



MedEase

Translating Medical Text

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Agenda

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The problem with medical text

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Summarization, Definitions, NER

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Ideas for improvement and final thoughts

The background features a pattern of light blue dots of varying sizes, some of which are arranged in wavy, horizontal bands. Scattered throughout the background are several plus signs (+) in different styles: some are solid light blue, some are white with a black outline, and some are small and faint. The overall aesthetic is clean and modern.

Introduction

**Has this ever
happened to you?**





Informed Consent – Henrietta Lacks

Informed Consent: permission granted in the knowledge of the possible consequences, typically that which is given by a patient to a doctor for treatment with full knowledge of the possible risks and benefits.

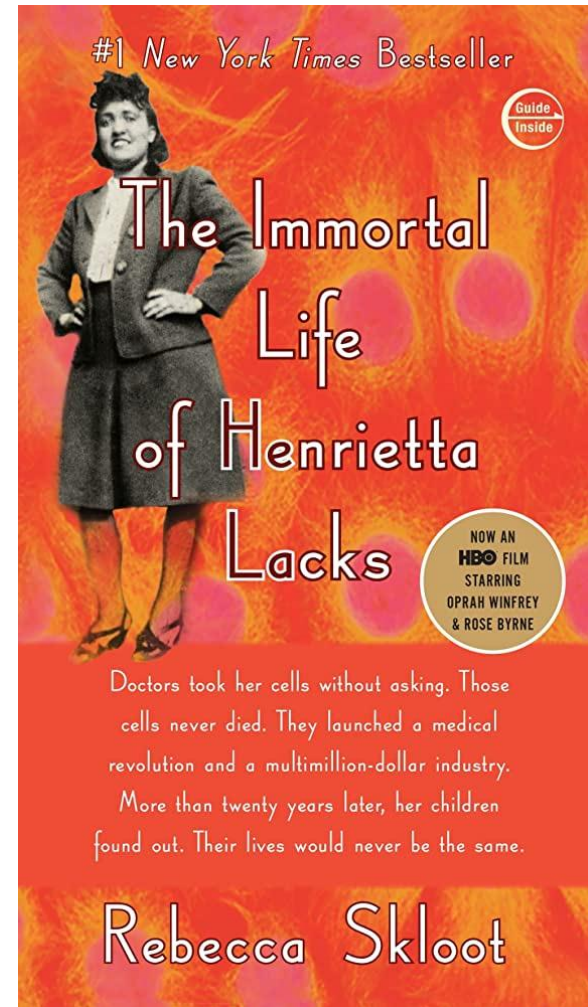
"written informed consent was obtained from each patient"

Henrietta Lacks (1920-1951)

Treated For Cancer At Johns Hopkins in 1951

Samples were taken which became the HeLa Stem Cell Line

HeLa Cells have become fundamental in the creation of modern treatments and drugs



Building

The background features a light blue dot pattern that forms a wave-like shape at the bottom. Scattered throughout are various plus signs: some are solid light blue, some are white with black outlines, and some are small and faint. A central white rectangle with a thin blue border contains the word "Building" in a bold, dark blue font.

Summarization

- Spacy Model used is the `en_core_sci_sm`

PREOPERATIVE DIAGNOSIS: , Morbid obesity., POSTOPERATIVE DIAGNOSIS: , Morbid obesity., PROCEDURE: , Laparoscopic antecolic antegastric Roux-en-Y gastric bypass with EEA anastomosis., ANESTHESIA: , General with endotracheal intubation., INDICATION FOR PROCEDURE: , This is a 30-year-old female, who has been overweight for many years. She has tried many different diets, but is unsuccessful. She has been to our Bariatric Surgery Seminar, received some handouts, and signed the consent. The risks and benefits of the procedure have been explained to the patient., PROCEDURE IN DETAIL: , The patient was taken to the operating room and placed supine on the operating room table. All pressure points were carefully padded. She was given general anesthesia with endotracheal intubation. SCD stockings were placed on both legs. Foley catheter was placed for bladder decompression. The abdomen was then prepped and draped in standard sterile surgical fashion. Marcaine was then injected through umbilicus. A small incision was made. A Veress needle was introduced into the abdomen. CO2 insufflation was done to a maximum pressure of 15 mmHg. A 12-mm VersaStep port was placed through the umbilicus. I then placed a 5-mm port just anterior to the midaxillary line and just subcostal on the right side. I placed another 5-mm port in the midclavicular line just subcostal on the right side, a few centimeters below and medial to that, I placed a 12-mm VersaStep port...

Result

I then ran the distal bowel down, approximately 100 cm, and at 100 cm, I made a hole at the antimesenteric portion of the Roux limb and a hole in the antimesenteric portion of the duodenogastric limb, and I passed a 45 white load stapler and fired a stapler creating a side-to-side anastomosis. The risks and benefits of the procedure have been explained to the patient.,PROCEDURE IN DETAIL: ,The patient was taken to the operating room and placed supine on the operating room table. I joined the spike with the anvil and fired a stapler creating an end-to-side anastomosis, then divided across the redundant portion of my Roux limb with a white load GI stapler, and removed it with an Endocatch bag. I placed another 5-mm port in the midclavicular line just subcostal on the right side, a few centimeters below and medial to that, I placed a 12-mm VersaStep port.

Definitions

- Function scrapes definition from Merriam Webster
- Limitations: Some definitions are incorrect due to multiple meanings

I then ran the **distal** (['anatomy ', ': situated away from the point of attachment or origin or a central point especially of the body compare proximal', 'the distal ends of the tibia and fibula'])bowel (['biology ', ': intestine, gut'])down, (['a(1)', ': toward or in a lower physical position', "Don't look down. Pull down the blind."])approximately ([': in an approximate manner', 'an event in ancient history that can only be approximately dated', '—used to indicate that a stated number, amount, or value is an approximation Approximately [=around, about] 2,000 people attended the rally.arrived at approximately 11:30 in the morning During a lifetime, a person will take approximately 500 million breaths.—Arthur S. Slutsky, M.D., et al.'])100 ([': a number equal to 10 times 10 see Table of Numbers'])cm, (['centimeter'])and at 100 ...

Name Entity Recognition



SpaCy models for biomedical text processing

- Spacy Model `en_ner_bc5cdr_md` for Biomedical Text
- Entities: **CHEMICAL** and **DISEASE**

history of present illness:, the patient is well known to me for a history of **iron-deficiency anemia DISEASE** due to chronic **blood loss DISEASE** from **colitis DISEASE** . we corrected her hematocrit last year with intravenous (iv) **iron CHEMICAL** . ultimately, she had a total proctocolectomy done on 03/14/2007 to treat her **colitis DISEASE** . her course has been very complicated since then with needing multiple surgeries for removal of **hematoma DISEASE** . this is partly because she was on anticoagulation for a right arm deep **venous thrombosis DISEASE** (**dvt DISEASE**) she had early this year, complicated by **septic phlebitis DISEASE** . chart was reviewed, and i will not reiterate her complex history. i am asked to see the patient again because of concerns for **coagulopathy DISEASE** . she had surgery again last month to evacuate a **pelvic hematoma DISEASE** , and was found to have **vancomycin CHEMICAL** resistant enterococcus, for which she is on multiple antibiotics and followed by **infectious disease DISEASE**

Model Evaluation Problem

Gather a dataset of text that includes entities
to be extracted

Perform text preprocessing
(ex. Tokenization, POS tagging)

Annotate the dataset with true labels

Train NER model

Evaluate model

Gold-standard annotation:

Gold-standard annotation is a set of **true labels** or **reference summaries** that serve as a benchmark for evaluating natural language processing tasks like named entity recognition (NER) and summarization

Web App

The background features a pattern of light blue dots of varying sizes, creating a halftone effect. Scattered throughout are several plus signs: some are solid light blue, while others are white with a thin black outline. The plus signs are concentrated in the upper right and lower left corners, with a few smaller ones in between.

Enter text here...

Summarization

Add Definitions

Entities

Display NER

Output Section

'PROCEDURE PERFORMED: , Excisional breast biopsy with needle localization.,ANESTHESIA: , General.,PROCEDURE: , After informed consent was obtained, the patient was brought to the radiology suite where needle localization was performed with mammographic guidance. I reviewed the localizing films with the radiologist, and the patient was then brought to the operative suite and placed supine on the operating table. General endotracheal anesthesia was induced without incident. The patient was prepped and draped in the usual sterile manner.,The skin overlying the needle tip was incised in a curvilinear fashion. Dissection down to the needle tip was performed using a combination of Metzenbaum scissors and Bovie electrocautery. Every attempt was made to get approximately 1 cm of normal tissue around the lesion. The wire was released and the lesion having been excised was removed from the wound and sent to Radiology for confirmation of excision. The wound was copiously irrigated with sterile water, and hemostasis was obtained using Bovie electrocautery. Once Radiology called and confirmed complete excision of the mass, the skin incision was approximated with 4-0 Vicryl in a subcuticular fashion. The skin was prepped with benzoin and Steri-Strips were applied. A dressing was then applied. All surgical counts were reported as correct.,Having tolerated the procedure well, the patient was subsequently taken to the recovery room in good and stable condition.'

[Summarization](#)[Add Definitions](#)[Entities](#)[Display NER](#)

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[Summarization](#)[Add Definitions](#)[Entities](#)[Display NER](#)

Output Section

Add definitions:

'PROCEDURE PERFORMED: ([': transitive verb', ': to adhere to the terms of : fulfill', 'perform a contract']), Excisional ([': the act or procedure of removing by or as if by cutting out', 'especially', ': surgical removal or resection'])breast ([': either of the pair of mammary glands extending from the front of the chest in pubescent and adult human females and some other mammals', 'also'])biopsy ([': the removal and examination of tissue, cells, or fluids from the living body'])with needle ([': a small slender usually steel instrument that has an eye for thread or surgical sutures at one end and that is used for sewing'])localization., ANESTHESIA: , General., PROCEDURE: , After ([': following in time or place : afterward, behind, later', 'we arrived shortly after returned 20 years after'])informed ([': having information', 'informed sources informed observers'])consent ([': intransitive verb', ': to give assent or approval : agree', 'consent to being tested She consented to our request.'])was obtained, ([': transitive verb', ': to gain or attain usually by planned action or effort', 'The information was difficult to obtain. We obtained a copy of the original letter.'])the patient ([': bearing pains or trials calmly or without complaint'])was brought to the radiology ([': a branch of medicine concerned with the use of radiant energy (such as X-rays) or radioactive material in the diagnosis and treatment of disease'])suite ([': retinue', 'especially'])where needle ([': a small slender usually steel instrument that has an eye for thread or surgical sutures at one end and that is used for sewing'])localization ([': transitive verb', ': to make local : orient locally'])was performed ([': transitive verb', ': to adhere to the terms of : fulfill', 'perform a contract'])with mammographic ([': X-ray examination of the breasts (as for early detection of

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Future Work / Conclusion

Future Work



Summarization

Train on our own data of summarized medical transcriptions



Definitions

Pick out the challenging words and also have the correct definitions and shift to a mtl model



NER

Make our own annotations for more medial entities.

Conclusion

- Empowering Access to Medical Knowledge
- Visit our website today and start exploring a whole new world of medical knowledge!





Thank You For Your Attention

Any Questions?

References

Images

<https://www.dyslexia.com/about-dyslexia/signs-of-dyslexia/common-characteristics-of-adult-dyslexia/>

<https://www.healthgrades.com/>