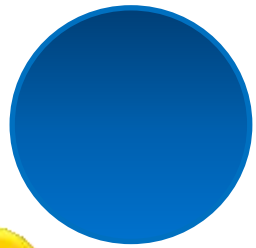


# ARTIFICIAL INTELLIGENCE



**MISSION TO TRAIN THE  
STUDENT WELL  
ESTABLISHED SOCIETY  
WITH A POOL OF HUMAN  
TALENTS TO FULLFILL THE  
REQUIREMENTS  
COMPANY/NATION WITH  
SYSTEMATICS APPROA  
CH!**



## ABOUT

### ARTIFICIAL INTELLIGENCE AGASTYAS SOLUTIONS

**AGASTYAS SOLUTIONS** is provides a well-known professional's **ARTIFICIAL INTELLIGENCE** training.

**ARTIFICIAL INTELLIGENCE** Course offered at AGASTYAS SOLUTIONS are devised with best practices recommended by Google and other leading search engines. Our strategies are developed with many years of experience. We are passionate about **ARTIFICIAL INTELLIGENCE** and that's why our strategies WORK! We are sure our sound knowledge and effective **ARTIFICIAL INTELLIGENCE** principles will turn you into an **ARTIFICIAL INTELLIGENCE** Professional.



# OUR MOTO!

TO TRAIN AND MAKE  
EVERYSTUDENT AN  
OUTSTANDING ARTIFICIAL  
INTELLIGENCE  
PROFESSIONALS.

AGASTYA SOLUTIONS

A Journey to Excellence



# OUR STUDENTS WORKS AT



AGASTYA SOLUTIONS

A journey to excellence



# ADVANCED AND EXPERT ARTIFICIAL INTELLIGENCE

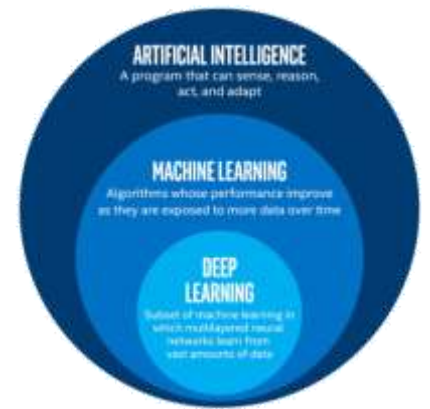
❖ **SUPPORT & GUIDANCE FOR GOOGLE & OTHER  
INDUSTRY CERTIFICATIONS.**

❖ **CASE STUDIES & REAL TIME PROJECTS/  
TRAINING**

**DURATIONS**

*45 – 75 Hours.* ⌚





# INTRODUCTION TO DEEP LEARNING & AI

## DEEP LEARNING: A REVOLUTION IN ARTIFICIAL INTELLIGENCE

✚ LIMITATIONS OF MACHINE LEARNING

### WHAT IS DEEP LEARNING?

- ✚ NEED FOR DATA SCIENTISTS
- ✚ FOUNDATION OF DATA SCIENCE
- ✚ WHAT IS BUSINESS INTELLIGENCE
- ✚ WHAT IS DATA ANALYSIS
- ✚ WHAT IS DATA MINING



### WHAT IS MACHINE LEARNING? ANALYTICS VS DATA SCIENCE

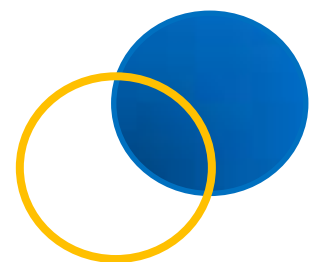
✚ VALUE CHAIN



- # TYPES OF ANALYTICS
- # LIFECYCLE PROBABILITY
- # ANALYTICS PROJECT LIFECYCLE
- # ADVANTAGE OF DEEP LEARNING OVER MACHINE LEARNING
- # REASONS FOR DEEP LEARNING
- # REAL-LIFE USE CASES OF DEEP LEARNING
- # REVIEW OF MACHINE LEARNING

## DATA

- # BASIS OF DATA CATEGORIZATION
- # TYPES OF DATA
- # DATA COLLECTION TYPES
- # FORMS OF DATA & SOURCES
- # DATA QUALITY & CHANGES
- # DATA QUALITY ISSUES
- # DATA QUALITY STORY
- # WHAT IS DATA ARCHITECTURE



- ✚COMPONENTS OF DATA ARCHITECTURE
- ✚OLTP VS OLAP
- ✚HOW IS DATA STORED?

## **BIG DATA**



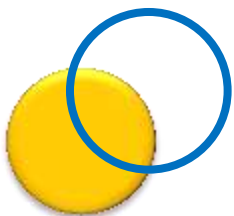
- ✚WHAT IS BIG DATA?
- ✚5 VS OF BIG DATA
- ✚BIG DATA ARCHITECTURE
- ✚BIG DATA TECHNOLOGIES
- ✚BIG DATA CHALLENGE
- ✚BIG DATA REQUIREMENTS
- ✚BIG DATA DISTRIBUTED  
COMPUTING & COMPLEXITY
- ✚HADOOP
- ✚MAP REDUCE FRAMEWORK
- ✚HADOOP ECOSYSTEM



## **DATA SCIENCE DEEP DIVE**

- ✚WHAT DATA SCIENCE IS

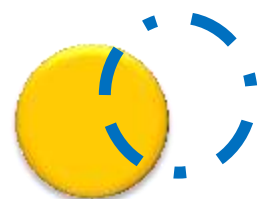
- # WHY DATA SCIENTISTS ARE IN DEMAND
- # WHAT IS A DATA PRODUCT
- # THE GROWING NEED FOR DATA SCIENCE
- # LARGE SCALE ANALYSIS COST VS STORAGE
- # DATA SCIENCE SKILLS
- # DATA SCIENCE USE CASES
- # DATA SCIENCE PROJECT LIFE CYCLE & STAGES
- # DATA ACQUISITION
- # WHERE TO SOURCE DATA
- # TECHNIQUES
- # EVALUATING INPUT DATA
- # DATA FORMATS
- # DATA QUANTITY
- # DATA QUALITY
- # RESOLUTION TECHNIQUES
- # DATA TRANSFORMATION
- # FILE FORMAT CONVERSIONS
- # ANONYMIZATION





# PYTHON

- #PYTHON OVERVIEW
- #ABOUT INTERPRETED LANGUAGES
- #ADVANTAGES/DISADVANTAGES OF PYTHON  
PYDOC.
- #STARTING PYTHON
- #INTERPRETER PATH
- #USING THE INTERPRETER
- #RUNNING A PYTHON SCRIPT
- #USING VARIABLES
- #KEYWORDS
- #BUILT-IN FUNCTIONS
- #STRINGSDIFFERENT LITERALS
- #MATH OPERATORS AND EXPRESSIONS
- #WRITING TO THE SCREEN
- #STRING FORMATTING
- #COMMAND LINE PARAMETERS AND FLOW  
CONTROL.
- #LISTS



✚ TUPLES

✚ INDEXING AND SLICING

✚ ITERATING THROUGH A SEQUENCE

✚ FUNCTIONS FOR ALL SEQUENCES



## OPERATORS AND KEYWORDS FOR SEQUENCES

✚ THE XRANGE() FUNCTION

✚ LIST COMPREHENSIONS

✚ GENERATOR EXPRESSIONS

✚ DICTIONARIES AND SETS.

## NUMPY & PANDAS

✚ LEARNING NUMPY

✚ INTRODUCTION TO PANDAS

✚ CREATING DATA FRAMES

✚ GROUPINGSORTING

✚ PLOTTING DATA



✚CREATING FUNCTIONS

✚SLICING/DICING OPERATIONS

## DEEP DIVE – FUNCTIONS & CLASSES & OOPS

✚FUNCTIONS

✚FUNCTION PARAMETERS

✚GLOBAL VARIABLES

✚VARIABLE SCOPE AND  
RETURNING VALUES, SORTING

✚ALTERNATE KEYS

✚LAMBDA FUNCTIONS

✚SORTING COLLECTIONS OF COLLECTIONS

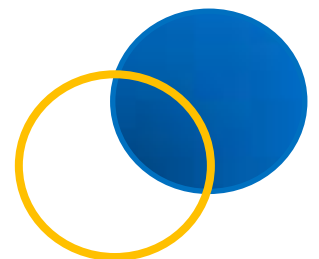
✚CLASSES & OOPS



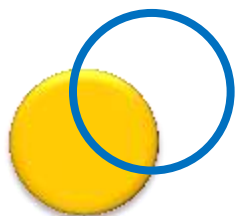
## STATISTICS

✚WHAT IS STATISTICS

✚DESCRIPTIVE STATISTICS



- #CENTRAL TENDENCY MEASURES
- #THE STORY OF AVERAGE
- #DISPERSION MEASURES
- #DATA DISTRIBUTIONS
- #CENTRAL LIMIT THEOREM
- #WHAT IS SAMPLING
- #WHY SAMPLING
- #SAMPLING METHODS
- #INFERENTIAL STATISTICS
- #WHAT IS HYPOTHESIS TESTING
- #CONFIDENCE LEVEL
- #DEGREES OF FREEDOM
- #WHAT IS PVALUE
- #CHI-SQUARE TEST
- #WHAT IS ANOVA
- #CORRELATION VS REGRESSION
- #USES OF CORRELATION & REGRESSION



# MACHINE LEARNING, DEEP LEARNING & AI USING PYTHON

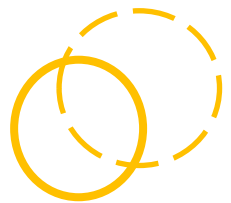
## INTRODUCTION

- ✚ ML FUNDAMENTALS
- ✚ ML COMMON USE CASES
- ✚ UNDERSTANDING SUPERVISED AND UNSUPERVISED LEARNING TECHNIQUES



## CLUSTERING

- ✚ SIMILARITY METRICS
- ✚ DISTANCE MEASURE TYPES: EUCLIDEAN, COSINE MEASURES
- ✚ CREATING PREDICTIVE MODELS
- ✚ UNDERSTANDING K-MEANS CLUSTERING
- ✚ UNDERSTANDING TF-IDF, COSINE SIMILARITY AND THEIR APPLICATION TO VECTOR SPACE MODEL
- ✚ CASE STUDY



# IMPLEMENTING ASSOCIATION RULE MINING

- ✚ WHAT IS ASSOCIATION RULES & ITS USE CASES?
- ✚ WHAT IS RECOMMENDATION ENGINE & IT'S WORKING?
- ✚ RECOMMENDATION USE-CASE
- ✚ CASE STUDY



# UNDERSTANDING PROCESS FLOW OF SUPERVISED LEARNING TECHNIQUES DECISION TREE CLASSIFIER

- ✚ HOW TO BUILD DECISION TREES
- ✚ WHAT IS CLASSIFICATION AND ITS USE CASES?
- ✚ WHAT IS DECISION TREE?
- ✚ ALGORITHM FOR DECISION TREE INDUCTION
- ✚ CREATING A DECISION TREE

✚ CONFUSION MATRIX

✚ CASE STUDY



## RANDOM FOREST CLASSIFIER

✚ WHAT IS RANDOM FORESTS

✚ FEATURES OF RANDOM FOREST

✚ OUT OF BOX ERROR ESTIMATE AND VARIABLE IMPORTANCE

✚ CASE STUDY

## NAIVE BAYES CLASSIFIER.

✚ CASE STUDY

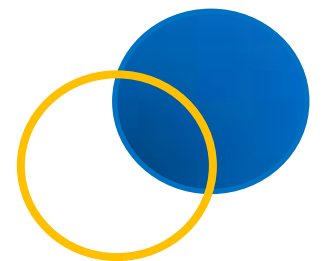


## PROJECT DISCUSSION

## PROBLEM STATEMENT AND

## ANALYSIS

✚ VARIOUS APPROACHES TO SOLVE A DATA SCIENCE PROBLEM





- ✚ PROS AND CONS OF DIFFERENT APPROACHES AND ALGORITHMS

## **LINEAR REGRESSION**

- ✚ CASE STUDY
- ✚ INTRODUCTION TO PREDICTIVE MODELING
- ✚ LINEAR REGRESSION OVERVIEW
- ✚ SIMPLE LINEAR REGRESSION
- ✚ MULTIPLE LINEAR REGRESSION

## **LOGISTIC REGRESSION**

- ✚ CASE STUDY
- ✚ LOGISTIC REGRESSION OVERVIEW
- ✚ DATA PARTITIONING
- ✚ UNIVARIATE ANALYSIS
- ✚ BIVARIATE ANALYSIS
- ✚ MULTICOLLINEARITY ANALYSIS
- ✚ MODEL BUILDING
- ✚ MODEL VALIDATION



- ✚ MODEL PERFORMANCE ASSESSMENT  
AUC & ROC CURVES
- ✚ SCORECARD



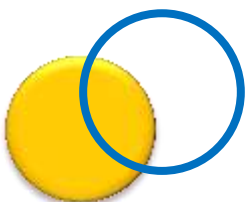
## **SUPPORT VECTOR MACHINES**

- ✚ CASE STUDY
- ✚ INTRODUCTION TO SVMs
- ✚ SVM HISTORY
- ✚ VECTORS OVERVIEW
- ✚ DECISION SURFACES
- ✚ LINEAR SVMs
- ✚ THE KERNEL TRICK
- ✚ NON-LINEAR SVMs
- ✚ THE KERNEL SVM

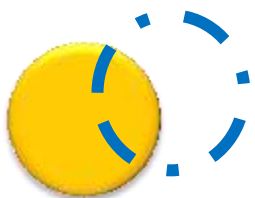


## **TIME SERIES ANALYSIS**

- ✚ DESCRIBE TIME SERIES DATA
- ✚ FORMAT YOUR TIME SERIES DATA



- # LIST THE DIFFERENT COMPONENTS OF TIME SERIES DATA
- # DISCUSS DIFFERENT KIND OF TIME SERIES SCENARIOS
- # CHOOSE THE MODEL ACCORDING TO THE TIME SERIES SCENARIO
- # IMPLEMENT THE MODEL FOR FORECASTING
- # EXPLAIN WORKING AND IMPLEMENTATION OF ARIMA MODEL
- # ILLUSTRATE THE WORKING AND IMPLEMENTATION OF DIFFERENT ETS MODELS
- # FORECAST THE DATA USING THE RESPECTIVE MODEL
- # WHAT IS TIME SERIES DATA?
- # TIME SERIES VARIABLES
- # DIFFERENT COMPONENTS OF TIME SERIES DATA



- ✚ VISUALIZE THE DATA TO IDENTIFY TIME SERIES COMPONENTS
- ✚ IMPLEMENT ARIMA MODEL FOR FORECASTING
- ✚ EXPONENTIAL SMOOTHING MODELS
- ✚ IDENTIFYING DIFFERENT TIME SERIES SCENARIO BASED ON WHICH DIFFERENT EXPONENTIAL SMOOTHING MODEL CAN BE APPLIED
- ✚ IMPLEMENT RESPECTIVE MODEL FOR FORECASTING
- ✚ VISUALIZING AND FORMATTING TIME SERIES DATA
- ✚ PLOTTING DECOMPOSED TIME SERIES DATA PLOT
- ✚ APPLYING ARIMA AND ETS MODEL FOR TIME SERIES FORECASTING
- ✚ FORECASTING FOR GIVEN TIME PERIOD
- ✚ CASE STUDY



# MACHINE LEARNING PROJECT

## MACHINE LEARNING ALGORITHMS

### PYTHON

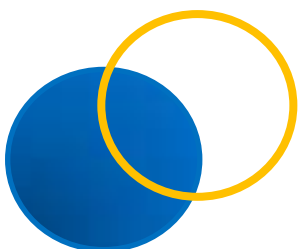
- ▣ VARIOUS MACHINE LEARNING ALGORITHMS IN PYTHON
- ▣ APPLY MACHINE LEARNING ALGORITHMS IN PYTHON



## FEATURE SELECTION AND PRE-PROCESSING



- ▣ HOW TO SELECT THE RIGHT DATA
- ▣ WHICH ARE THE BEST FEATURES TO USE
- ▣ ADDITIONAL FEATURE SELECTION TECHNIQUES
- ▣ A FEATURE SELECTION CASE STUDY
- ▣ PREPROCESSING



✚ PREPROCESSING SCALING  
TECHNIQUES

✚ HOW TO PREPROCESS YOUR DATA

✚ HOW TO SCALE YOUR DATA

✚ FEATURE SCALING FINAL PROJECT



## WHICH ALGORITHMS PERFORM BEST

✚ HIGHLY EFFICIENT MACHINE  
LEARNING ALGORITHMS

✚ BAGGING DECISION TREES

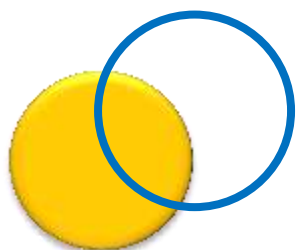
✚ THE POWER OF ENSEMBLES

✚ RANDOM FOREST ENSEMBLE TECHNIQUE

✚ BOOSTING – ADABOOST

✚ BOOSTING ENSEMBLE STOCHASTIC GRADIENT  
BOOSTING

✚ A FINAL ENSEMBLE TECHNIQUE





# MODEL SELECTION CROSS VALIDATION SCORE

- INTRODUCTION MODEL TUNING
- PARAMETER TUNING GRIDSEARCHCV
- A SECOND METHOD TO TUNE YOUR ALGORITHM
- HOW TO AUTOMATE MACHINE LEARNING
- WHICH ML ALGO SHOULD YOU CHOOSE
- HOW TO COMPARE MACHINE LEARNING ALGORITHMS IN PRACTICE



## TEXT MINING& NLP

- SENTIMENTAL ANALYSIS
- CASE STUDY



## PYSPARK AND MLLIB

- INTRODUCTION TO SPARK CORE
- SPARK ARCHITECTURE



- ✚ WORKING WITH RDDS
- ✚ INTRODUCTION TO PYSPARK
- ✚ MACHINE LEARNING WITH PYSPARK – MLLIB

## **DEEP LEARNING & AI USING PYTHON**

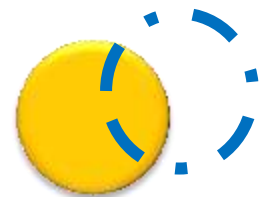
### **DEEP LEARNING & AI**

- ✚ CASE STUDY
- ✚ DEEP LEARNING OVERVIEW
- ✚ THE BRAIN VS NEURON
- ✚ INTRODUCTION TO DEEP LEARNING



## **INTRODUCTION TO ARTIFICIAL NEURAL NETWORKS**

- ✚ THE DETAILED ANN
- ✚ THE ACTIVATION FUNCTIONS
- ✚ HOW DO ANNS WORK & LEARN
- ✚ GRADIENT DESCENT
- ✚ STOCHASTIC GRADIENT DESCENT





- #BACKPROPOGATION
- #UNDERSTAND LIMITATIONS OF A SINGLE PERCEPTRON
- #UNDERSTAND NEURAL NETWORKS IN DETAIL
- #ILLUSTRATE MULTI-LAYER PERCEPTRON
- #BACKPROPAGATION – LEARNING ALGORITHM
- #UNDERSTAND BACKPROPAGATION – USING NEURAL NETWORK EXAMPLE
- #MLP DIGIT-CLASSIFIER USING TENSORFLOW
- #BUILDING A MULTI-LAYERED PERCEPTRON FOR CLASSIFICATION
- #WHY DEEP NETWORKS
- #WHY DEEP NETWORKS GIVE BETTER ACCURACY?
- #USE-CASE IMPLEMENTATION
- #UNDERSTAND HOW DEEP NETWORK WORKS?
- #HOW BACKPROPAGATION WORKS?



✚ ILLUSTRATE FORWARD PASS, BACKWARD PASS

✚ DIFFERENT VARIANTS OF GRADIENT DESCENT

## CONVOLUTIONAL NEURAL NETWORKS



✚ CONVOLUTIONAL OPERATION

✚ RELU LAYERS

✚ WHAT IS POOLING VS FLATTENING

✚ FULL CONNECTION

✚ SOFTMAX VS CROSS ENTROPY

✚ " BUILDING A REAL WORLD CONVOLUTIONAL NEURAL NETWORK FOR IMAGE CLASSIFICATION"



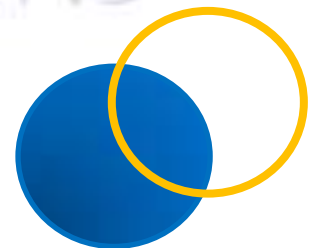


# WHAT ARE RNNs – INTRODUCTION TO RNNs

- RECURRENT NEURAL NETWORKS RNN
- LSTMS UNDERSTANDING LSTMS
- LONG SHORT TERM MEMORY NEURAL NETWORKS LSTM IN PYTHON

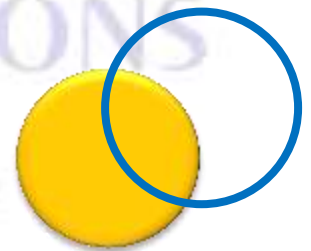
# RESTRICTED BOLTZMANN MACHINE (RBM) AND AUTOENCODERS

- RESTRICTED BOLTZMANN MACHINE
- APPLICATIONS OF RBM
- INTRODUCTION TO AUTOENCODERS
- AUTOENCODERS APPLICATIONS
- UNDERSTANDING AUTOENCODERS
- BUILDING A AUTOENCODER MODEL



# TENSORFLOW WITH PYTHON

- # INTRODUCING TENSORFLOW
- # INTRODUCING TENSORFLOW
- # WHY TENSORFLOW?
- # WHAT IS TENSORFLOW?
- # TENSORFLOW AS AN INTERFACE
- # TENSORFLOW AS AN ENVIRONMENT
- # TENSORS
- # COMPUTATION GRAPH
- # INSTALLING TENSORFLOW
- # TENSORFLOW TRAINING
- # PREPARE DATA
- # TENSOR TYPES
- # LOSS AND OPTIMIZATION
- # RUNNING TENSORFLOW PROGRAMS



# BUILDING NEURAL NETWORKS USING TENSORFLOW

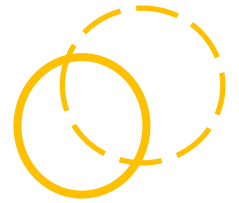
- ✚ TENSORS
- ✚ TENSORFLOW DATA TYPES
- ✚ CPU VS GPU VS TPU
- ✚ TENSORFLOW METHODS
- ✚ INTRODUCTION TO NEURAL NETWORKS
- ✚ NEURAL NETWORK ARCHITECTURE
- ✚ LINEAR REGRESSION EXAMPLE REVISITED
- ✚ THE NEURON
- ✚ NEURAL NETWORK LAYERS
- ✚ THE MNIST DATASET
- ✚ CODING MNIST NN



# DEEP LEARNING USING TENSORFLOW

- ✚ DEEPENING THE NETWORK
- ✚ IMAGES AND PIXELS

- ✚ HOW HUMANS RECOGNISE IMAGES
- ✚ CONVOLUTIONAL NEURAL NETWORKS
- ✚ CONVNET ARCHITECTURE
- ✚ OVERFITTING AND REGULARIZATION
- ✚ MAX POOLING AND RELU ACTIVATIONS
- ✚ DROPOUT
- ✚ STRIDES AND ZERO PADDING
- ✚ CODING DEEP CONVNETS DEMO
- ✚ DEBUGGING NEURAL NETWORKS
- ✚ VISUALISING NN USING TENSORFLOW
- ✚ TENSORBOARD



## **TRANSFER LEARNING USING KERAS AND TFLEARN**

- ✚ TRANSFER LEARNING INTRODUCTION
- ✚ GOOGLE INCEPTION MODEL
- ✚ RETRAINING GOOGLE INCEPTION WITH OUR  
OWN DATA DEMO
- ✚ PREDICTING NEW IMAGES

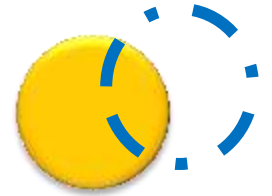
TRANSFER LEARNING SUMMARY

EXTENDING TENSORFLOW

KERAS

TFLEARN

KERAS VS TFLEARN COMPARISON



**GETTING A HIGH PAYING JOB OR  
SETTING UP YOUR BUSINESS**

**BEST WISHES FOR YOUR GREAT  
ENDEAVORS & FUTURE!**

**THANK YOU!**

