SMARTSIM

DL SMART-MV

MACHINE VISION COURSE

DE LORENZO

SMART SIMULATOR FOR LEARNING MACHINE VISION

The DL SMART-MV is a software that has been developed to teach industrial machine vision in a unique and effective way.

With this software, students can improve their individual experience on studying artificial vision in practice.

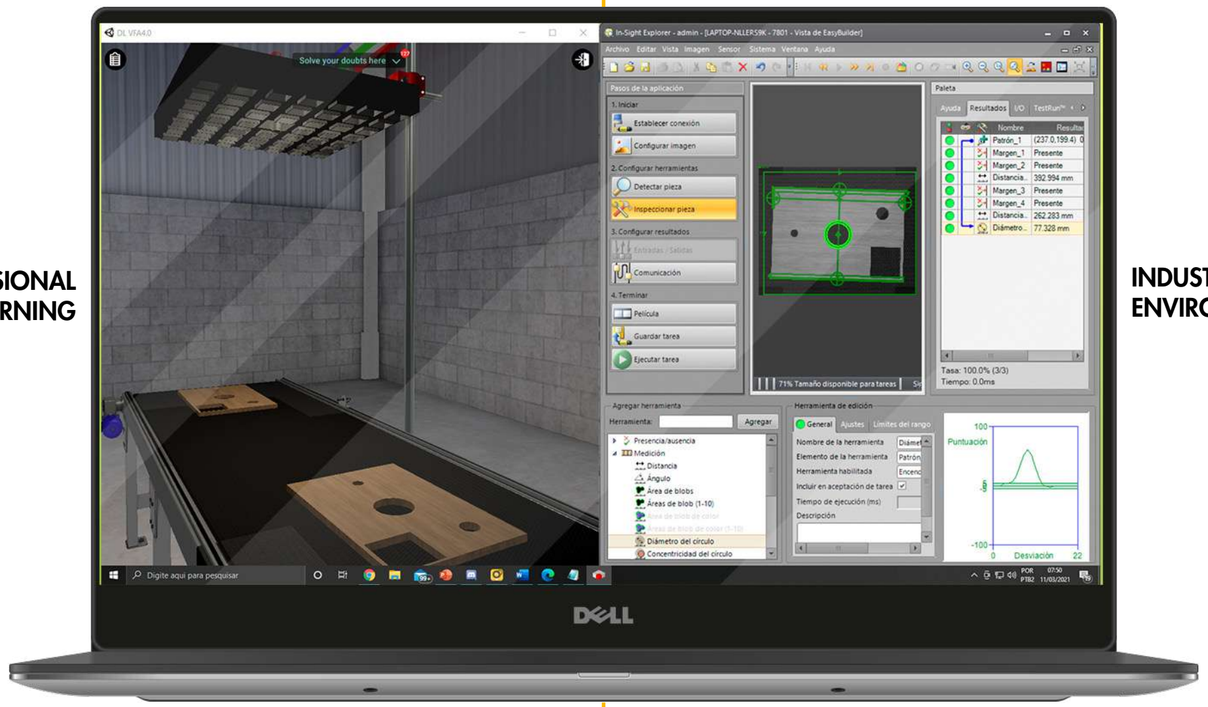
Professors can explore this trainer to provide experiments to students with the following topics:

- **Computational vision: cameras, illumination, colors;**
- **Methods of filtering and imaging;**
- **General concepts and standards;**
- **Edge detectors;**
- **Tools to detect position, recognize patterns, count, measure and read codes.**

This software works integrated to Cognex Insight software (Not included).

PYTHON PROGRAMMING TOOLS | **POWERFUL 3D SIMULATOR**

PROFESSIONAL LEARNING



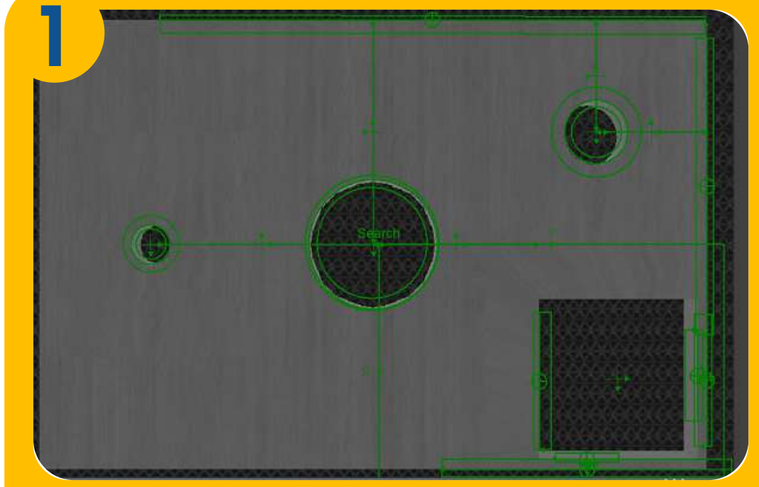
INDUSTRIAL REALISTIC ENVIRONMENTS

PROFESSIONAL EXPERIENCE | **REAL-LIFE SITUATIONS**

3D INDUSTRIAL REAL-LIFE SITUATIONS TO PROVIDE REAL PRACTICAL EXPERIENCE TO STUDENTS

EFFECTIVE LEARNING WITH GUIDANCE, REAL-LIFE PROJECTS, THEORY AND INSTRUCTIONS FROM BASIC TO ADVANCED

1

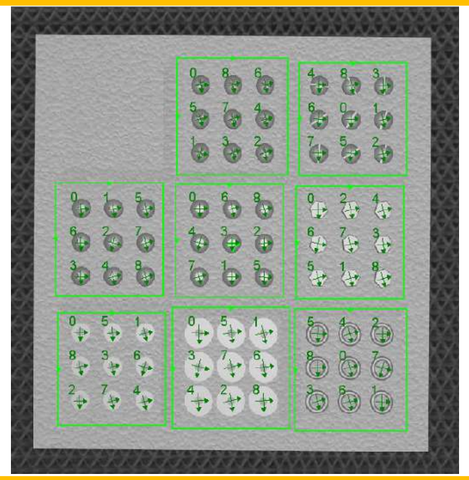


REAL TIME METROLOGICAL INSPECTION

Goal: The student is required to implement a measurement system to inspect furniture parts in real time, in a production line.

Automation contents: Cognex In-Sight software, system setup, positioning, calibration, measurement tools, use of the spreadsheet, inspection validation.

2



PATTERN RECOGNITION AND COUNTING

Goal: The student is required to implement a machine vision system using Cognex In-Sight to inspect if all assembly components are being provided in the correct quantities with the furniture.

New automation contents: pattern recognition, counting.

3

READING BAR CODES AND OCR

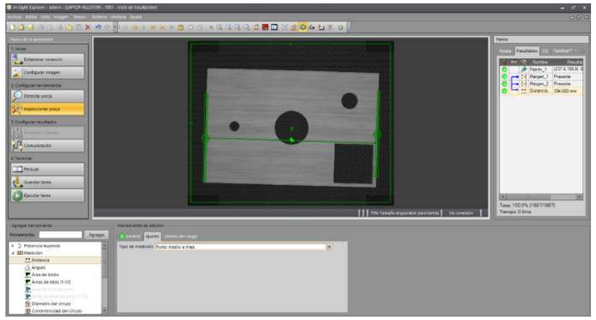
Goal: The student is required to implement a machine vision system to read the tag on the furniture box in order to ship it to the right customer.

New automation contents: OCR, bar code, data-matrix reading tools.

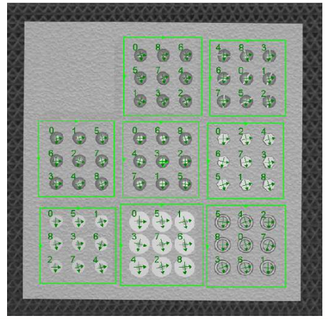
STUDENT CAN LEARN AND PRACTICE FROM BASIC TO ADVANCED
MACHINE VISION TOPICS

With the industrial 3D environments and also the built-in projects it´s possible to develop solutions in a software widely used in industries and work with very useful features.

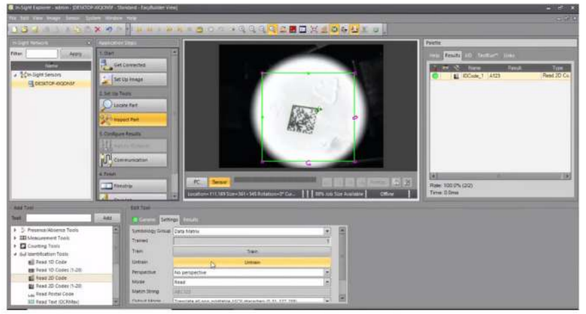
MEASURING



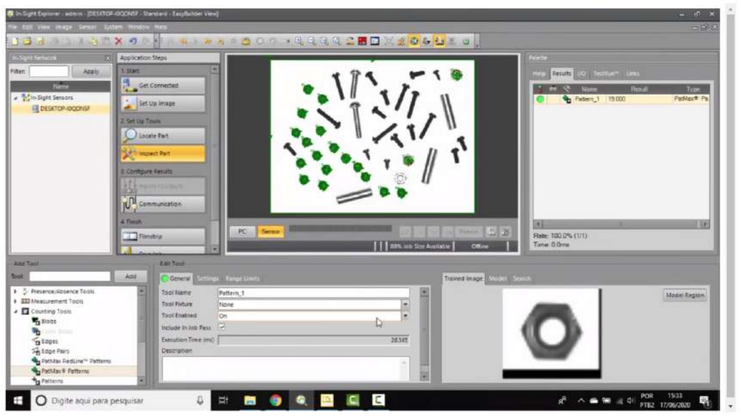
COUNTING



DATA MATRIX READING



PATTERN RECOGNITION



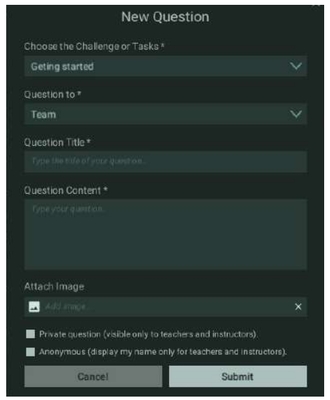
OPTICAL CHARACTER RECOGNITION

WHY IS IT A SMARTSIM?

IT CONNECTS PROFESSOR, STUDENT AND SCHOOL

De Lorenzo´s cloud server receives students activities and provides reports and analytics to professors and institutions. Besides, a student can start working at school and continue at home or vice-versa.

The platform includes a query and answer system that enables professors to support the students counting on a team of monitors. That means better support with less effort of the professors. The students can see questions asked by other colleagues too so that way if more than one student have the same doubt the professors answer will attend them all.



COMPATIBLE WITH THE DL SMART-DASHBOARD (SOLD SEPARETLY)

PROFESSORS CAN FOLLOW STUDENTS PROGRESS

The professor can do and access everything the student can. Besides, he/she can also access the dashboard's portal. It includes interesting reports and analytics that help the professor to monitor the group in real time, as well as to identify students who are doing very well, as well as those who need help, who are not working at all and who seem to be "cheating".

Tasks report

This is an important tool since it provides evidence of the activities a student worked on. That means the school has evidence of the practical activities the distance learner has done with detailed information about it.

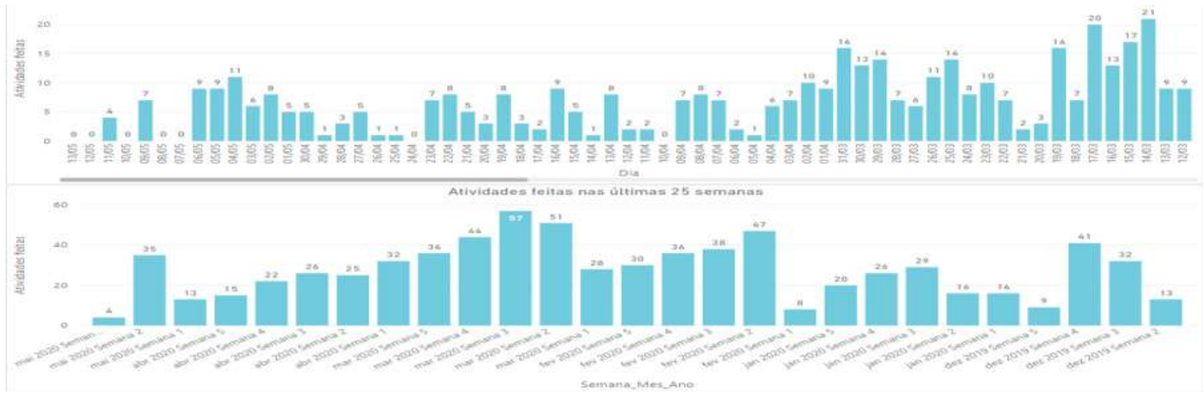
Curso	Tarefa	Timestamp	IsDon
Scripts	1.1 - Abrindo uma tela modal	3/9/2020 6:33:37 PM	False
Desenvolvimento de sistemas supervisórios	2.6 - Implementar Gráficos	11/22/2019 7:14:00 PM	False
Desenvolvimento de sistemas supervisórios	2.5 - Montar interface principal	11/18/2019 5:04:15 PM	True
Desenvolvimento de sistemas supervisórios	2.4 - Construindo os objetos da aplicação	11/18/2019 4:28:54 PM	True
Desenvolvimento de sistemas supervisórios	2.3 - Explorando Recursos	11/15/2019 5:35:44 PM	True
Desenvolvimento de sistemas supervisórios	2.2 - Conhecendo o Elipse E3	11/15/2019 5:10:00 PM	True
Desenvolvimento de sistemas supervisórios	2.1 - Comunicação OPC	11/14/2019 12:57:42 PM	True
Desenvolvimento de sistemas supervisórios	1.8 - Comandos pelo supervisório	11/14/2019 11:25:14 AM	True
Desenvolvimento de sistemas supervisórios	1.7 - Implementando alarmes	11/8/2019 7:33:30 PM	True

PROFESSOR CAN SEE WHICH STUDENTS ARE ON SCHEDULE

With this interface, the professor may choose which groups he/she wants to monitor, to verify who is on schedule, who is pending and so on. It is possible to define the expected progress percentage in relation to the tasks available in the course.

RHYTHM

This other dashboard shows the number of activities the students did daily and weekly. The professor may decide to verify it regarding a whole group/class or a specific student.



EFFORT/TASK DEDICATED TIME

If the professor selects a student, he/she may verify how much time the student took to develop and deliver each task of the course.

Tempo por tarefa

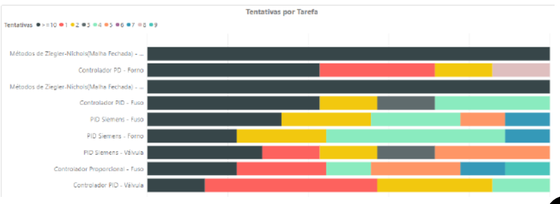
Tarefa	Duracao Total (h)
Controlador ON-OFF - Forno	4.33
Estudando a Planta - Forno	4.08
Controlador PI - Forno	3.14
Resposta transiente e estacionária - Forno	2.50
Estudando a planta - Fuso	2.45
Métodos de Ziegler-Nichols(Malha Fechada) - Forno	2.35
Controlador PD - Forno	1.99
Controlador ON-OFF - Válvula	1.88
PID Siemens - Forno	1.63
Controlador Proporcional - Forno	1.44
Controlador PI - Válvula	1.42
Métodos de Ziegler-Nichols(Malha Aberta) - Forno	1.29
Estudando a planta - Válvula	1.22

PROGRESS VS TIME TAKEN

It is also possible to verify the distribution of the dedicated time with relation to the number of tasks done by each student at any period of time. That helps to identify who is doing well, who may need help, who is doing nothing and who is trying to cheat.

TRIALS PER TASK

This chart helps the teacher to understand which task may be the most difficult and which one may be the easiest in order to adjust the deadlines.



SUMMARY OF FEATURES

IT'S A 3D SIMULATOR

IT HAS BUILT-IN PROJECTS

MEASURING PARTS

TASK SPECIFICATIONS

Your first job in this project is to implement a system to make measurements using Machine Vision in order to assure 100% conformity with the specification.

SOFTWARE SETUP

Since it's your first time with In-Sight it's important that you learn how to use it. The following material will be helpful.

- Configuration and Setup
- Menu items - Part 1: basic features
- Menu items - Part 2: image features
- Menu items - Part 3: application features

THE PROJECTS INCLUDE GUIDANCE

READING TEXTS

Now that we can read the data from the Data Matrix, we also need to read the data that is on the package in text form. Reading characters can be a very complicated task to implement, but the In-Sight already provides a ready and easy tool to use.

To understand a little bit about this tool you can access the link below, on it you will learn how to automatically validate texts in a very simple way.

- Texts reading

As we have three texts, you should use the tool **three times** positioning it on the appropriate texts, one for the customer, one for the city and one for the store number. For the delivery, put the customer's name in the cell "M10", city in "M11", the store in "M12" and the reading of the Data Matrix in "M13".

+ CONTENTS AND SUPPORT MATERIALS, SO THEY CAN LEARN BY THEMSELVES

STUDY AND LEARN

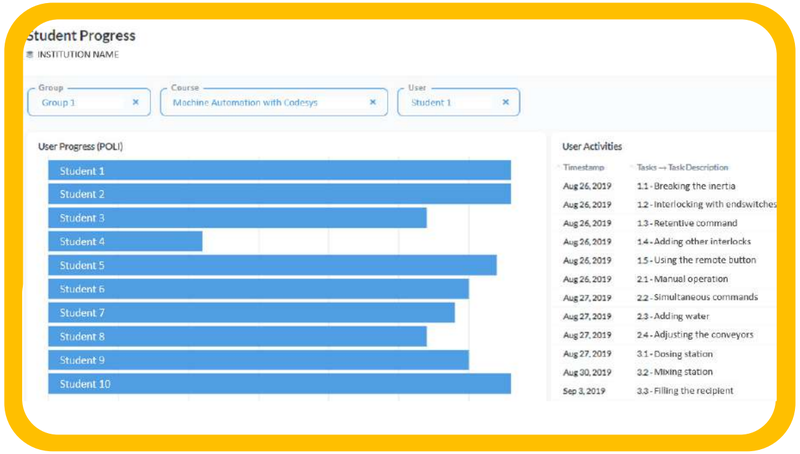
Before you work on anything, we recommend that you study the following material to understand:

- what machine vision is
- why one should use it
- what are its key parts
- and what it has to do with industry 4.0

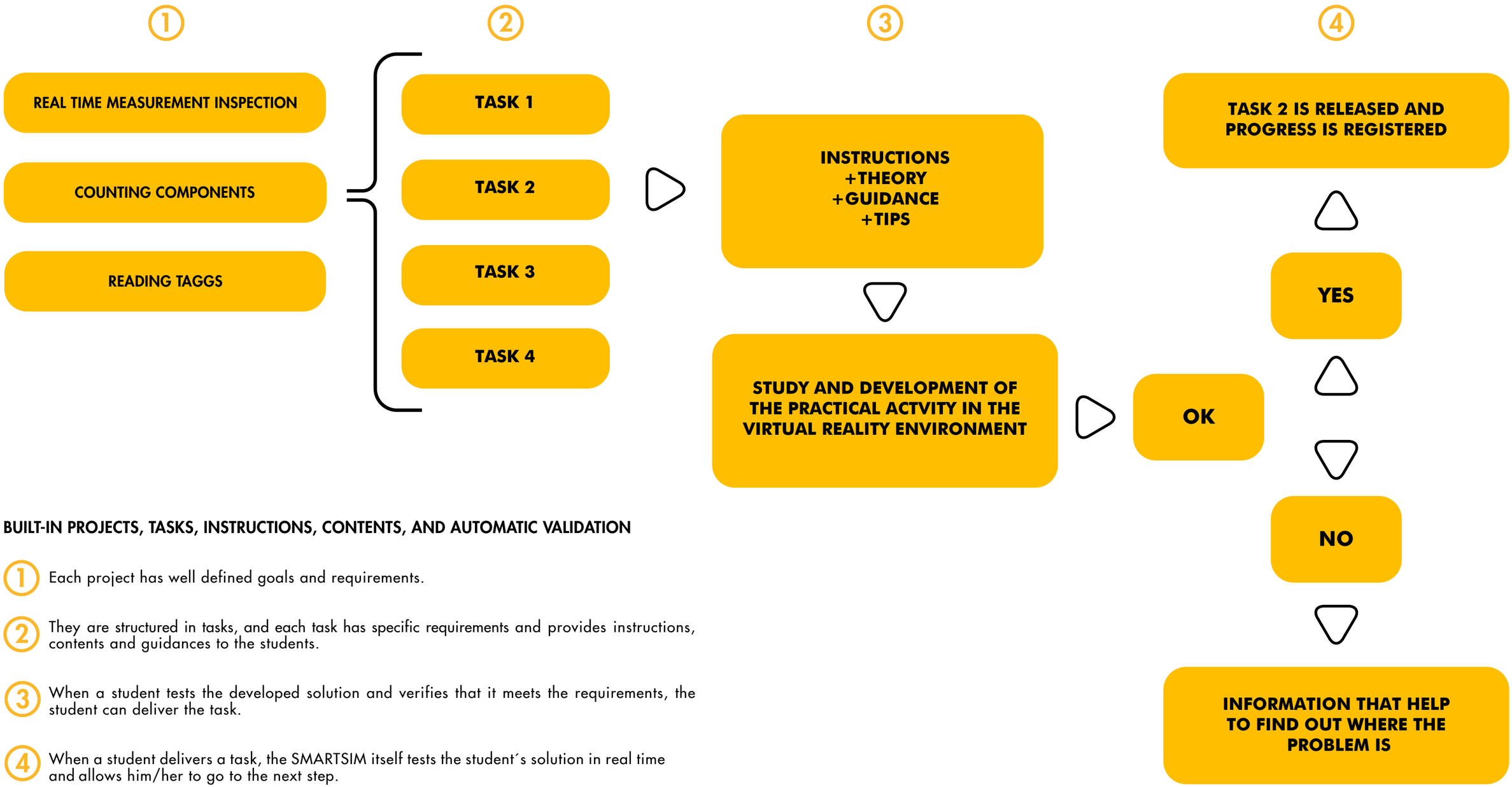
The materials provided are from 2 of the main manufactures of machine vision systems: Cognex and Omron.

IT AUTOMATICALLY CHECKS STUDENT ACTIVITIES TO LET THEY MOVE ON, LIKE IN GAME

PROFESSORS CAN MONITOR STUDENTS, AND VERIFY WHICH POINT THEY NEED HELP



HOW ARE BUILT-IN PROJECTS STRUCTURED?



BUILT-IN PROJECTS, TASKS, INSTRUCTIONS, CONTENTS, AND AUTOMATIC VALIDATION

1. Each project has well defined goals and requirements.
2. They are structured in tasks, and each task has specific requirements and provides instructions, contents and guidances to the students.
3. When a student tests the developed solution and verifies that it meets the requirements, the student can deliver the task.
4. When a student delivers a task, the SMARTSIM itself tests the student´s solution in real time and allows him/her to go to the next step.

SYSTEM REQUIREMENTS

ORDER CODES

DL SMART-MV

MACHINE VISION COURSE

DL-SMART-DASHBOARD

CLASSROOM MANAGEMENT FOR SMARTSIMs

IMPORTANT NOTE:

THIS PRODUTS DO NOT INCLUDE ANY THIRD PARTY SOFTWARES. TO OUR KNOWLEDGE, COGNEX INSIGHT EXPLORER CAN BE FREE DOWNLOADED ON COGNEX WEBSITE.

MINIMUM REQUIREMENTS

OPERATIONAL SYSTEM

64-BIT WINDOWNS 10

DIRECTX VERSION

DIRECTX 11

PROCESSOR

INTEL i5 9400F OR AMD RYZEN 5 3600

MEMORY

8GB

GHRAPHIC CARD

STORAGE

HDD (1GB)

RECOMMENDED REQUIREMENTS

OPERATIONAL SYSTEM

64-BIT WINDOWNS 10 PRO

DIRECTX VERSION

DIRECTX 12

PROCESSOR

INTEL i7 9700 OR AMD RYZEN 7 3700X

MEMORY

16 GB

GHRAPHIC CARD

NVIDIA GTX 1050 TI 4GB OR RX 550 4GB

STORAGE

HDD (1GB)