

## **Internship R&D at ENGIE Lab – Object Detection and Recognition from Visual Documents**

### **Description:**

ENGIE Lab CRIGEN is a centre of research, development and operational expertise dedicated to gas, new energies, and emerging technologies. Located in the Paris region in the city of Stains, it has about 200 employees. It supports the business by providing cutting edge expertise and develops tested, proven, and marketable industrial applications. CRIGEN is committed to sharing novel ideas, scientific knowledge and technical expertise and its ability to innovate is a key advantage for the ENGIE Group.

Currently, the need for scene text recognition and detection in business applications is rising due to the importance of information in the images. In this context, the processing of business documents such as invoices [1] is playing a vital role at ENGIE. Visual documents are classified where relevant details are extracted manually and putted into database systems for further processing. The information recognized in the visual documents has advantages as it is:

1. Time saving;
2. Efficient and reliable: The data will be recognized easily and avoids human error (if performed manually);
3. Easier to understand the data for particular entity (country, city, business unit, code, product, etc.);
4. Improves the decision making of the organization with useful information;
5. Easy and efficient to convert data into digitalized format.

In this context, the trainee project will concern the combination of computer vision and natural language processing techniques to automatically extract key information from visual documents (image, plan, invoice, etc).

As a trainee, you will explore different tasks for visual document analysis such as:

- Optical character recognition (OCR)
- Object detection (text, symbols, lines, etc)

You will have the opportunity to join the Computer Science and Artificial Intelligence Laboratory (CSAI). You will be integrated in the group and work closely with scientists and engineers.

### **Tasks and Responsibilities:**

1. State of the art on object detection and recognition from visual documents;
2. Proposal of key information extraction approach;
3. Designing and development of the proposed approach;
4. Drafting of work documentation as required;

5. Contributing to academic research papers.

### **Trainee profile**

M2, computer engineering school, you have a technical profile in software development and a knowledge on machine learning, deep learning and data science.

### **Requirements:**

- Good knowledge (theoretical and applied) in Machine Learning (ML), Deep Learning and computer vision;
- Strong knowledge skills on Python and ML frameworks (sklearn, tensorflow, pytorch);
- Self-driven and comfortable working independently and in teams;
- Fluent in English;

### **Other details:**

- We propose 6 months contract for start-up as soon as possible;
- Please attach your CV, cover letter and transcripts;
- Localisation: CRIGEN (Centre de Recherche et d'Innovation dans le Gaz et les Energies Nouvelles) ENGIE in 4, rue Joséphine Baker 93240 - Stains - (RER D, Tram 11) ;
- Contacts: [rim.hantach@external.engie.com](mailto:rim.hantach@external.engie.com) and [gisela.lechuga@engie.com](mailto:gisela.lechuga@engie.com) (CV, cover letter, gradebooks, company presence planning)
- Email Subject: [Internship R&D at ENGIE LAB – Object Detection and Recognition from
- Visual Documents]

### **References:**

- [1] Cha, Jae-Min & Lee, Taekyong & Salim, Shelly & Ryu, Bohyun. (2019). Object Detection for P&ID Images. I3CDE.
- [2] Wenwen, Yu & Ning, Lu & Xianbiao, Qi & Ping, Gong & Rong, Xiao. (2020). PICK: Processing Key Information Extraction from Documents using Improved Graph Learning-Convolutional Networks.
- [3] Yu, & Cha, & Lee, & Kim, & Mun, Duhwan. (2019). Features Recognition from Piping and Instrumentation Diagrams in Image Format Using a Deep Learning Network. Energies.