Université de Rennes

Direction de la Recherche et de l'Innovation

Appel à projets - Année 2026

Contrats doctoraux «Ordinaires»

ECOLE DOCTORALE : MATISSE **POLE DE RECHERCHE : Mathématiques-numérique**

Unité de recherche d'accueil

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Sujet

Titre : Advanced Visual-Language Transformer for Historical newspapers understanding

Mots clés : Historical newspapers, Deep learning, Text recognition, Machine Learning, Layout Analysis, Historical Document

Cotutelle internationale (oui/non) : Non **Si oui, préciser l'établissement et le pays de rattachement** :

Descriptif (15-30 lignes) :
Contexte socioéconomique et scientifique ; Les hypothèses et questions posées ; Les grandes étapes de la thèse et démarche ; Approches méthodologiques et techniques envisagées

This thesis is in line with the domain of handwriting recognition and document analysis. The goal is to design an end-to-end model able to understand the inherent structure of documents, combined with text recognition. We focus on historical newspapers for the valuable data they contain. Historical newspapers offer a very interesting study case. 1) This is challenging, as older documents present increased difficulties due to the old language, the style of writing, the deterioration of the document or low-quality digitizations, which often make the task of transcribing a specific document difficult and troublesome, even for an expert. 2) The layout of newspapers is highly codified, with several levels of hierarchy, leading to a complex document structure, but with high variabilities depending on pages or editors and guided by some implicit rules regarding the reading order.

We are interested in designing an advanced Transformer-based model, able to localize, recognize and understand the content of historical newspapers. The aim is to leverage from external knowledge about how a newspaper is structured to constrain the model's behavior, making training easier. One way could be to prevent the Transformer attention to attend to specific parts of the image, because it does not make sense to look at them during the recognition process. Another way could be to propose adaptative loss function for training specific parts of the networks.

This thesis is conducted in connection with the LabCom Synapses in partnership with the Ouest-France company. We are considering publications in high-level conferences or journals covering the Machine Learning domain (e.g. CVPR, NeurIPS, ICML) and the document analysis field (ICDAR, IJDAR)

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➢ **Ce document est à renvoyer par la direction de l'unité de Recherche aux animateurs du Pole Recherche et à l'école Doctorale pour le 13 février 2026 au plus tard**