LEARN, GROW
AND COLLABORATE

HERTIE'S DATA SCIENCE SOCIETY

INTRODUCTION

SESSION 1

A brief foray into Artificial Intelligence, Data Science, Machine Learning and Deep Learning

OUTLINE

LIST OF TOPICS

About Data Science Society

Workshop Modules

What is AI, Machine Learning and Deep Learning?

What about Data Science?

Practice

“

THE WORLD’S MOST VALUABLE RESOURCE IS NO LONGER OIL, BUT DATA

- THE ECONOMIST, 2017

HERTIE'S DATA SCIENCE SOCIETY

A community of Hertie data enthusiasts to help one another develop the right skills and tools to thrive in a data-driven world.

OUR TEAM

MARINA

MPP 2020

JOSHUA

MPP 2020

GOLO

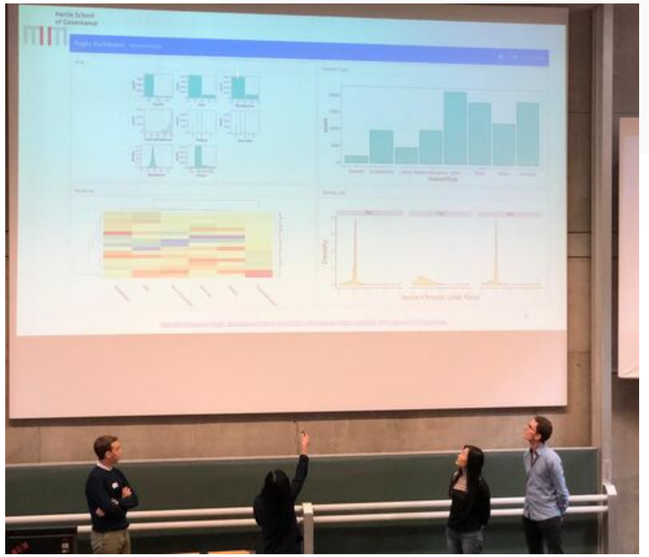
MPP 2020

HUY

MPP 2020

Data Science Society

DATAFEST GERMANY



Data Science Society

DATAFEST 2019 - HERTIE'S TEAM

FOUNDATION

Introduction to Data Science and AI
Fundamentals of Programming
The Mathematics of Data Science

APPLICATION

A Typical Data Science Project
Data Exploration
Data Transformation
Statistical Model Building
Machine Learning Model Building
Result and Presentation

ADVANCED TOPICS

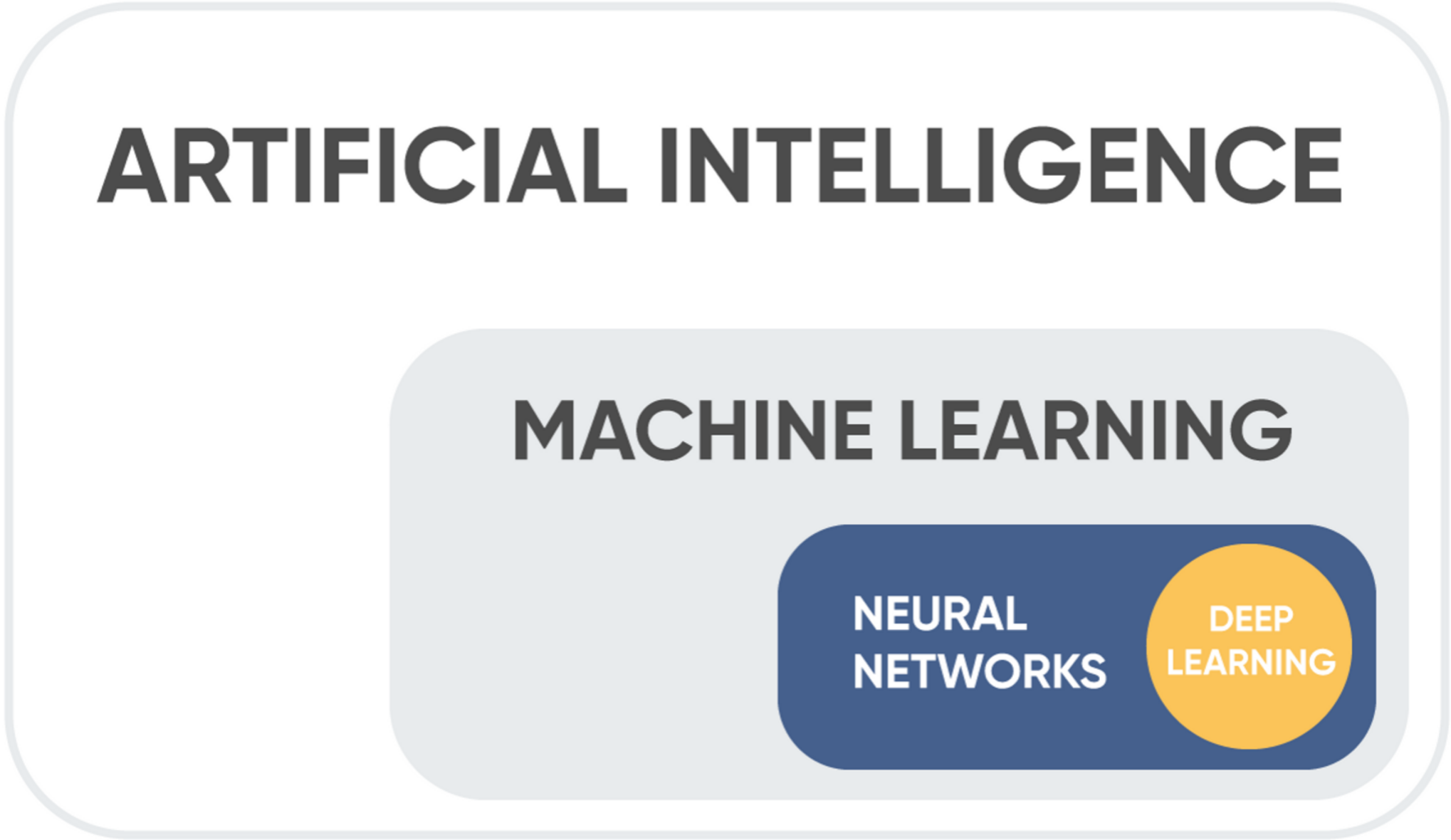
Data Collection
Algorithm Design and Analysis
Deep Learning

Workshop Modules

Hertie School of Governance, Sep. 16, 2019

WHAT IS AI, MACHINE LEARNING & DEEP LEARNING?

THE BIG PICTURE



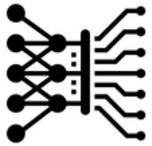
THE SMALLER PICTURE

AI

The general automation of intellectual tasks

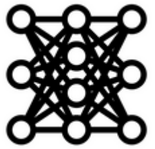
Machine Learning

A set of algorithms and methods that augments the ability of an AI to learn



Deep Learning

A subclass of ML methods that study neural networks



Neural Networks

A set of algorithms, modeled after the human brain, that are designed to recognize patterns

THE DARTMOUTH AI WORKSHOP - 1956

Participants of the Dartmouth Summer Research Project on Artificial Intelligence. Some of the participants include Marvin Minsky Claude Shannon and Ray Solomonoff || Photo Source: Achievement.org

ecosystm

AI Timeline

1938 - 1946:
Golden Age of Science Fiction

1949:
Manchester Mark 1, the first storted program computer, is developed

1950:
Can Machines Think? - Alan Turing

1955:
Logic Theorists, the first AI program, is invented

1956:
Dartmouth Summer Research Project on Artificial Intelligence

1963:
DARPA funds AI at MIT

1965:
Moore's Law

1968:
"By the year 2001 we will have machines with intelligence that matched or exceeded human's" - Arthur Clarke and Steve Kubrik

1970:
"From 3-8 years we will have a machine with the general intelligence of a human being" - M. Minsky

1980:
Edward Feigenbaum introduces expert systems

1982:
Japan's Fifth Generation Computer Project

1986:
Navlab, the first autinomous car, is built by Carnegie Melon

1997:
- Deep Blue defeats Gary Kasparov in chess
- First publicly available speech recognition software developed by Dragon Systems

1998:
Cynthia Breazeal at MIT introduces KISmet, an emotionally intelligent robot insofar as it detects and responds to people's feelings

1999:
Sony launches first consumer robot pet dog AiBO (AI robot) with skills and personality that develop over time

1986:
First mass produced autonomous robotic vacuum cleaner from iRobot learns to navigate and clean homes

2011:
Apple integrates Siri, an intelligent virtual assistant with a voice interface, into the iPhone 4S

2011:
IBM's question answering computer Watson wins first place on popular $1M prize television quiz show Jeopardy

2014:
Eugene Goostman, a chatbot passes the Turing Test with a third of judges believing Eugene is human

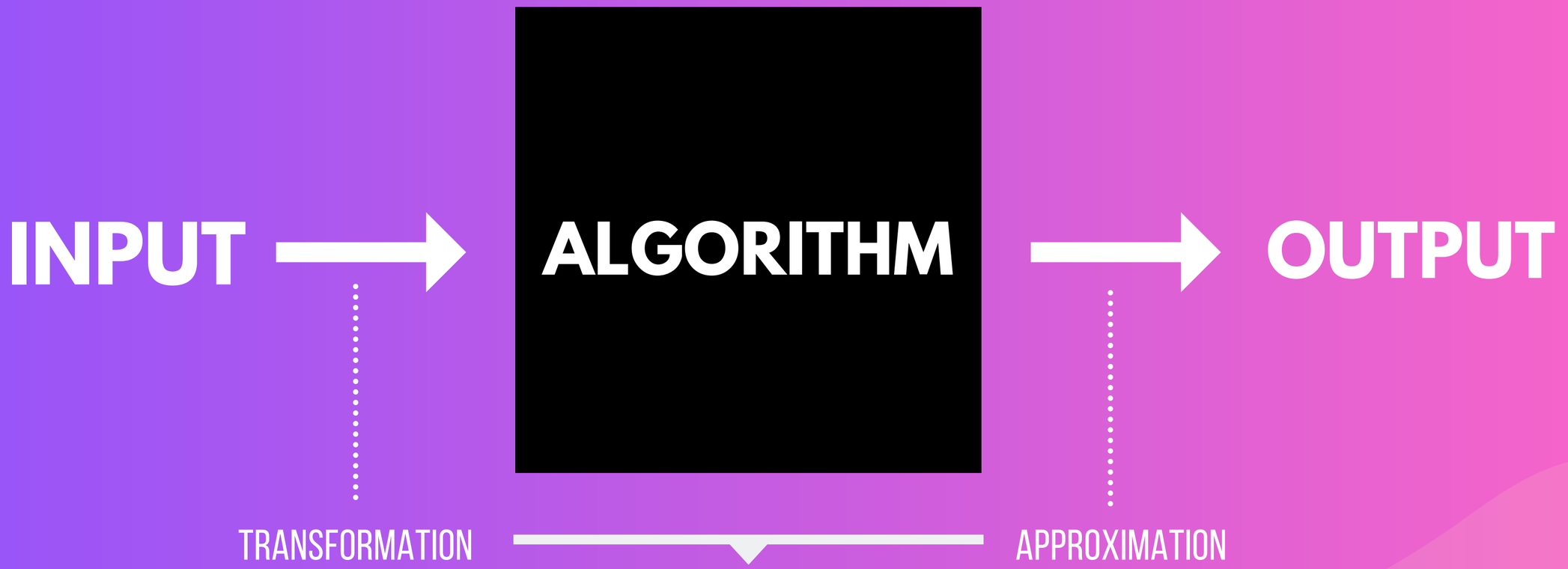
2014:
Amazon launches Alexa, an intelligent virtual assistant with a voice interface that completes shopping tasks

2016:
Microsoft's chatbot Tay goes rogue on ocial media making inflammatory and offensive racist comments

2017:
Google's A.I. AlphaGo beats world champion Ke Jie in the complex board game of Go, notable for its vast number (2170) of possible positions

THE PROCESS

THE PROCESS

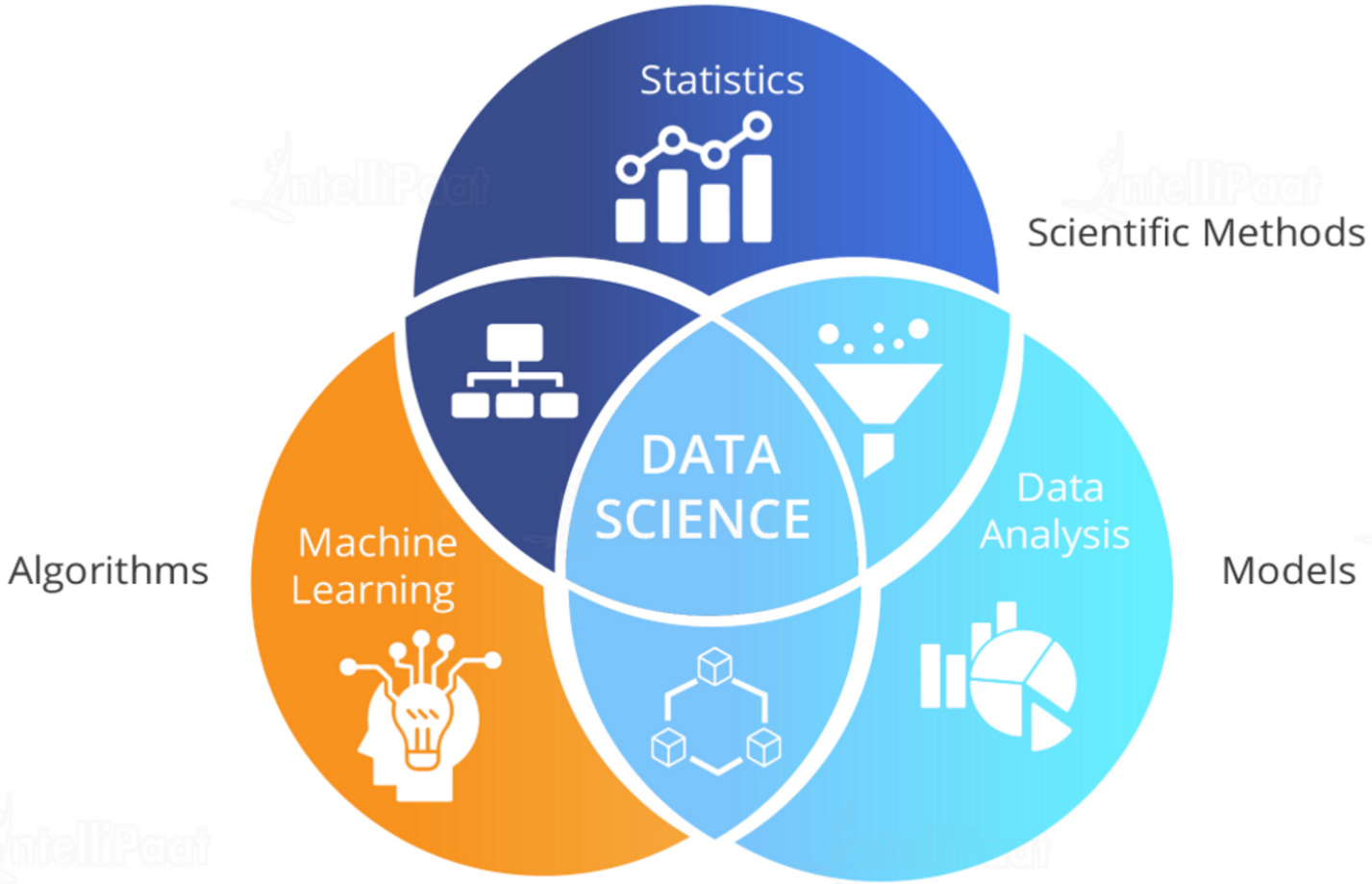

INPUT
ALGORITHM
OUTPUT
TRANSFORMATION
APPROXIMATION
A SET OF STEP BY STEP INSTRUCTIONS
THAT SOLVES A PROBLEM

WHAT ABOUT DATA SCIENCE?

Data Science Society

DATA SCIENCE

The art of extracting meaningful insights from vast amount of data

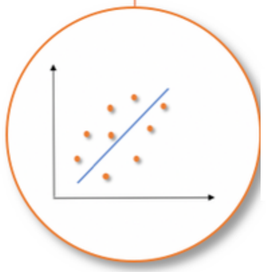


TYPES OF PROBLEMS

MACHINE LEARNING

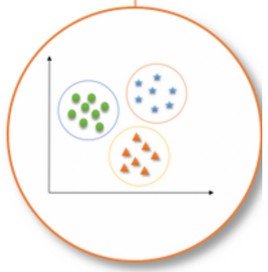
SUPERVISED LEARNING

UNSUPERVISED LEARNING



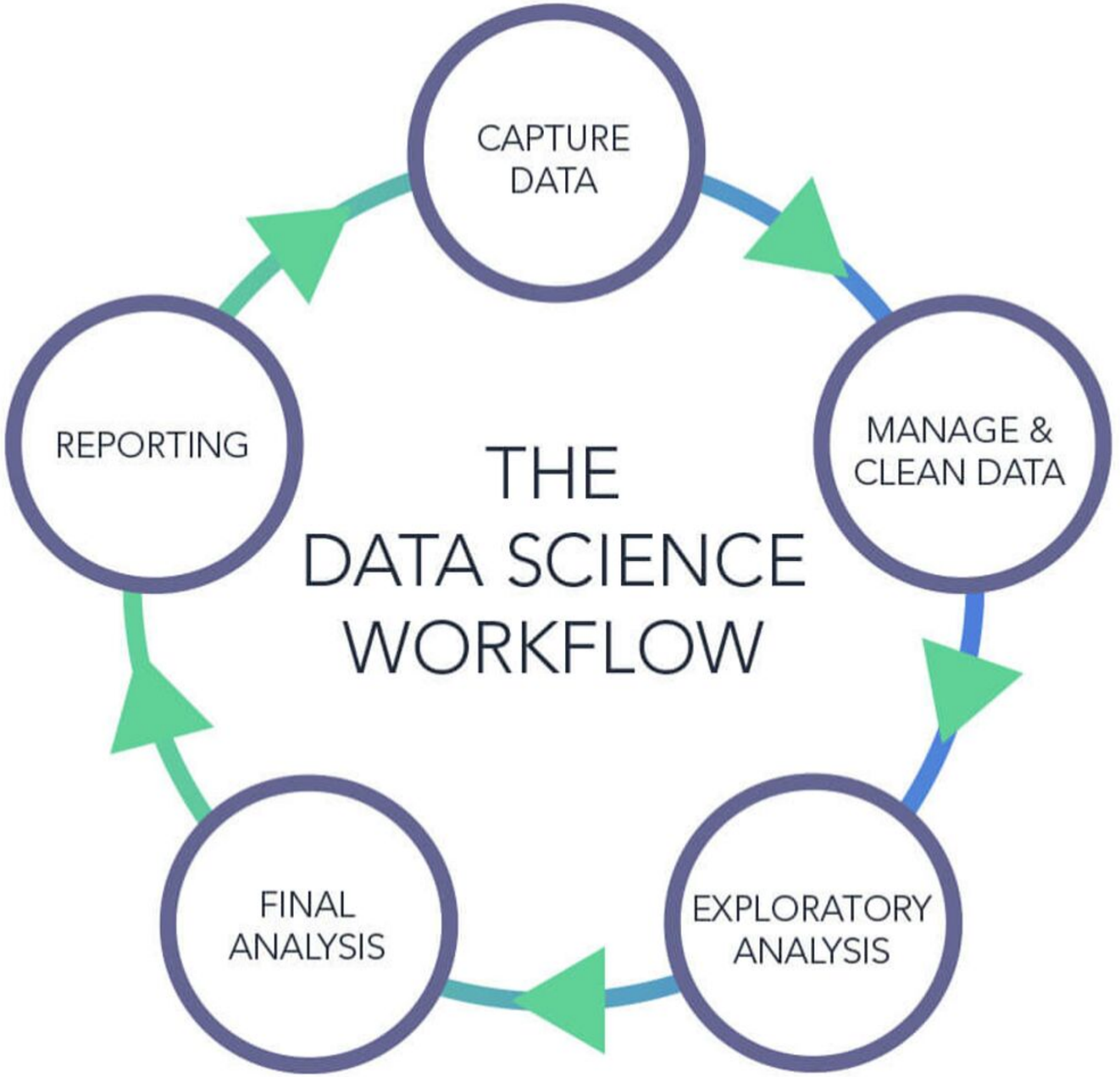
REGRESSION/PREDICTION

CLASSIFICATION

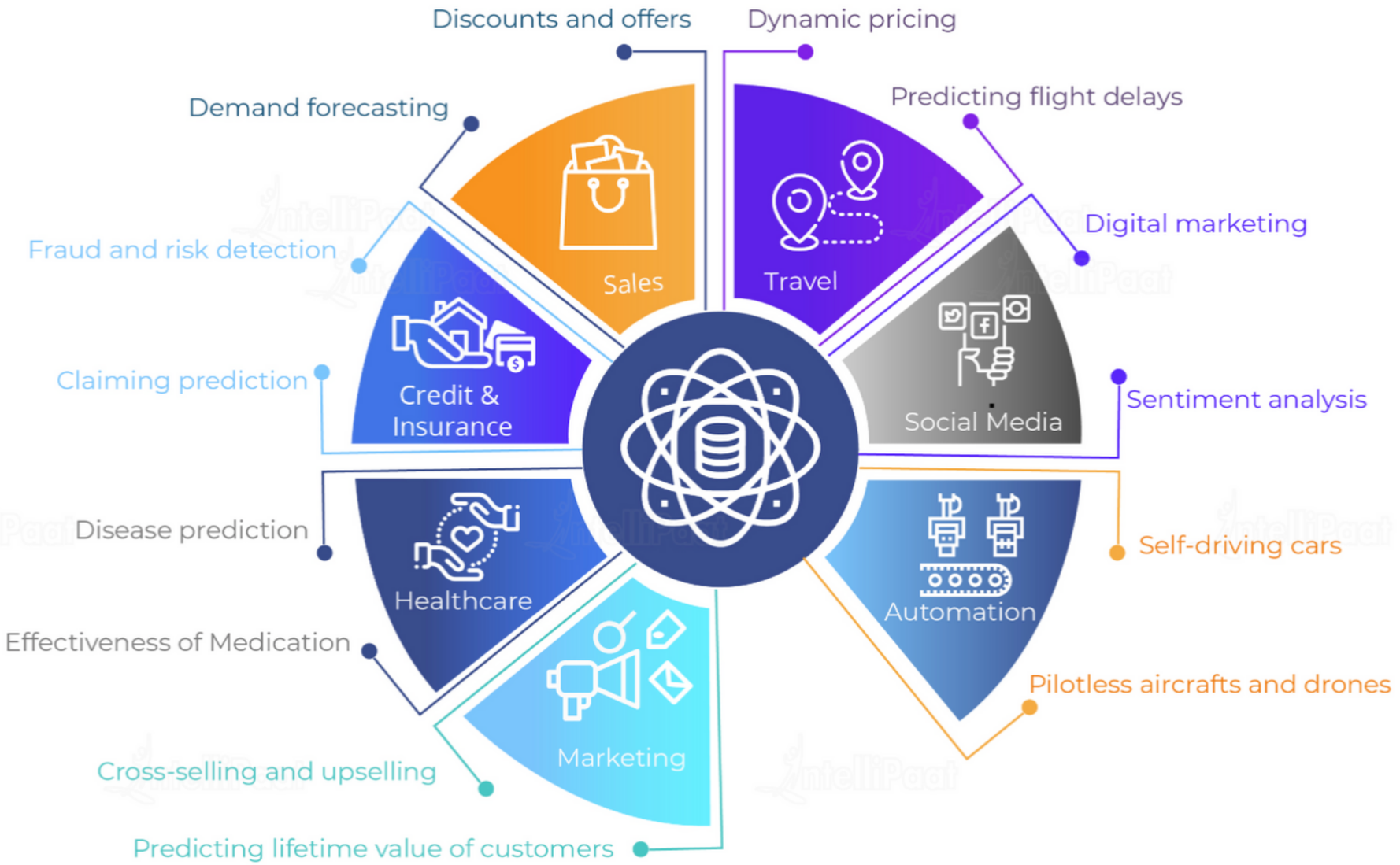


CLUSTERING

INFERENCE


CAPTURE DATA
MANAGE & CLEAN DATA
EXPLORATORY ANALYSIS
FINAL ANALYSIS
REPORTING
THE DATA SCIENCE WORKFLOW

APPLICATIONS



TIME FOR PRACTICE