systems
- AI and Machine Learning with Python Laboratory
- Database Laboratory
- Fundamentals of Quantitative Aptitude and Soft Skills

Professional Elective-I

1. Introduction to Data Science
2. Statistical Inference / Stochastic Processes
3. Principles of Cryptography

Open Elective-I

1. Data Science
2. Machine Learning using Python
3. Embedded Programmimg

6th Semester

- Advanced AI and ML techniques
- Startup and IPR
- Web Applications using Machine Learning Techniques
- Professional Elective –II
- Open Elective – II
- Natural Language and Image Processing Laboratory
- Web Applications Laboratory
- Mini Project

Professional Elective-II

1. Andriod Application Development
2. Data Mining and Predictive Modeling
3. Digital Image Processing

Open Elective-II

1. Applications of AI in Industry
2. Software Testing Quality Assurance
3. Internet of Things (IoT)

7th Semester

- Robotic Process Automation
- Internet of Things with Machine Learning
- Professional Elective – III
- Professional Elective – IV
- Professional Elective – V
- Open Elective – III
- Robotics Automation Laboratory
- Internet of Things Laboratory
- Project Phase – I
- Internship

Professional Elective-V

1. Neural Networks and Deep Learning
2. Cognitive Analysis
3. Bio Informatics

Professional Elective-III

1. Image Processing using Python
2. Applications of MATLAB

Professional Elective-IV

1. Reinforcement Learning
2. Cloud Computing
3. Robot Kinematics and Dynamics

Open Elective-III

1. Research Paper Writing
2. Advanced Embedded Programming
3. AI Speech Processing

8th Semester

- Professional Elective – VI
- Professional Elective – VII
- Project Phase – II
- Seminar
- Moocs /Swayam (Online Course)

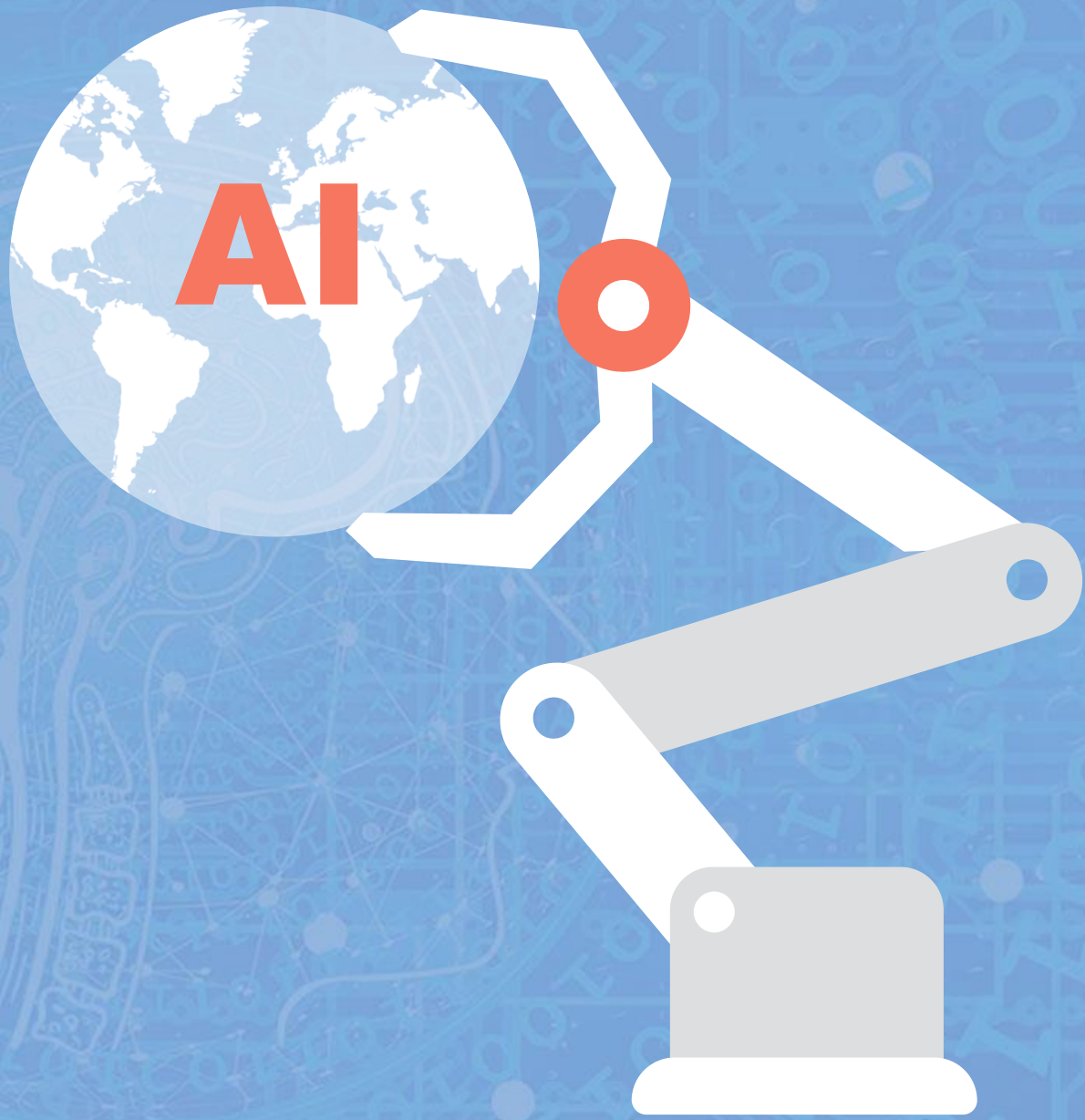
Professional Elective-VI

1. Randomized Algorithms
2. Applied Time Series Analysis
3. AI in Healthcare
4. Algorithm for Intelligent Systems and Robotics

Professional Elective-VII

1. Natural Language Processing
2. Big Data Analysis
3. Cybercrime Forensics and Digital Forensics

V. Conclusions

- As an Artificial Intelligence aspirant, you have ample of job opportunities in this field.
- Artificial intelligence will transform the global economy, and AI jobs are in high demand.
- According to International Data Corporation (IDC), the number of AI jobs is expected to globally grow 16 percent this year.
- AI careers are future-proof, meaning they are likely to survive well into the future.
- Getting an education in AI is challenging and requires persistence and personal initiative.

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