

# Natural Language Processing

*NLP in one day*

**KING'S**  
*College*  
**LONDON**



**NIHR** | Maudsley Biomedical  
Research Centre

# Introduction



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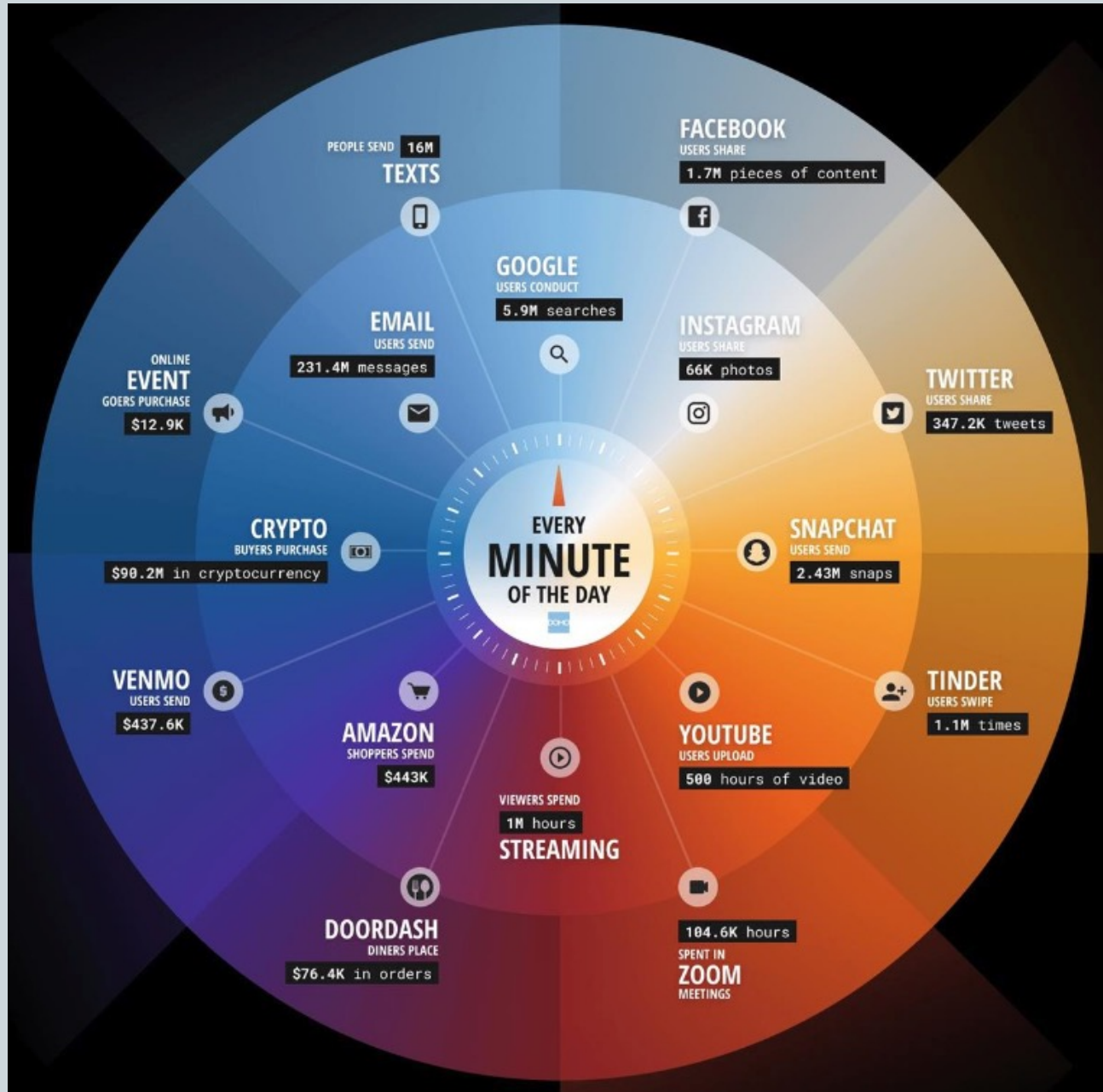


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# Text is everywhere



Data Never Sleeps 10.0  
from domo.com (April  
2022)



# Generative AI



Write a short definition of natural language processing



Natural Language Processing (NLP) is a field of artificial intelligence that focuses on enabling computers to understand, interpret, and generate human language. It involves analyzing and processing natural language data, such as text or speech, to perform tasks like translation, sentiment analysis, speech recognition, and information extraction. NLP combines linguistics, computer science, and machine learning to bridge the gap between human communication and computer understanding.



# Electronic health records (EHRs) – structured and unstructured information

## HAEMATOLOGY

HAEMOGLOBIN (g/L)

151

HCT

0.422

RED CELL COUNT

4.83

MCV

87.4

MCH

31.3

MCHC (g/L)

 \* 358

RDW

PLATELET COUNT

MPV

WHITE CELL COUNT

Neutrophils

Lymphocytes

Monocytes

Eosinophils

Basophils

ESR

## BIOCHEMISTRY

SODIUM

POTASSIUM

CHLORIDE

BICARBONATE

UREA

CREATININE

estimated GFR

## Clinical Findings

Concept ID	Preferred term
16932000	Nausea and vomiting
68566005	Urinary tract infectious disease
38341003	Hypertensive disorder
49436004	Atrial fibrillation
49218002	Hip pain
301011002	Escherichia coli urinary tract infect
40835002	Coffee ground vomiting
167667006	Fecal occult blood: negative

## Procedures

Concept ID	Preferred term
52734007	Total replacement of hip
117010004	Urine culture
76009000	Esophagogastroduodenoscopy
91251008	Physical therapy procedure

Reason: CHECK ETT TUBE PLACEMENT, ?PNA, CHF

[\*\*Signature 1\*\*]

UNDERLYING MEDICAL CONDITION:

85 y/o male s/p acute mi and catheterization now in ccu with cardiogenic shock

REASON FOR THIS EXAMINATION:

CHECK ETT TUBE PLACEMENT

?PNA

CHF

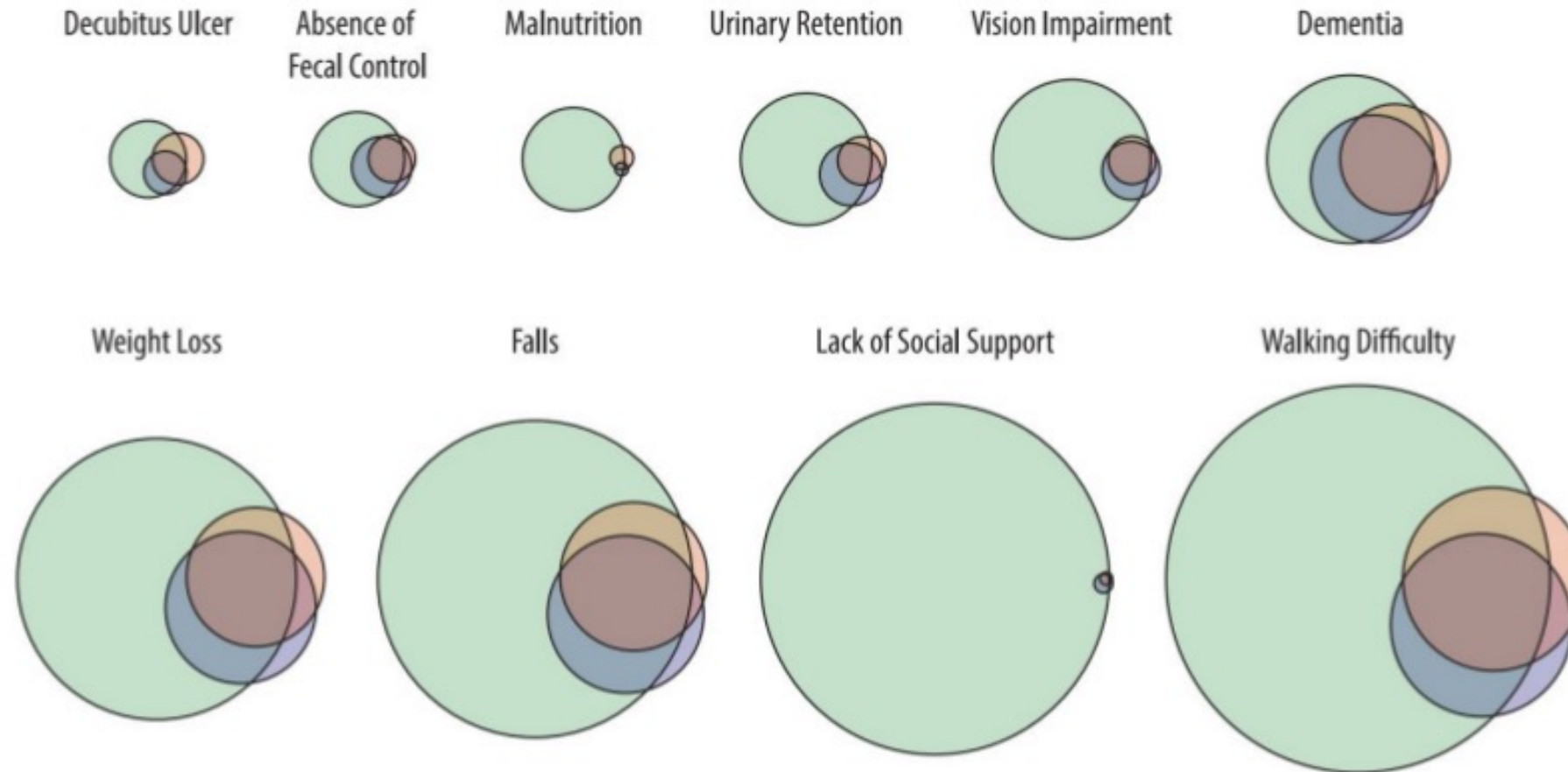
[\*\*Signature 1\*\*]

FINAL REPORT

CLINICAL INDICATION: Assess endotracheal tube placement in patient with congestive heart failure.

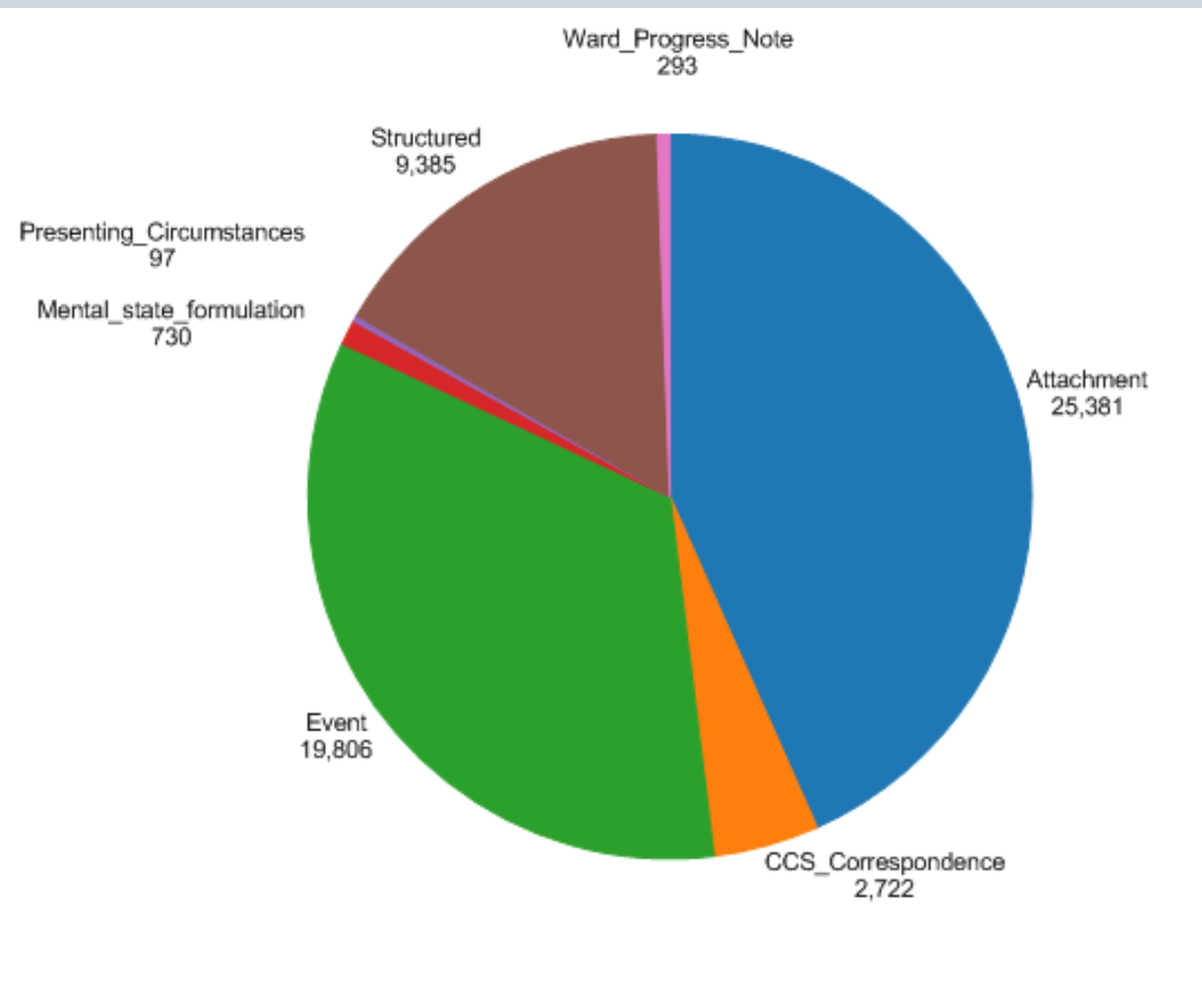
Comparison is made to previous study of one day earlier. An endotracheal tube is present, in satisfactory position. A Swan-Ganz catheter terminates in the proximal left pulmonary artery and has been withdrawn in the interval. An intraaortic balloon pump terminates about 3.3 cm below the superior aspect of the aortic knob, and a nasogastric tube terminates in the region of the gastroduodenal junction.

# How much unstructured, textual information is in an EHR?

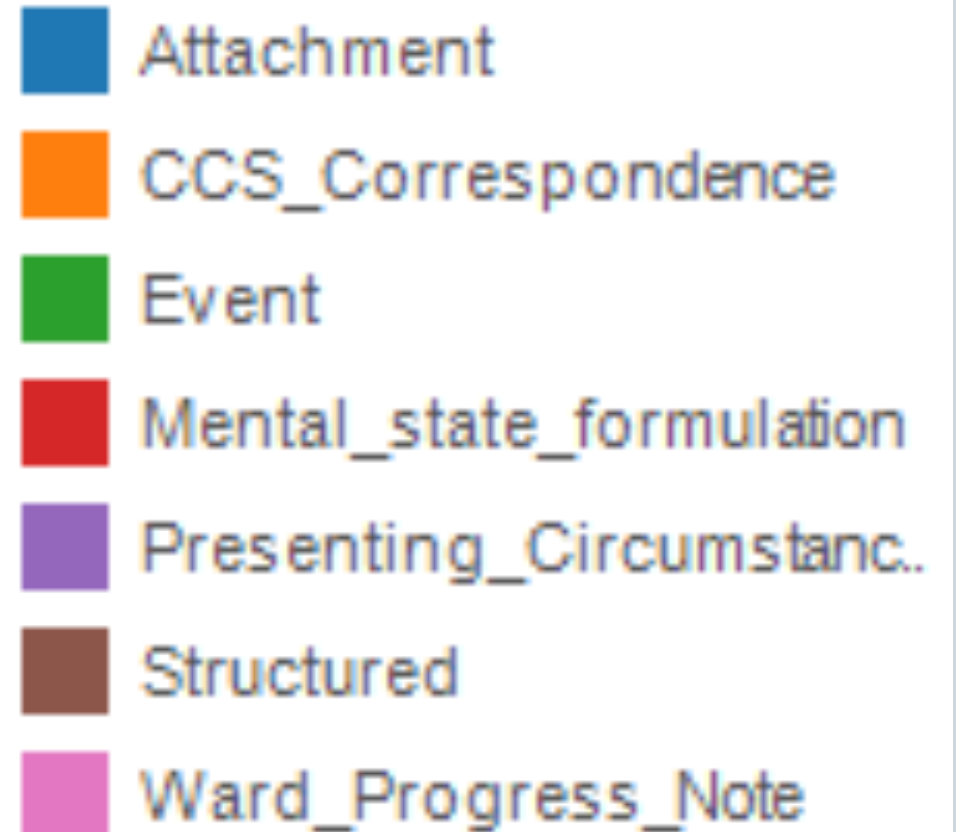


**Figure 2.** Green: Unstructured free text EHR data; Other colours: structured data. “The value of Unstructured Electronic Health Record Data in Geriatric Syndrome Case Identification”. (Kharrazi et al., 2018)

# An example – Mini Mental State Examinations



## source



# Thank you

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