ROADMAP

Final Year Internship 2023

THE FUTURE IS YOU

SOCIETE GENERALE

Centrale CASABLANCA

1. INTERNSHIP SUBJECT

Distillation Learning is one of the hot research topics in the field of machine learning. The internship is about assessing some of its applications for model risk management **(MRM)** usages at Société Générale.

MRM is a depeartement focuses on assessing and challenging banking models to enhance, upgrade, or adapt their performance. For a regression model, MRM department will be interested in assuring if hypotheses are verified such as independency, identical distribution of individuals, Homoscedasticity, etc., and developing other models for banking and financial uses.

As a data scientist intern, my role is to explore distillation learning applications for potential usages in MRM. So far, the literature review has been done and the deliverable will be a synthetic review note due 16/05.

2. DEFINING THE PROBLEM

The internship subject is clearly stated, and the problem is already defined that is **explore usages of knowledge distillation for useful MRM applications**. However, during the literature review, we have focused on knowledge distillation applications in explainable artificial intelligence **(XAI),** model complexity reduction, and model performance enhancing.

3. INTERNSHIP GANT DIAGRAM

Task	Duration	Due Date	Remarks
Knowledge Distillation Techniques and Applications 1- Literature Review Note 2- Existing Packages Review 3- Identifications of Potential Use Cases	1 month	5/10/23	Editing a scientific synthetic note about knowledge distillation usages and techniques
Workshop 1: Literature Review Presentation and Use Cases.	3 days	5/26/23	
Coding Part 1- Example Implementation and Package Creation 2- Test on MRM missions such as Basel models, speech recognition and NLP projects 3- Comparing, synthetizing and note redaction	2 months	7/ 10/23	
Note de synthèse @Centrale Casablanca	2 days	6/30/23	Already Done
Creation of MRM tool	1 month	7/30/23	Specifications are to define with MRM data scientists' team.
Workshop 2: Resulats and Use Cases Presentation	3 days	to define	
Memory Redaction	1 Month	August	@Centrale Casablanca
MRM Distillation Learning Tool, packages developing	1 Month	9/25/23	

4. WRAP-UP

So far, a clear roadmap was set-up. The first step about the synthetic note of literature review was already done. We are now at the phase of identifying usages that will potentially catch MRM team attention for code development, benchemarking and tests.

5. REFERENCES

1. Craven and al., 1995: Extracting Tree-Structured Representations of Trained Networks
2. Caruana and al.,2006: model compression
3. Hinton and al.,2015: Distilling the Knowledge in a Neural Network
4. Han and al., 2015: Learning both Weights and Connections for Efficient
5. Hoffman and al., 2015: Cross Modal Distillation for Supervision Transfer
6. Zagoruyko and al., 2017: Attention Transfer
7. Huang and al., 2017: Knowledge Distill via Neuron Selectivity Transfer
8. Caruana and al., 2017: Interpretable & Explorable Approximations of Black Box Models
9. Burda, Edwards and al., 2018: Exploration by Random Network Distillation
10. Caruana and al., 2018: Distill-and-Compare: Auditing Black-Box Models Using Transparent Model Distillation
11. Liu and al., 2018: Improving the Interpretability of Deep Neural Networks with Knowledge Distillation
12. Asadulaev and al., 2019: Interpretable Few-Shot Learning via Linear Distillation
13. Bastani and al., 2019: Interpreting Blackbox Models via Model Extraction