

Enhancing Named Entity Recognition for Agricultural Commodity Monitoring with Large Language Models

EuroMLSys '24, April 22nd 2024, Athens, Greece

Abir Chebbi, Guido Kniesel, Nabil Abdennadher, Giovanna Di Marzo Serugendo



**UNIVERSITÉ
DE GENÈVE**

Hes·SO  **GENÈVE**
Haute Ecole Spécialisée
de Suisse occidentale

Introduction

- Effective crop quantity & price monitoring
- Vital for food security & global economy



- Need expressed by governments & agri-business
- Essential for informed decision-making

Challenge

- Processing unstructured data
- Massive data volumes in agriculture sector



Objectives

Improve data accessibility through automated tagging and categorization using NER.

We assess the effectiveness of LLMs in NER specifically for agricultural commodity monitoring.

Methodology

- We used AWS Ground Truth for annotation.
- The study involved a total of 395 samples extracted from various sources.

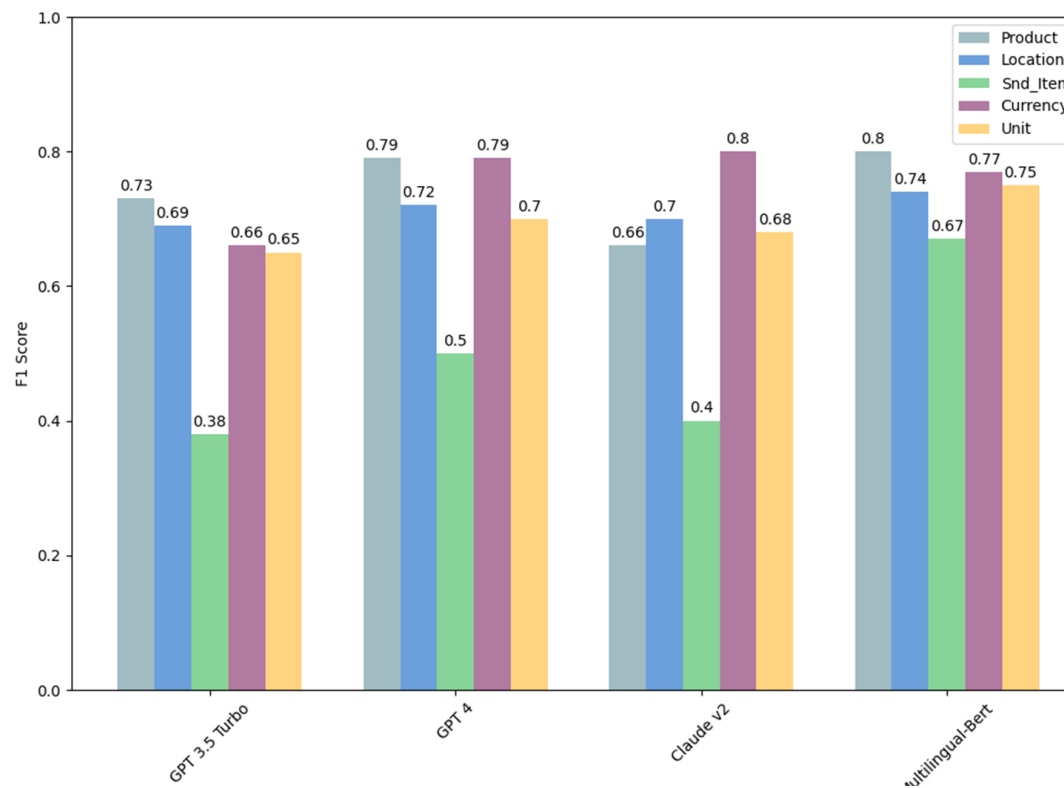
Entity	Entity description	Examples
Product	Words that denote a specific product or item in the agriculture domain	Corn, Cotton Wheat, Cattle Mutton, Poultry etc.
Location	Words that represent geographical locations, such as city names, countries, etc.	Decatur, IL , OHIO, Fort Dodge, etc.
Snd_item	reference for something in the inventory's lifecycle	inventory, livestock, exports, demand, etc.
Currency	Words that represent various types of currency	Brazil Cruzado Novo ,Iraqi Dina Egyptian Pound US Dollar, etc.
Unit	Words that denote units of measurement in various contexts	USD per metric ton, hectare, tons, meter, Day, Week, etc.

Models

- Large Language Models(LLMs):
 - Models: GPT-3.5 Turbo, GPT-4, and Claude v2.
 - Technique: We used the few-shot prompting technique.
- Base Model:
 - Model: The Multilingual BERT model, facilitated by the spaCy-transformers library.
 - Data allocation: 60% of the samples were allocated for training the model, while 40% were used as the evaluation set.

Results

Comparing the F1 scores of various language models for NER tasks, specifically in identifying the five entities.



Conclusion

- Broaden entity recognition for better analytics
- Develop methods for model reliability verification
- Explore continuous learning for model relevance



THANK you for your attention!