

# Applied Data Science Project

*“Generation of video reviews based on textual descriptions”*

## Checkpoint II:

- Objective(s)
- Data processing
- Foundation model
- Video generation
- State of the project

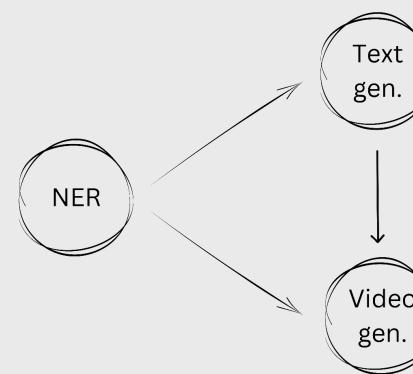
# Project (objectives)



12

RESPONSIBLE  
CONSUMPTION  
AND PRODUCTION

- Goal: a system able to generate text and video reviews from a list of features of a given product
- The **objective** is to increase the chance of a better match between customer and products
- The system is divided in three main components:



# Project (research questions)



12

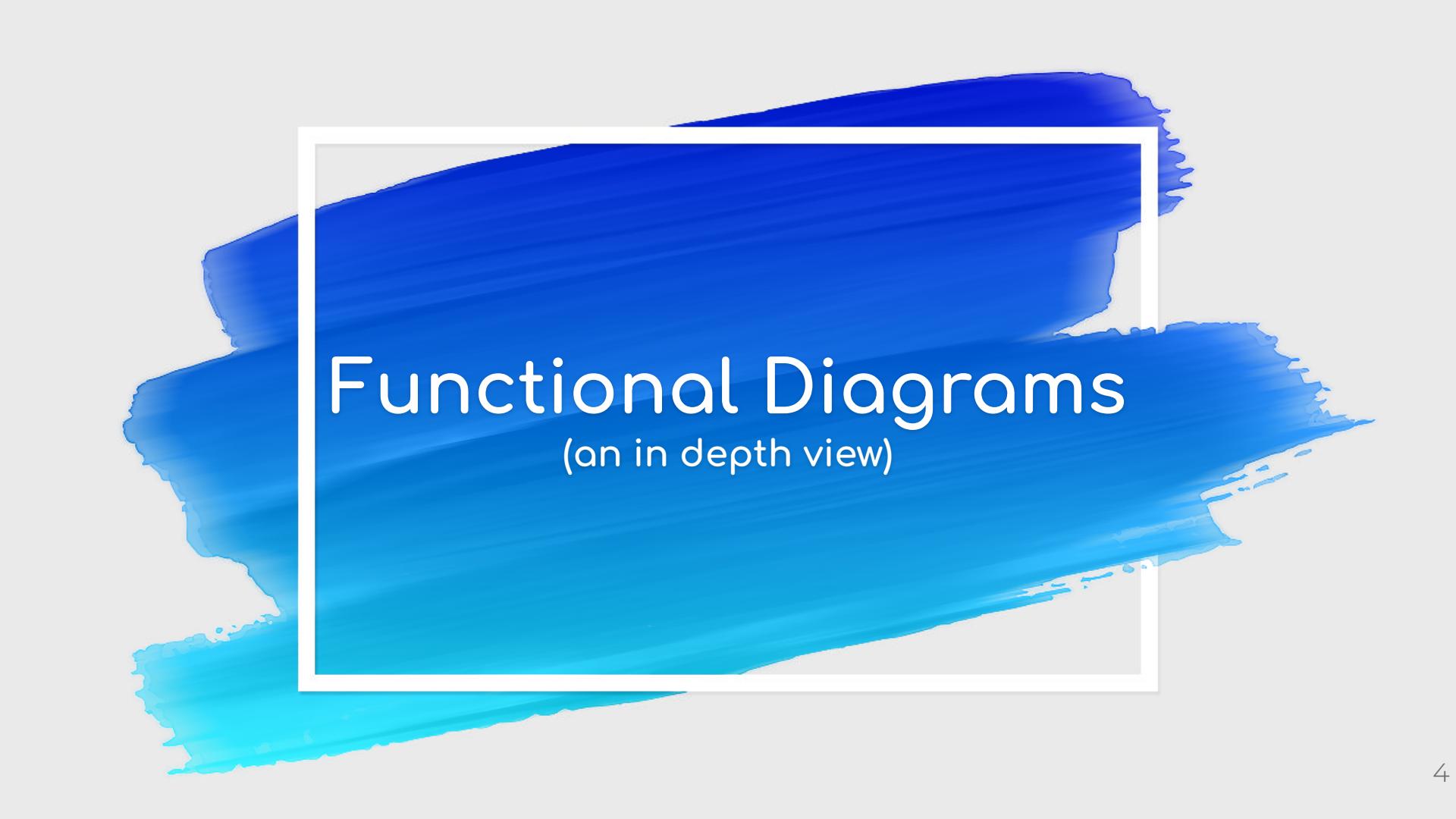
RESPONSIBLE  
CONSUMPTION  
AND PRODUCTION

Main criticalities/research questions:

- Can we obtain a dataset suitable for the fine tuning of the foundation model?
- Can we synchronize the audio and video on the video?
- Can we retrieve information from the output and compare it with the data we have in input?

We will further show:

- A more in depth view of the structure of the various modules
- Discussion on the data preprocessing (in particular the NER)
- Discussion on the foundation model
- First look at the video generation module



# Functional Diagrams

(an in depth view)

# What does the NER do?



Croma Electronic  
Products Dataset



Amazon Phone  
Dataset

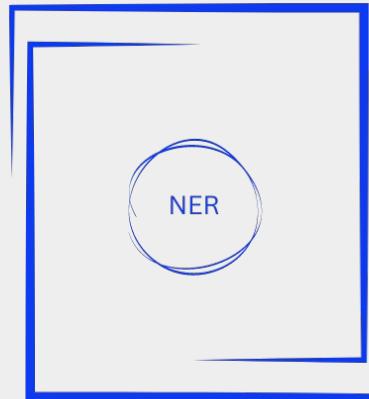


Amazon Product  
Info Sample



Merged dataset of  
reviews

INPUT



OUTPUT



Dataset of tagged  
reviews



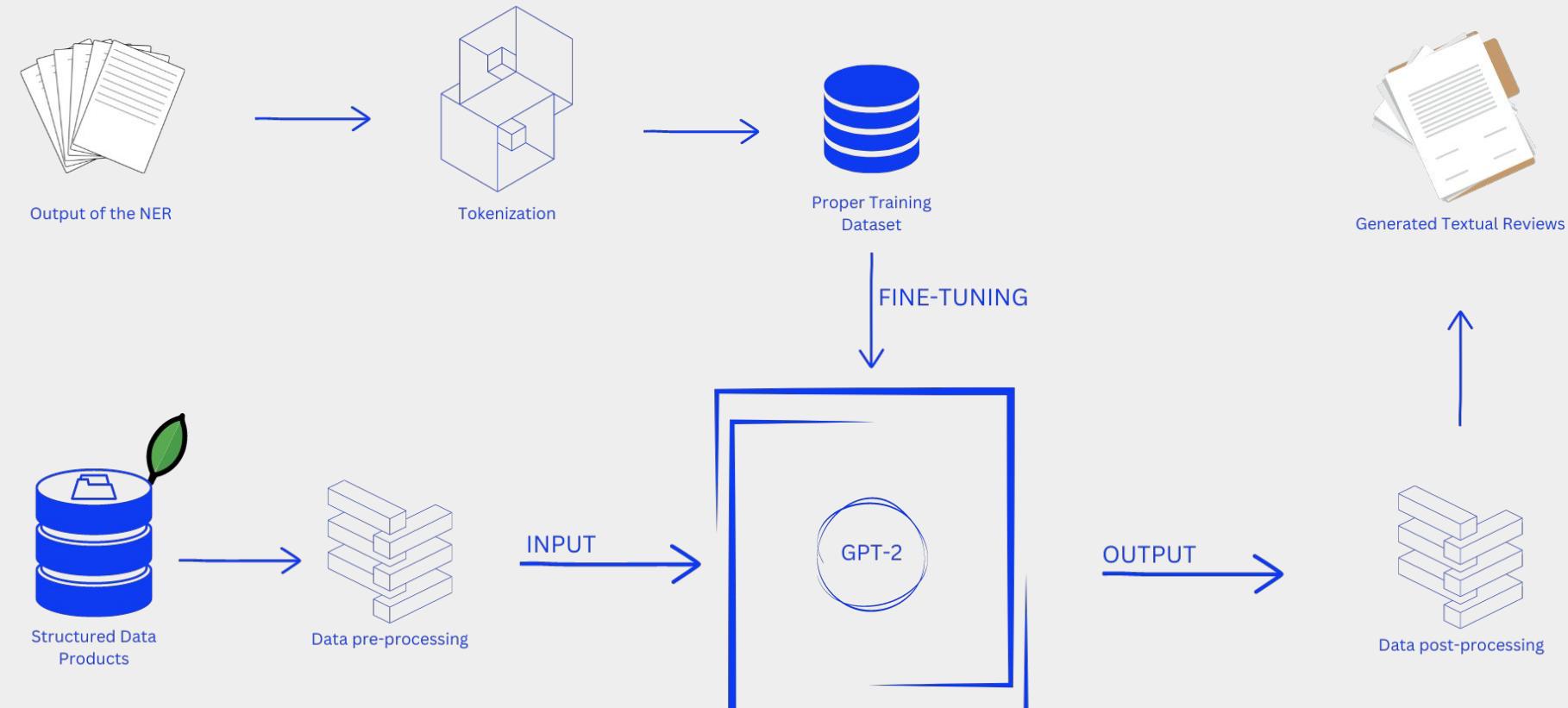
Manually Annotated  
Reviews



Data pre-processing

Built-in refrigerators come with a streamlined look and will blend seamlessly with your kitchen cabinetry. The new LG GL-T402JPZN Double-Door Refrigerator PROD comes with a brilliant design that will level up your kitchen decor. A galore of features makes this fridge the most desirable in the current market. It comes with a net capacity of 360 Litres ATTR and its 3 star rating is convincing because even continuous use will not consume much units.. Assortment of Features. The LG GL-T402JPZN Double-Door Refrigerator PROD gives you a range of features that come handy in your everyday usage. Completely frost-free operations makes sure your freezer isn't choked up with frost. It comes with Linear Cooling ATTR (Powered by Inverter Linear Compressor ATTR and Door Cooling Plus). Equipped with Smart Assistance and Control. The LG GL-T402JPZN Double-Door Refrigerator PROD is equipped with Catechin Deodorizer ATTR . It performs Stabilizer Free operation. It comes with Eco-friendly Refrigerant. It is designed with Pull out tray. It has levelling legs. Comes with Royale handle. Comes with Smart Diagnosis ATTR , Auto Smart Connect ATTR feature.

# GPT-2



## Structured Input

## Post-processed Output

# PHILIPS 65PUS7600 TV

#### ## GENERAL OVERVIEW

Enjoy a high-quality viewing experience with the brilliant PHILIPS 65 Inch TV that allows you to enjoy watching content with an ease. Enjoy a high-quality viewing experience with the brilliant PHILIPS 65 Inch TV that allows you to enjoy watching content with an ease. The television comes loaded with various connectivity features to ensure you enjoy watching content according to your convenience at all times. Apart from also giving you amazing picture quality and a viewing experience, the television gives you a very ergonomic and comfortable design which facilitates long hours of usage at all times. The amazing performance coupled with a sleek design makes the television a perfect option for you.

#### #### Brilliant Visuals

Enjoy an immersive viewing experience as the PHILIPS 65 Inch TV comes with various connectivity features that ensure you enjoy watching content according to your convenience. The Wi-Fi connectivity allows you to connect your television to a wide range of Wi-Fi devices so that you can enjoy your favorite movies, shows and songs on a bigger screen.

#### #### Ergonomic Design

Apart from giving you amazing picture quality, the television also boasts of a very ergonomic design which facilitates comfortable and convenient usage. The television comes with a 4K resolution that ensures you enjoy visuals that are up to 3840 x 2160 (4K) pixels.

#### ## KEY FEATURES & AUDIO

Enjoy the power of Dolby Vision on your television with the amazing PHILIPS 65PUS7600 TV which is sure to give you an amazing audio experience. Enjoy the power of Dolby Vision on your television with the amazing PHILIPS 65PUS7600 TV which is sure to give you an amazing audio experience. The Dts audio decoder technology gives you Dolby sound quality like never before to give you an amazing audio output so that you can enjoy every dialogue, every scene, from the highest settings to the darkest recesses of your mind. The Dts studio sound Dolby Technology gives you cinematic sound like never before to give you distortion-free audio and the Dts audio recorder gives you a hands-free TV experience so that you can enjoy your television viewing experience anywhere and anytime. The amazing features coupled with a user-friendly design makes it the perfect option for you.

#### #### Amazing Audio Output

Experience enhanced audio quality with the PHILIPS 65PUS7600 TV which is sure to mesmerize one and all with its cutting-edge technology. The Dolby audio technology allows you to enjoy distortion-free audio so that you can enjoy any dialogue, every scene, from the highest settings to the darkest recesses of your mind. The Dts studio sound Dolby Technology gives you Dolby sound quality like never before and allows you to enjoy distortion-free audio so that you can enjoy your television viewing experience anywhere and anytime.

#### #### Ergonomic Design

Apart from delivering high-quality sound, the PHILIPS 65PUS7600 TV comes with a very ergonomic and easy to hold design that makes it extremely easy to use. This ergonomic design ensures that it does not get in your way while you are watching a video or watching movies.

#### ## SPECIAL FEATURES & NETWORK & DISPLAY

The video player is responsible for providing the viewer with high resolution television content that is suitable for the viewing pleasure of the buyer. The video player is responsible for providing the viewer with high resolution television content that is suitable for the viewing pleasure of the buyer. In order to fulfill the buyer's expectation of viewing this television you need to have access to a high quality video player which offers you with perfect usage. The PHILIPS 65PUS7600 TV offers you with perfect usage. It comes with Miracast technology. It has 1 Motion Interpolation Frequency. It has Ethernet Port. It has Wi-Fi, RJ-45 Support. It supports Miracast (IPv4).

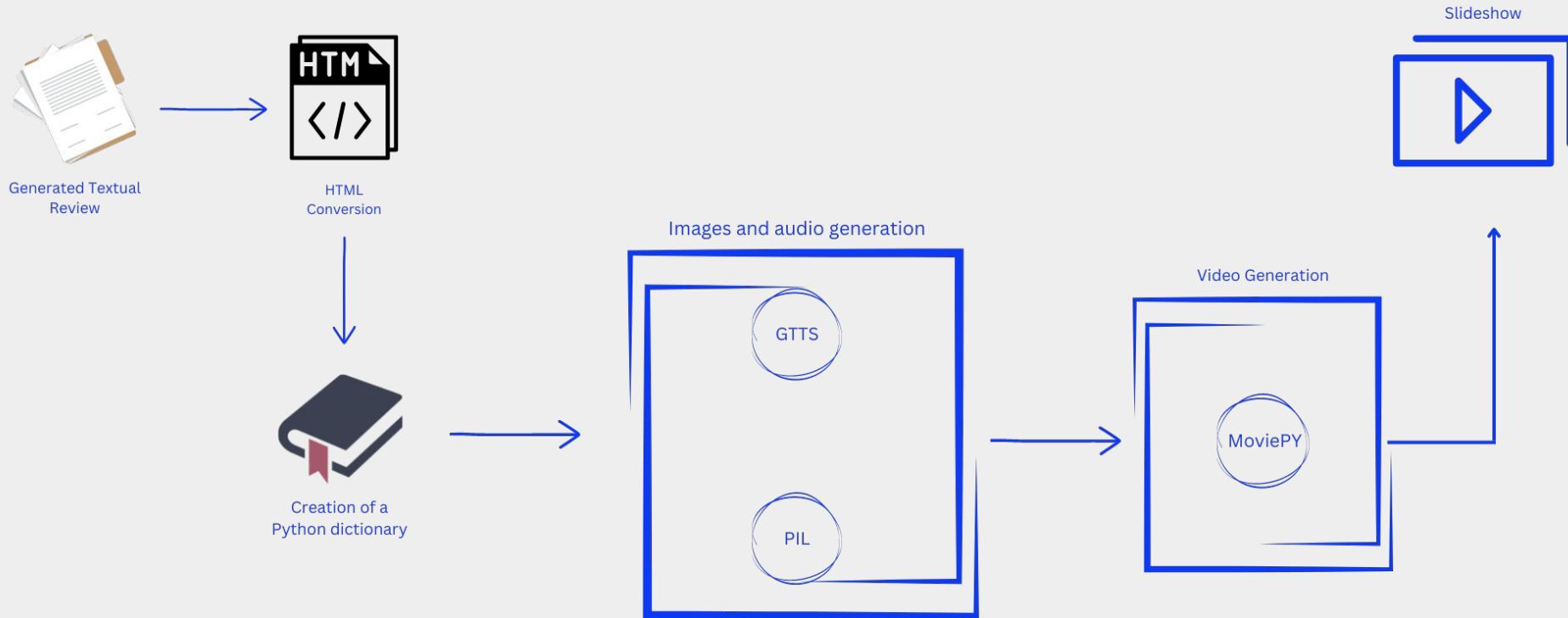
#### #### Perfect Usage

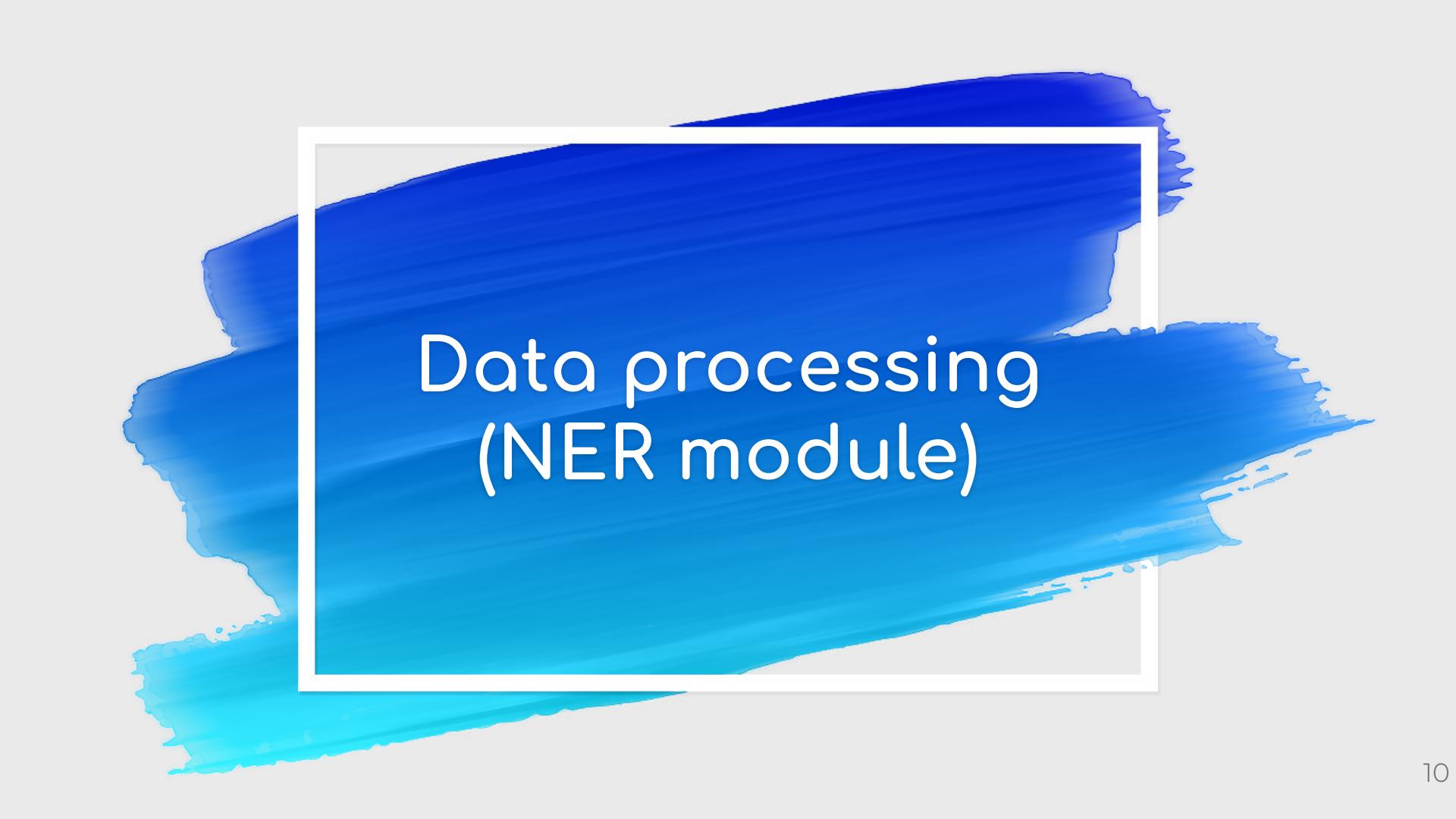
The PHILIPS 65PUS7600 TV offers with flat screen resolution. It comes with 4K (3840 x 2160 (4K) pixels. It enhances the viewing experience of the buyer. It supports Pmr (Perfect motion Rate) 1400 hz Motion Interpolation Technology. It also comes with Ethernet Port. It has Miracast (IPv4).

#### #### Awesome Design

The PHILIPS 65PUS7600 TV offers with flat screen performance. It comes with Flat screen technology. It comes with 3840 x 2160 (4K) pixels resolution.

# TTS and Slideshow Generation

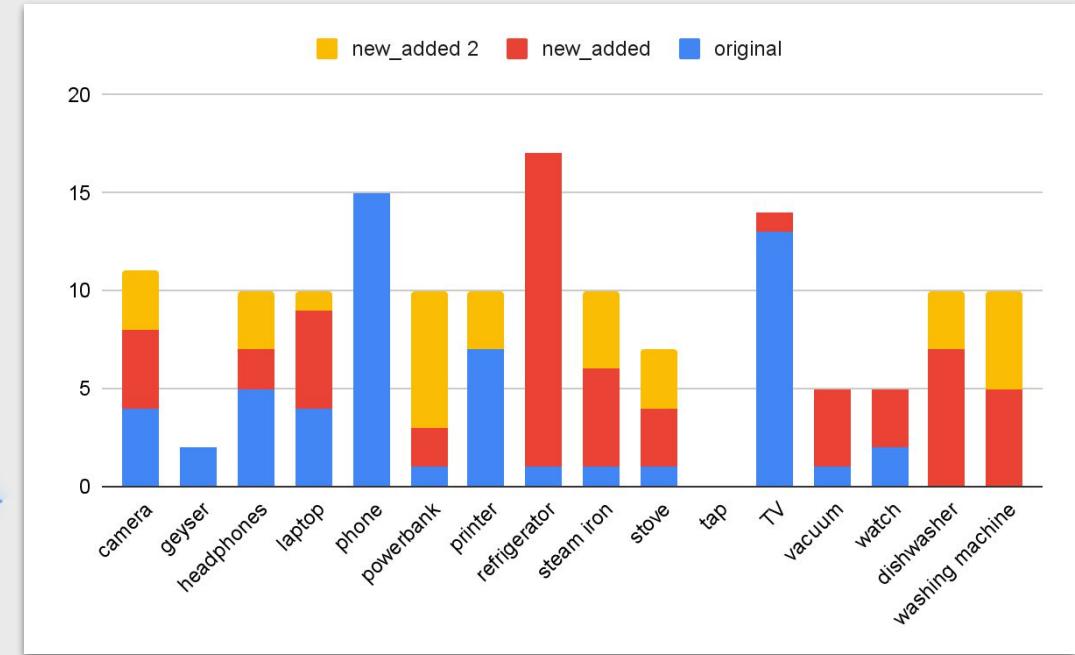


The background of the slide features a large, abstract brushstroke design. It consists of several overlapping layers of paint, primarily in shades of blue and white. The strokes are thick and expressive, creating a dynamic and artistic feel. The overall shape of the slide is defined by these brushstrokes.

# Data processing (NER module)

# NER

## Training Dataset



Criticalities:

- Database still not balanced enough
- Output model may have different performance with respect to different topics



# NER

## Evaluation metrics

Evaluation method:

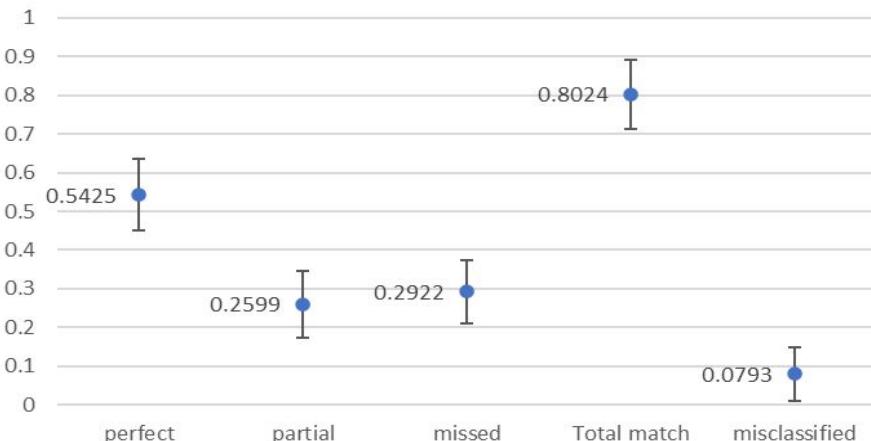
- K-Fold with 10 split

Metrics for evaluation :

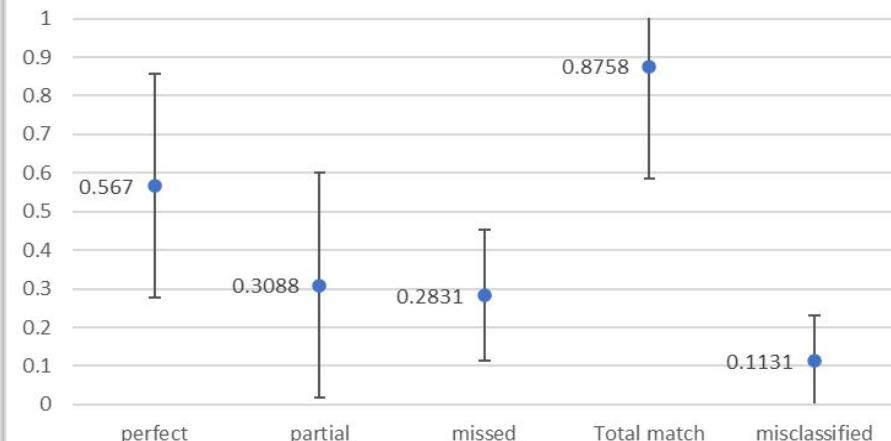
- Perfect match
- Partial match
- Missed
- Misclassified
- Total match

# Original NER performance

ORIGINAL NER ATTRIBUTE PERFORMANCE



ORIGINAL NER PRODUCT PERFORMANCE

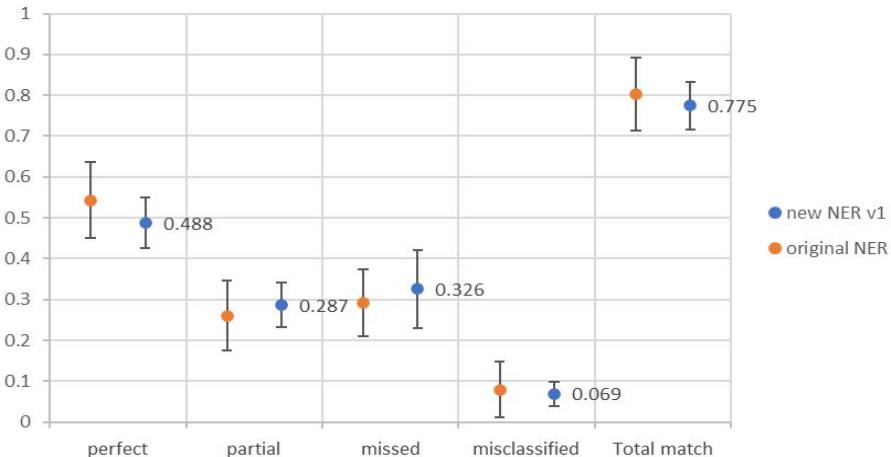


Criticality:

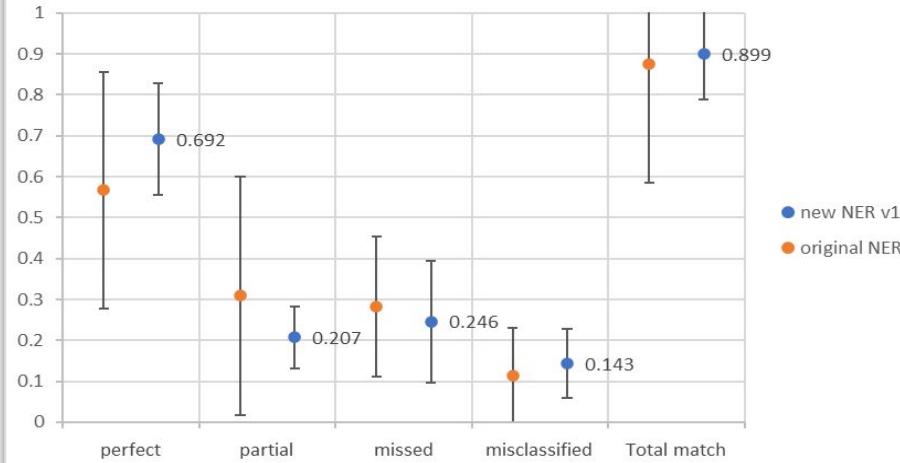
- Product performance not very stable (particular focus on standard deviation)

# Expanded NER: ver. A

new NER version 1 attributes



new NER version 1 products



What we did:

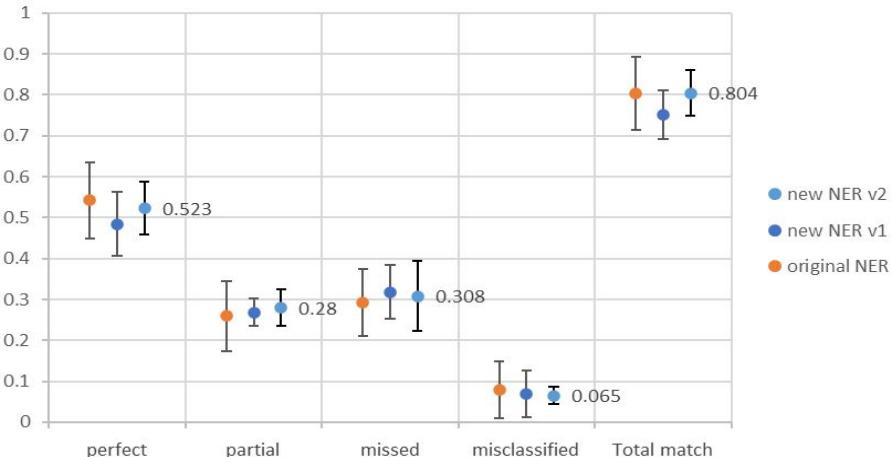
- Trained the module with the newly added reviews

What we got:

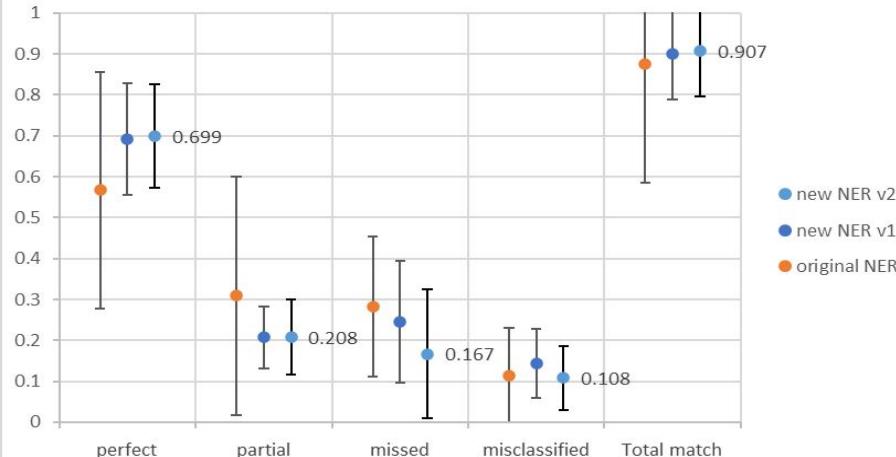
- Attribute performance decreased
- Product performance increased

# Expanded NER: ver. B

new NER version 2 attributes



new NER version 2 products

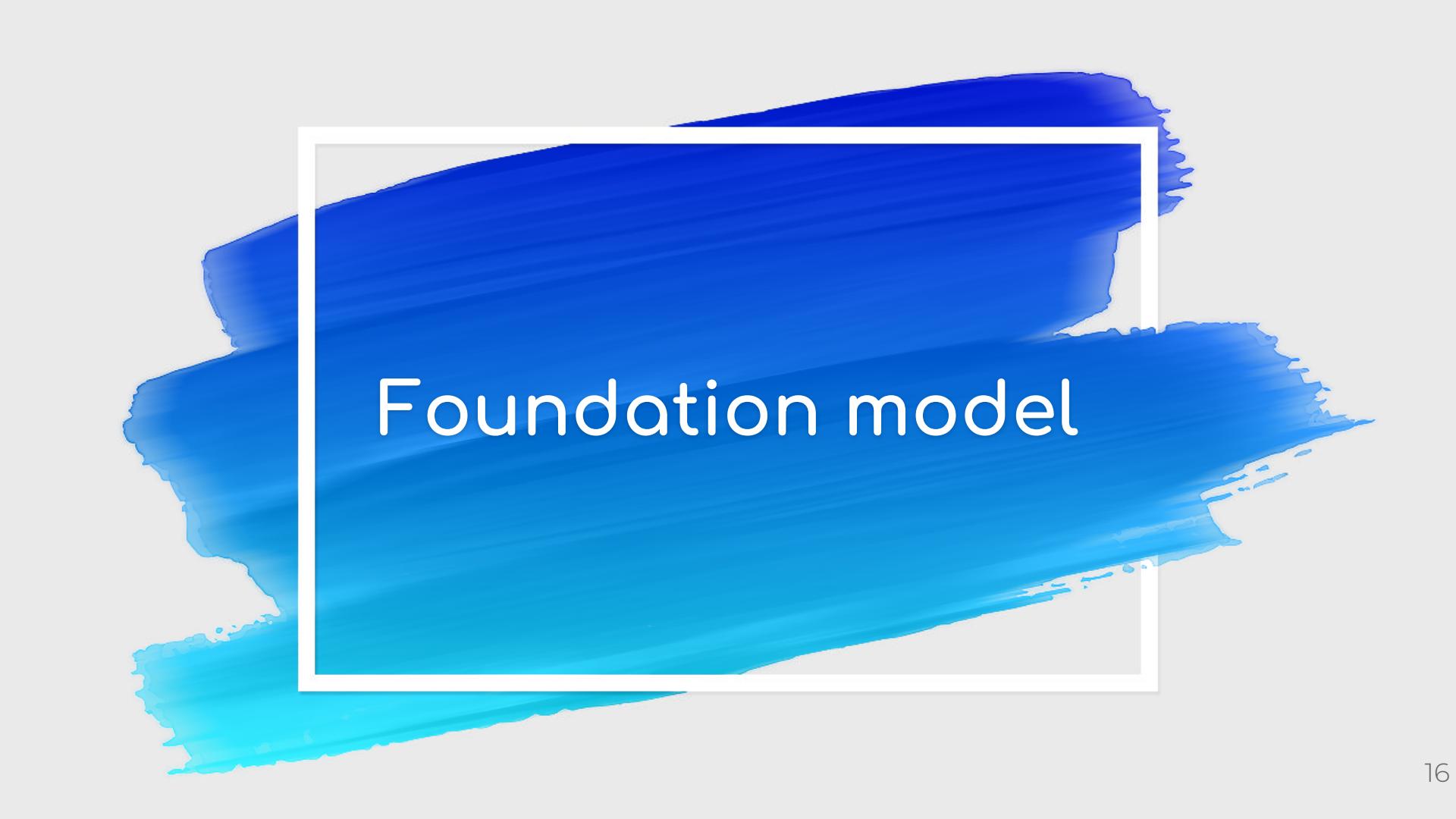


What we did:

- Adapt the tagging of the original dataset to the tagging of the new dataset

What we got:

- Increasing performance both with attributes and products wrt original model
- Reduced drastically the standard deviation of the obtained values -> good

The background features a large, abstract brushstroke pattern in shades of blue and white, resembling a landscape or sea. It has irregular, wavy edges and a central area where the blue is more concentrated.

# Foundation model

# Foundation model

GPT-2 small



## Text Generation Model

- Created by OpenAI in February 2019
  - Transformer architecture
  - Small - 117M parameters, 768 Dimensionality
- Currently trained on 6 epochs with the newest version of NER model
- Evaluation:
  - BLEU
  - GLEU (GOOGLE-BLEU)



# Temperature parameter: how to address the different user personas



NAME	JHON	EMILY	EMMA
QUOTE	"Clarity is true elegance"	"You can always do better"	"Work smarter not harder"
JOB	Waiter	Web Developer	Reviewer
OBJECTIVE	Find simple and clear information about the products to buy	Find accurate product reviews and quickly comparing the large amounts of suitable products	Have a tool to help her in her job of writing reviews for upcoming tech products
TYPE OF USER	Basic	Advanced	Advanced (commercial usage)
ADDRESSED BY	Setting the temperature parameter higher	Setting the temperature parameter lower	Leaving the choice of the temperature parameter to the user

# Foundation model

(moving on)

GPT-2 Medium  
- A larger model



- 345M Parameters
- 1024 Model Dimensionality

The larger, the better?

- With default training parameters, the ram space of the development platform is not enough.
- The larger model has more internal parameters, and a low number of epochs of training will lead to worse performance than the smaller one.

In the following work, we will try to research a solution.

The background of the slide features a large, abstract brushstroke pattern. It consists of several overlapping layers of paint. The top layer is a dark blue color with visible horizontal brushstrokes. Below it is a lighter blue layer, and at the bottom is a cyan layer. The edges of the strokes are rough and textured, creating a dynamic and artistic feel.

# Video generation



From textual reviews to video format

## Main issues:

- generate audio
- generate video
- synchronize text and audio

### Initial Idea

for each paragraph of the review,  
show the title and play audio of its content

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# Slideshow

## GENERAL OVERVIEW

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## Slideshow

## Brilliant Visuals

Next soon...

in addition to the name of the paragraph, the video will also show the features just mentioned in the speech

## Main idea:

- Apply NER model to the review to tag features
- Compare the list of features just tagged with input features by means of a distance matrix
- Search for the distances above a fixed threshold and choose the one that better matches the review feature



What is to come

# GANTT CHART



CP1

CP2

CP3

Unsuccessful

Deadline 1

Deadline 2

Deadline 3



Thanks you for your attention.  
Questions?

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