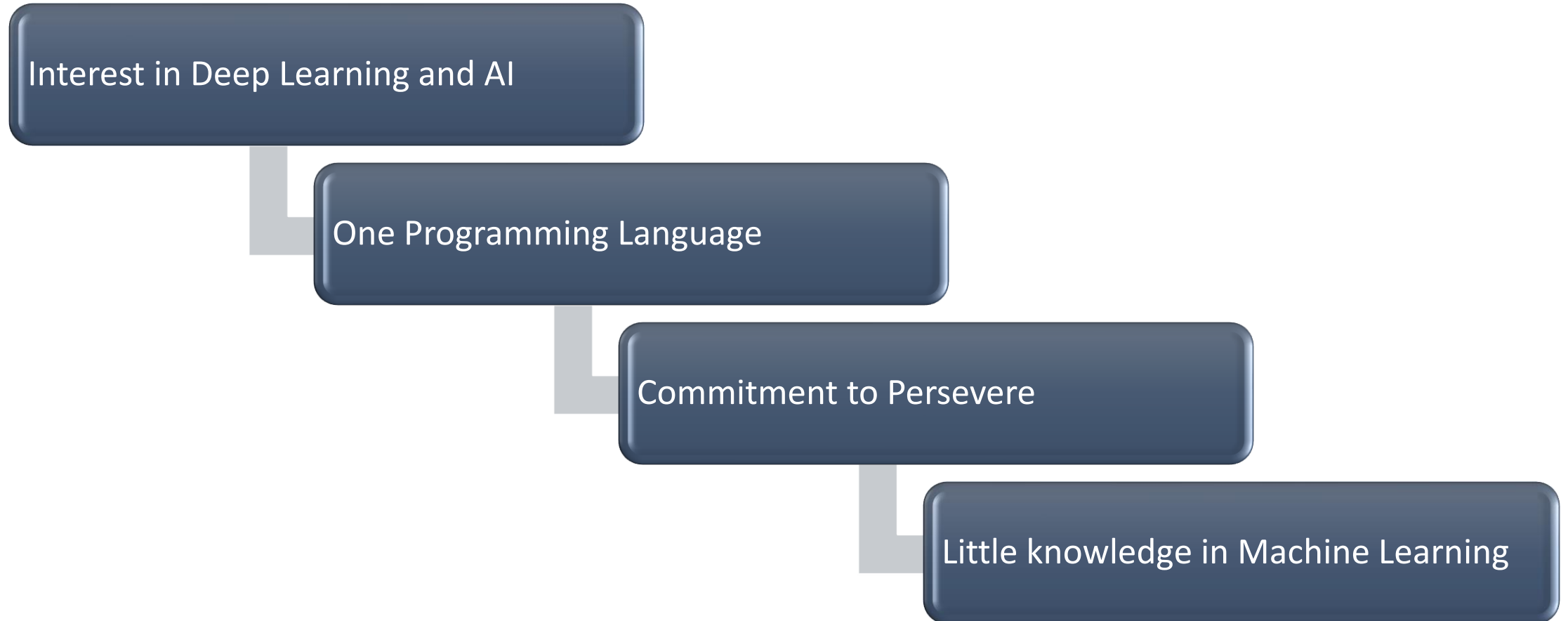


AI and Deep Learning





Prerequisites



Motivation for the



It is redefining the way computing is being used to solve societal problems

Some of the existing jobs are going to vanish or change and most attractive jobs are in deep learning

It is one of fastest growing technology being adapted across disciplines

Most of the startups now have an element of AI to build new applications

Objectives and Outcomes



Knowledge of deep learning concepts

To apply appropriate tuning to improve the accuracy of network

To enable you to develop sample projects

ARTIFICIAL INTELLIGENCE

Early artificial intelligence stirs excitement.



MACHINE LEARNING

Machine learning begins to flourish.



DEEP LEARNING

Deep learning breakthroughs drive AI boom.



1950's

1960's

1970's

1980's

1990's

2000's

2010's

Since an early flush of optimism in the 1950s, smaller subsets of artificial intelligence – first machine learning, then deep learning, a subset of machine learning – have created ever larger disruptions.

Deep Learning/AI APPLICATIONS



Few Popular Applications: Precision Agriculture, Learner Profiling, Video Captioning, Exploring Patterns from Satellite images, Image detection in Healthcare, Identifying specific markers in Genomes, Creating Art and Music, Recommendations, behavior prediction,

Three main areas where Deep learning is being prominently applied

Detection

Text & Speech

Image
interpretation

Human behavior &
identity

Abuse & Fraud

Prediction

Recommendations

Individual
behavior &
condition

Collective behavior

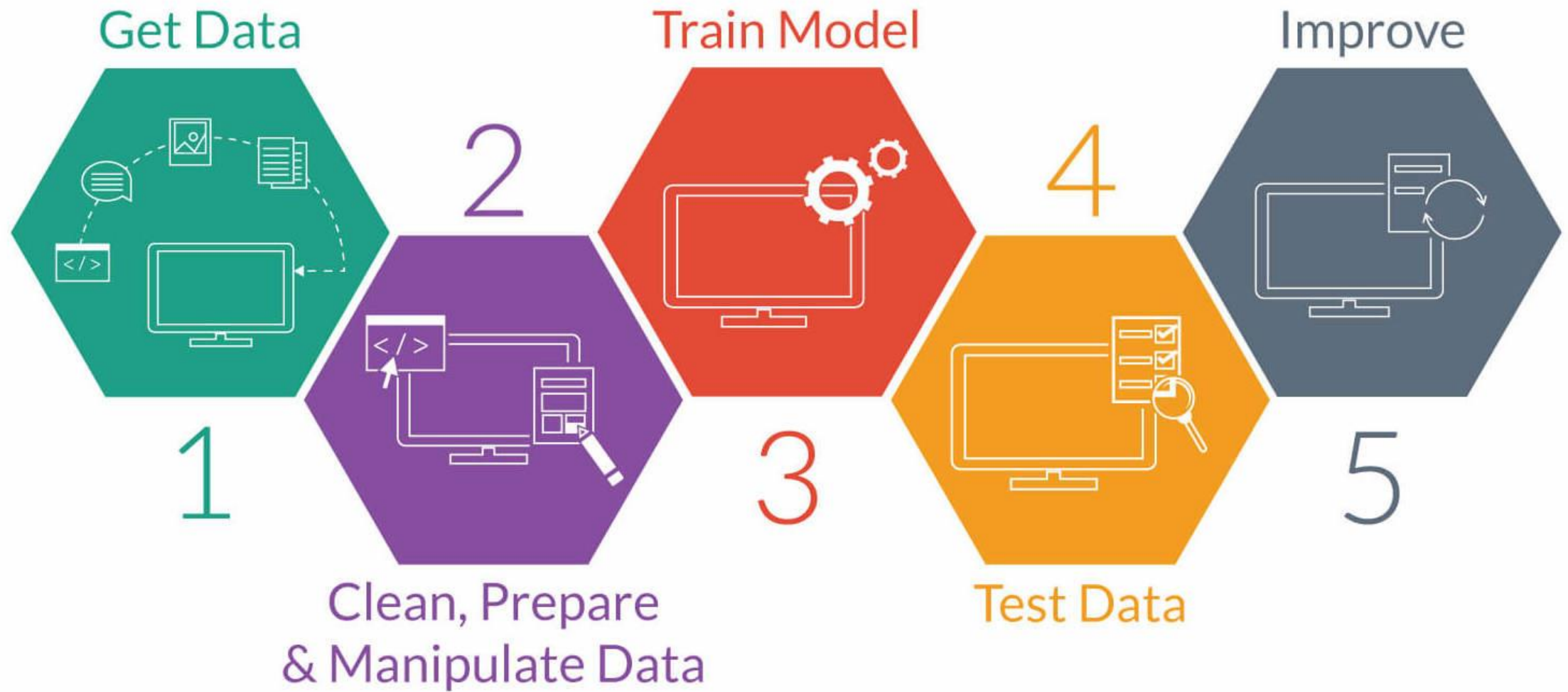
Generation

Visual art

Music

Text

Design



1. Problems where a) There is no deterministic algorithm (not even of evil complexity) e.g. Recognizing a 3D object from a given scene, Handwriting recognition, Speech recognition

2. Problems which don't have a fix solution and goal posts keep changing. System adapts and learns from experience e.g. SPAM emails, Financial fraud, IT Security Framework

3. Where Solutions are Individual specific or time dependent. e.g. recommendations and targeted advertisements

4. For prediction based on past and existing patterns (not defined or defined by huge number of weak rules) e.g. prediction of share prices etc.

For What kind of Applications we use Machine/Deep Learning

What Deep Learning cannot do !

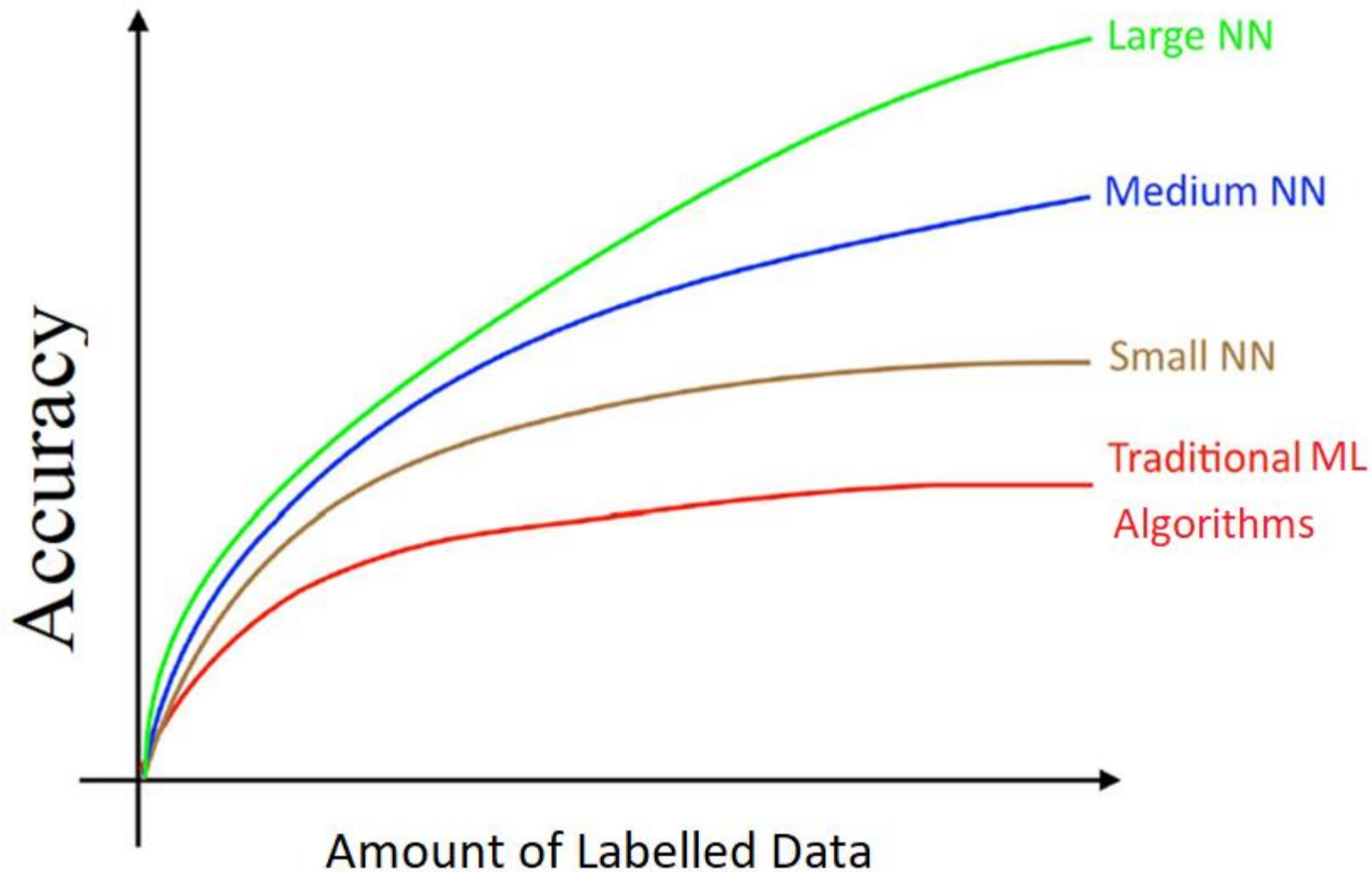
Deep Learning has not and will not be able to explicitly **replace humans**.

Its role will be more of an **implicit partnership**.

It will leave room for humans to think smarter (hopefully) and innovate more.

As many programmers fear, Deep Learning or Artificial Intelligence will not replace their jobs but will instead help them to write better software.

Why it has taken off now



Availability of Data has increased due to explosion in Smart Mobiles and devices

More Computing Power is available due to coming of NVIDIA GPUs

Release/development of new algorithms, APIs and Platforms for Deep Learning Applications

Essential Tools

- Git and Github
- Python
- Jupyter Notebooks
- Numpy for Matrix and Vector calculations
- Pandas for Data handling, curation and manipulation
- Matplotlib for plotting of graphs for different analysis on data
- So many other Python APIs to make your life easy to develop DL models

Reasons why developers love Python



It's simple



It's free



It's compatible



It's object-oriented



It has a lot of libraries

Types of Learning Algorithms

- **Supervised**
 - Learns from examples which provide desired outputs for given inputs
- **Unsupervised**
 - Learns patterns in input data when no specific output values are given
- **Reinforcement**
 - Learns by an indication of correctness at end of some reasoning