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ACADEMY



PILAT EUROPE
Leading a new era of human resources

Boost Program

SUMMER EDITION 2020

Artificial Intelligence Package: Nostradamus

- ✓ Introduction to Computer Vision
- ✓ Data Science and Machine Learning Practical tools and programming

KAÏNA-COM TRAINING CATALOGUE

Introduction to Computer Vision

Assessment of the basic functions of computer vision



KDS004 – Introduction to Computer Vision

Reference KDS004

Experience

- Beginner
- Intermediate
- Advanced

Duration Training Program:

- 2 days

Training Method

- I: i-learning, individual training (web-based training)
- V: v-learning, virtual class

C: c-learning, classroom training

KAÏNA-COM

LE CARRÉ HAUSSMANN II,
6 Allée de la Connaissance
77127 Lieusaint - France

Prerequisite One to two years programming skills in any other languages

Audience Data Scientist, High level Managers, Presale Managers, IT Managers, QA and Technical Support or those who wants to know more about Computer Vision.

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KDS004 – Introduction to Computer Vision, Continued

Objective

This course holds two days of the basic functions of computer vision including:

- Basic filters,
- Edge detectors,
- Feature extractor,
- Object (face) identifier,
- Optical flow
- Additional subjects.

The students are experiencing this field by coding in matlab and python with openCV

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KDS004 – Introduction to Computer Vision, Continued

Course Contents

Course Contents :

Table 1: KDS004 - Course Contents (Day#1)

Chapter	Description
Image processing & Matching	<ul style="list-style-type: none"> • Introduction to OpenCV with Python • Installation / API
Basic Operators	<ul style="list-style-type: none"> • Median, Box, common neighbors • convolution and kernel filters • Coding example: filtering an image and seeing results • Segmentation and thresholding methods • Morphological operators: dilate erode • Coding example: dilate/erode showing results and solving a basic problem • Connected components and labeling
Edge /Corner / Line detectors	<ul style="list-style-type: none"> • Sobel • Canny • Roberts • Laplacian • Hough transform • Coding example: running Sobel vs Canny and watching results
Image Matching	<ul style="list-style-type: none"> • Harris • Scale Invariant <ul style="list-style-type: none"> – why?? – SIFT • Advance Lab <ul style="list-style-type: none"> – SIFT – Effects of different params/config (bins, scaling, best match vs NN) – Effects of Noise in the image • SURF

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KDS004 – Introduction to Computer Vision, Continued

Course Contents, continued

Table 2: KDS004 - Course Contents (Day#2)

Chapter	Description
Object detectors	<ul style="list-style-type: none"> Object detection <ul style="list-style-type: none"> – Theory Face detection <ul style="list-style-type: none"> – Viola jones Haar Filters & Integral Image HoG
Mapping transforms - optional	<ul style="list-style-type: none"> Theory: Translation, Rotation, Rigid body, affine perspective Lab OpenCV transformations
3D understanding	<ul style="list-style-type: none"> Camera Projection theory Two cameras Structured light
Optical flow and tracking	<ul style="list-style-type: none"> Lucas-Kanade Theory Code Review in OpenCV (Link) & Applications
Deep Learning Intro	<ul style="list-style-type: none"> Overview of the technology Tools like Keras & TensorFlow
Summary including Q&A	<ul style="list-style-type: none"> Summary Exercise → Processing path: <ul style="list-style-type: none"> – Image processing & scaling ->Computer vision feature extraction ->Machine Learning classifier Q&A



KAÏNA-COM TRAINING CATALOGUE

Data Science and Machine Learning Practical tools and programming

Basis of understanding the data scientist environment, focusing mainly on common frameworks to enable selecting the appropriate approach to the problems at hands



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KDS001 – Data Science and Machine Learning Practical tools and programming

Reference KDS001

Experience

- Beginner
- Intermediate
- Advanced

Duration Training Program:

- 2 days

Training Method

- I: i-learning, individual training (web-based training)

V: v-learning, virtual class

C: c-learning, classroom training

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Prerequisite Basic programming skills in C, Java or any other language

Audience High level Managers, Presale Managers, IT Managers, QA and Technical Support or those who would like to understand the different problems that are suitable for machine learning and exercise different frameworks

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KDS001 – Data Science and Machine Learning Practical tools and programming, Continued

Objective

Data scientists use a set of algorithms which enables computers to solve problems that are classified on a higher complexity level than traditional algorithms. Examples of such cases are

- to predict a consumer behavior by its past choices,
- recognize a person within an image,
- “understand” written text,
- to predict a system failure or a cyber-attack.

Machine learning algorithms allow the computer to train and learn from its own mistakes and thus perfect its performance on new data.

This course gives the basis of understanding the data scientist environment, focusing mainly on common frameworks in order to enable selecting the appropriate approach to the problems at hands.

We will review various use cases and implement appropriate models and tools.

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KDS001 – Data Science and Machine Learning Practical tools and programming, Continued

Course Contents

Course Contents :

Table 1: KDS001 - Course Contents (Day#1)

Chapter	Description
Introduction to data science	<ul style="list-style-type: none"> • Examples and use cases • Statistics 101 • Machine learning introduction
Data preparation using various tools	<ul style="list-style-type: none"> • Exploratory data analysis • Cleaning the data • Filtering and scaling • Outliers and null values • PCA
Running machine learning algorithms	<ul style="list-style-type: none"> • Regression and decision trees • Statistical reasoning • Clustering • Weka Introduction
Mini project Part A: Recommendation System	<ul style="list-style-type: none"> • Data Preparation • Feature selection

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KDS001 – Data Science and Machine Learning Practical tools and programming, Continued

Course Contents, continued

Table 2: KDS001 - Course Contents (Day#2)

Chapter	Description
Machine learning in cloud environment, Big Data	<ul style="list-style-type: none">• Classification• Association Rules• Decision Trees
Validation of Results	<ul style="list-style-type: none">• Standard metrics• ROC curve analysis
Mini Project Part B: Recommendation System	<ul style="list-style-type: none">• Estimation of different models• Demo
Summary including Q&A	<ul style="list-style-type: none">• Summary including Q&A

