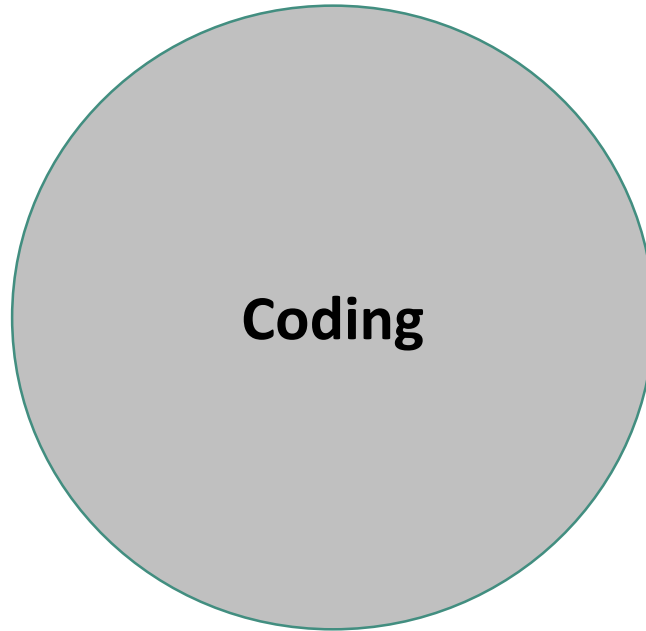


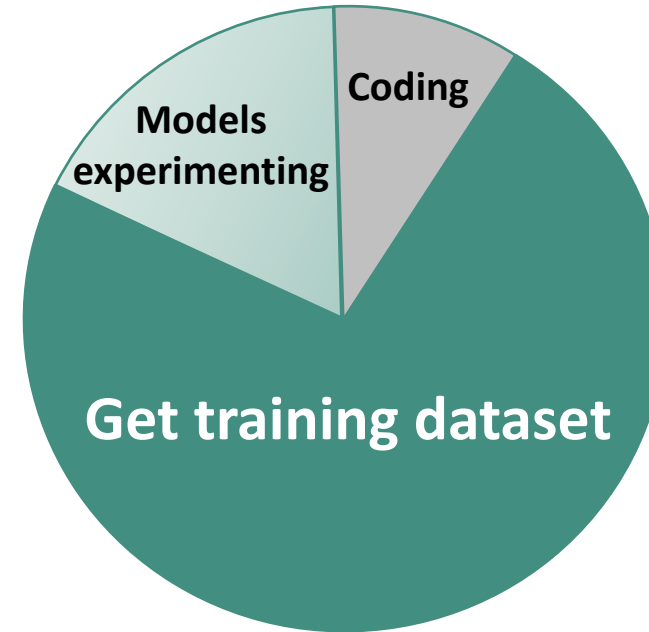


AI will transform our life in two main domains
Vision and **Human Language**





What people think AI is about



The reality

A **set of examples** the machine can learn on...
with an algorithm



This is a cat



This is a cat



This is a cat



This is NOT a cat

For **language** it's same **principle**

1. Off-the-shelf NLP models often **don't work** for specific needs
2. Implementation is **slowed down** by the need of building specific training dataset
3. AI/NLP systems often require integration of **business glossaries & knowledge graph**
4. Absence of maintenance leads to **quality deviations**

Sherpa platform

Mission #1:

Easy, rapid and stimulating training dataset creation

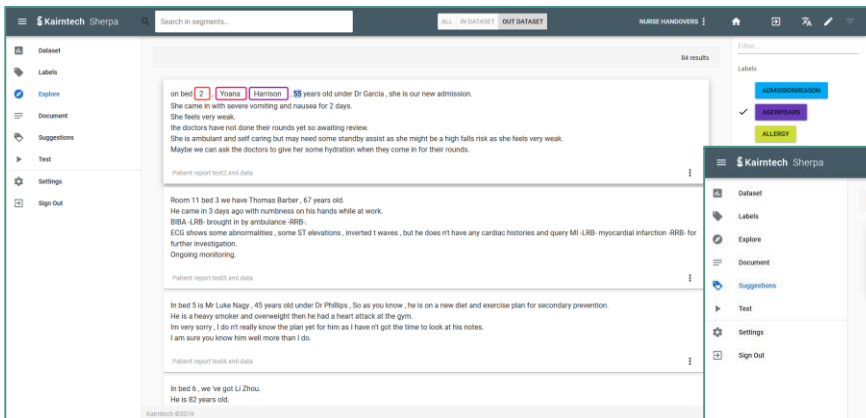
Label text



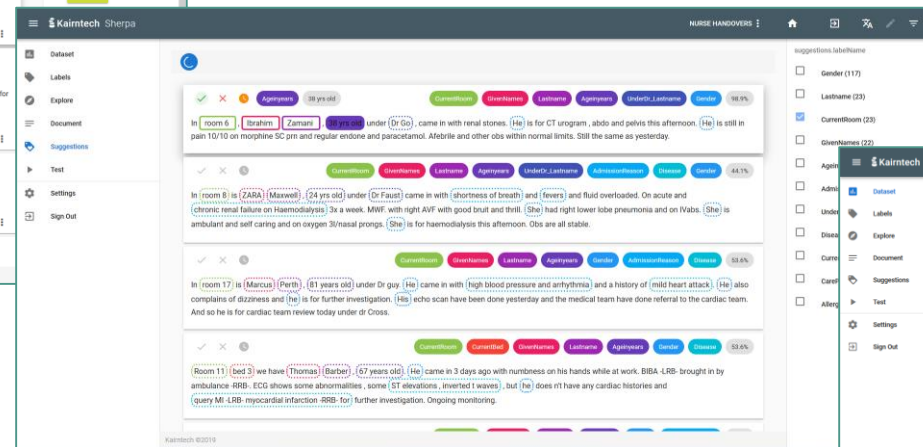
Review suggestions



Monitor Dataset and Learning Model



The screenshot shows the Sherpa platform interface with a document titled "Patient report text2.txt". The document text includes: "on bed 2 (Thomas) (Harrison) 55 years old under Dr Garcia, she is our new admission. She came in with severe vomiting and nausea for 2 days. She feels very weak. The doctors have not done their rounds yet so awaiting review. She is ambulant and self caring but may need some standby assist as she might be a high falls risk as she feels very weak. Maybe we can ask the doctors to give her some hydration when they come in for their rounds." Labels like "ADMISSION", "ALLERGY", "CurrentRoom", "CurrentBed", "CurrentAge", "CurrentSex", "CurrentUnderDr", "CurrentLastname", "CurrentFirstname", "CurrentMiddleName", "CurrentInitials", "CurrentSuffix", "CurrentTitle", "CurrentSuffix", "CurrentTitle", "CurrentSuffix" are visible. The interface also shows a sidebar with "Dataset", "Labels", "Explore", "Document", "Suggestions", "Text", "Settings", and "Sign Out".



The screenshot shows the Sherpa platform interface with a document titled "Patient report text2.txt". The document text includes: "In room 6 (Abraham) (Zamani) 60 yrs old under (Dr Go), came in with renal stones. (He) is for CT urogram, abdo and pelvis this afternoon, (He) is still in pain 10/10 on morphine 50 prn and regular endone and paracetamol. Afebrile and other obs within normal limits. Still the same as yesterday." Labels like "CurrentRoom", "CurrentBed", "CurrentAge", "CurrentSex", "CurrentUnderDr", "CurrentLastname", "CurrentFirstname", "CurrentMiddleName", "CurrentInitials", "CurrentSuffix", "CurrentTitle", "CurrentSuffix", "CurrentTitle", "CurrentSuffix" are visible. A suggestions panel on the right shows "Gender (117)", "Lastname (23)", "CurrentRoom (23)", "GivenNames (22)". The interface also shows a sidebar with "Dataset", "Labels", "Explore", "Document", "Suggestions", "Text", "Settings", and "Sign Out".



The screenshot shows the Sherpa platform interface with a dataset distribution chart and a model quality over time graph. The dataset distribution chart shows "Labels distribution over 1364 annotations" with a pie chart showing the following distribution: Gender (117, 8.5%), Lastname (23, 1.7%), CurrentRoom (23, 1.7%), GivenNames (22, 1.6%), Age (117, 8.5%), Admin (117, 8.5%), Under (117, 8.5%), Disease (117, 8.5%), Care (117, 8.5%), Suggestion (117, 8.5%), Allergy (117, 8.5%). The model quality over time graph shows "Quality over time" for a model built on CRF4 with a "F1 score: 88.8". The graph shows the quality of the model over time, with the last build a minute ago showing a quality of 88.8. The interface also shows a sidebar with "Dataset", "Labels", "Explore", "Document", "Suggestions", "Text", "Settings", and "Sign Out".

1. Problem

- Over a tenth of preventable adverse events in health care are caused by **failures in information flow** (clinical handover).
- Two-thirds of information is lost after 3-5 shifts if notes are taken by hand, or not at all.

2. Solution

- **Speech recognition** and **information extraction** provide a way to fill out a handover form for clinical proofing and sign-off.

3. Expected benefits

- Handover process much more efficient
- Improved patient care

Use Case: Nurse Handovers

SPOKEN, FREE-FORM TEXT DOCUMENT:
WAV file (93 words, 48 seconds, 4.25 MB)



Speech recognition

WRITTEN, FREE-FORM TEXT DOCUMENT:

Ken harris, bed three, 71 yrs old under Dr Gregor, came in with arrhythmia. He complained of chest pain this am and ECG was done and was reviewed by the team. He was given some anginine and morphine for the pain. Still tachycardic and new meds have been ordered in the medchart. still for pulse checks for one full minute. Still awaiting echo this afternoon. His BP is just normal though he is scoring MEWS of 3 for the tachycardia. He is still for monitoring.



Information extraction

WRITTEN, STRUCTURED DOCUMENT:

Ken¹ harris², bed three⁵,
71 yrs old³ under Dr Gregor^{6,1},
came in with arrhythmia⁷. He⁴
complained of chest pain¹ this
am and ECG² was done¹ and
was reviewed by the team¹. He
was given some anginine¹ and
morphine for the pain¹. Still
tachycardic² and new meds¹ have
been ordered in the medchart. still
for pulse checks for one full minute¹.
Still awaiting echo²
this afternoon³. His
BP is just normal² though he is
scoring MEWS of 3 for the tachycardia².
He is still for monitoring¹.

PATIENT INTRODUCTION:

1. GivenNames/Initials: Ken
2. LastName: harris
3. AgeInYears: 71 yrs old
4. Gender: He
5. CurrentBed: bed three
6. UnderDr: 6.1. LastName: Dr Gregor
7. AdmissionReason/Diagnosis: arrhythmia

MY SHIFT:

1. Status: chest pain
2. OtherObservation: tachycardic; BP is just normal; scoring MEWS of 3 for the tachycardia

APPOINTMENTS:

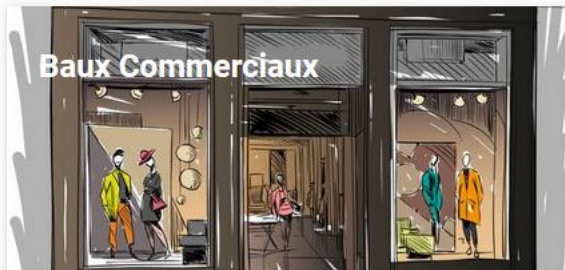
1. Status: was done; was reviewed by the team
2. Description: ECG; echo
3. Time: this afternoon

MEDICATION:

1. Medicine: anginine; morphine for the pain; new meds

FUTURE CARE:

1. Goal/TaskToBeCompleted/ExpectedOutcome: for pulse checks for one full minute; still for monitoring



Baux Commerciaux

Indemnités de baux commerciaux

214 documents
10727 segments
45 annotations

REMOVE



Clinical trials

Clinical trials

1040 documents
37744 segments
6 annotations

REMOVE



Deidentification

Deidentification of patient data

200 documents
4321 segments
3000 annotations

REMOVE



Munich Transports

Munich public transportation

206 documents
206 segments
500 annotations

REMOVE



Ubuntu

ask

ubuntu

Ask Ubuntu

162 documents
162 segments
129 annotations

REMOVE



Nurse Handovers

Nurse handover records

201 documents
201 segments
1364 annotations

REMOVE



ATIS Dataset

Airline Travel Information System

5473 documents
5871 segments
16560 annotations

REMOVE



Cinema Biographies

Biographies of movie stars

59 documents
601 segments
60 annotations

REMOVE

- Dataset
- Labels
- Explore
- Document
- Suggestions
- Test
- Settings
- Sign Out

84 results

on bed 2, Yoana Harrison, 55 years old under Dr Garcia, she is our new admission.
 She came in with severe vomiting and n... for 2 days.
 She feels very weak.
 the doctors have not done their rounds... waiting review.
 She is ambulant and self caring but may need some standby assist as she might be a high falls risk as she feels very weak.
 Maybe we can ask the doctors to give her some hydration when they come in for their rounds.

Patient report test2.xml.data

Room 11 bed 3 we have Thomas Barber, 67 years old.
 He came in 3 days ago with numbness on his hands while at work.
 BIBA -LRB- brought in by ambulance -RRB-.
 ECG shows some abnormalities, some ST elevations, inverted t waves, but he does n't have any cardiac histories and query MI -LRB- myocardial infarction -RRB- for further investigation.
 Ongoing monitoring.

Patient report test3.xml.data

In bed 5 is Mr Luke Nagy, 45 years old under Dr Phillips, So as you know, he is on a new diet and exercise plan for secondary prevention.
 He is a heavy smoker and overweight then he had a heart attack at the gym.
 Im very sorry, I do n't really know the plan yet for him as I have n't got the time to look at his notes.
 I am sure you know him well more than I do.

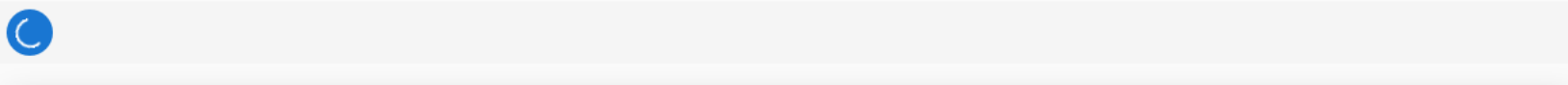
Patient report test4.xml.data

In bed 6, we've got Li Zhou.
 He is 82 years old.

Filter...

- Labels
- ADMISSIONREASON
 - AGEINYEARS
 - ALLERGY
 - CAREPLAN
 - CHRONICCONDITION
 - CURRENTBED
 - CURRENTROOM
 - DISEASE
 - GENDER
 - GIVENNAMES
 - LASTNAME
 - UNDERDR_GIVENNAMES
 - UNDERDR_LASTNAME

- Dataset
- Labels
- Explore
- Document
- Suggestions
- Test
- Settings
- Sign Out



Ageinyears 38 yrs old
 CurrentRoom GivenNames Lastname Ageinyears UnderDr_Lastname Gender 98.9%

room 6, Ibrahim Zamani, 38 yrs old under Dr Go, came in with renal stones. He is for CT urogram, abdo and pelvis this afternoon. He is still in pain 10/10 on morphine SC prn and regular endone and paracetamol. Afebrile and other obs within normal limits. Still the same as yesterday.

CurrentRoom GivenNames Lastname Ageinyears UnderDr_Lastname AdmissionReason Disease Gender 44.1%

In room 8 is ZARA Maxwell, 24 yrs old under Dr Faust came in with shortness of breath and fevers and fluid overloaded. On acute and chronic renal failure on Haemodialysis 3x a week. MWF. with right AVF with good bruit and thrill. She had right lower lobe pneumonia and on IVabs. She is ambulant and self caring and on oxygen 3l/nasal prongs. She is for haemodialysis this afternoon. Obs are all stable.

CurrentRoom GivenNames Lastname Ageinyears Gender AdmissionReason Disease 53.6%

In room 17 is Marcus Perth, 81 years old under Dr guy. He came in with high blood pressure and arrhythmia and a history of mild heart attack. He also complains of dizziness and he is for further investigation. His echo scan have been done yesterday and the medical team have done referral to the cardiac team. And so he is for cardiac team review today under dr Cross.

CurrentRoom CurrentBed GivenNames Lastname Ageinyears Gender Disease 53.6%

Room 11 bed 3 we have Thomas Barber, 67 years old. He came in 3 days ago with numbness on his hands while at work. BIBA -LRB- brought in by ambulance -RRB-. ECG shows some abnormalities, some ST elevations, inverted t waves, but he does n't have any cardiac histories and query MI -LRB- myocardial infarction -RRB- for further investigation. Ongoing monitoring.

- suggestions.labelName
- Gender (117)
 - Lastname (23)
 - CurrentRoom (23)
 - GivenNames (22)
 - Ageinyears (20)
 - AdmissionReason (19)
 - UnderDr_Lastname (9)
 - Disease (9)
 - CurrentBed (5)
 - CarePlan (1)
 - Allergy (1)

- Dataset
- Labels
- Explore
- Document
- Suggestions
- Test

- Settings
- Sign Out

116 results

AdmissionReason

In bed 8, is evelyn marshall came in with chest pain and cough .
 With history of asthma on puffers and heartburn on mylanta prn
 Nothing 's new.
 Just for further investigation.
 Awaiting doctor 's rounds.

Patient report test1.xml.data

on bed 2, Yoana Harrison, 55 years old under Dr Garcia, she is our new admission.
 She came in with severe vomiting and nausea for 2 days.
 She feels very weak.
 the doctors have not done their rounds yet so awaiting review.
 She is ambulant and self caring but may need some standby assist as she might be a high falls risk as she feels very weak.
 Maybe we can ask the doctors to give her some hydration when they come in for their rounds.

Patient report test2.xml.data

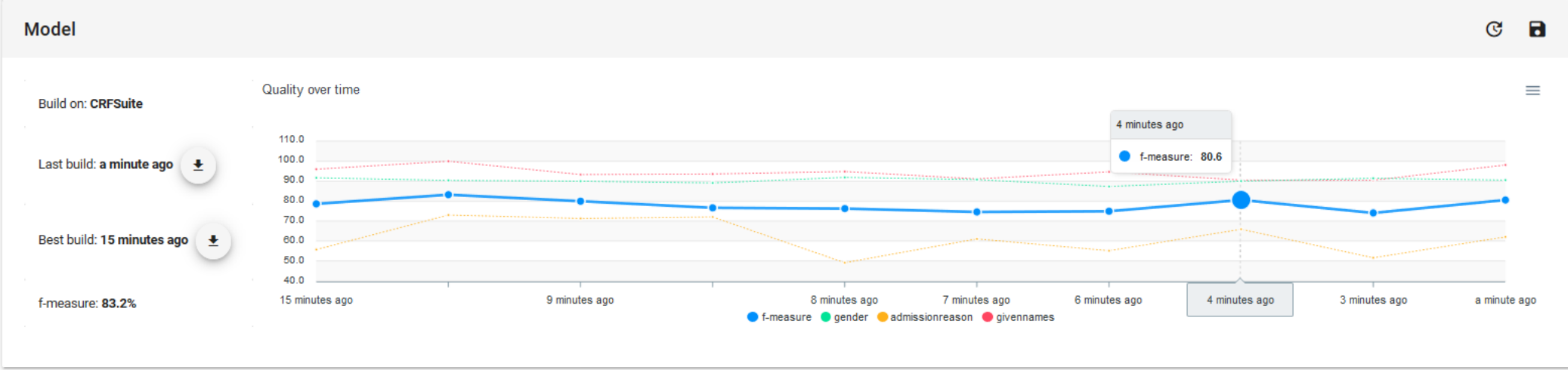
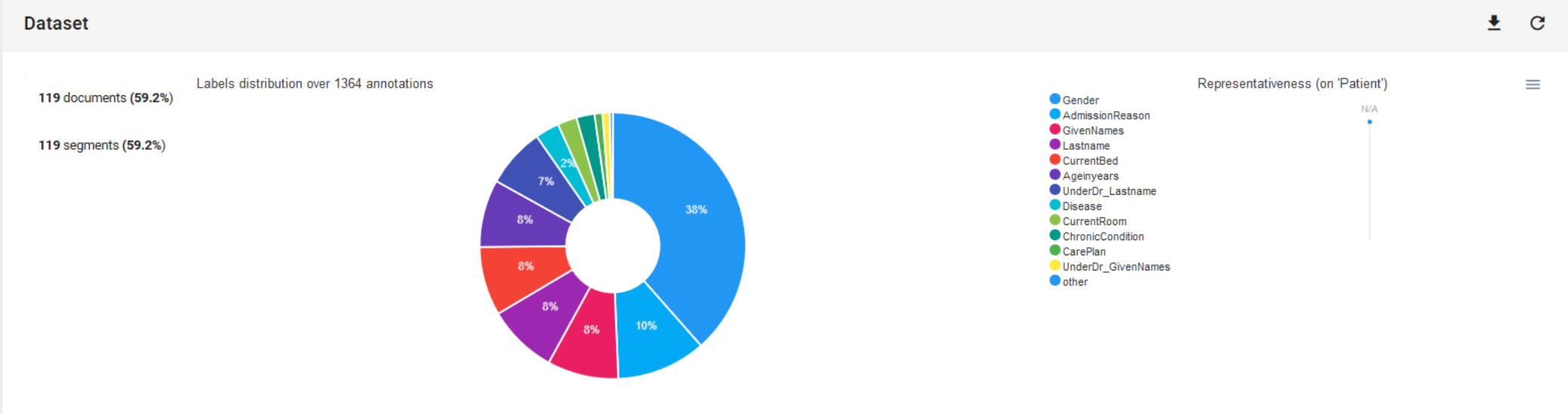
In bed 9, Sarika Ali, 41 years old under dr Paul, came in with arrhythmia .
 She is a new admission and she is very worried and anxious and would like to go home as she have some important work event next week.
 She is still under investigation and the doctors has n't had their rounds yet.
 She is still under close monitoring and for bloods later.

Patient report test11.xml.data

In room 4, Lucila Barbosa, 65 yrs old, came in with high cholesterol and already on statins, also with heartburn and swollen feet for further

- Filter...
- Labels
- ADMISSIONREASON
 - AGEINYEARS
 - ALLERGY
 - CAREPLAN
 - CHRONICCONDITION
 - CURRENTBED
 - CURRENTROOM
 - DISEASE
 - GENDER
 - GIVENNAMES
 - LASTNAME
 - ✓ UNDERDR_GIVENNAMES
 - UNDERDR_LASTNAME

- Dataset
- Labels
- Explore
- Document
- Suggestions
- Test
- Settings
- Sign Out





- Dataset
- Labels
- Explore
- Document
- Suggestions
- Test
- Settings
- Sign Out

Ken Harris, bed 3, 71 yrs old under Dr Gregor, came in with arrhythmia.



WRITTEN, STRUCTURED DOCUMENT:

Ken¹ harris², bed three⁵,
71 yrs old³ under Dr Gregor^{6.1},
came in with arrhythmia⁷. He⁴
complained of chest pain¹ this
am and ECG² was done¹ and
was reviewed by the team¹. He
was given some anginine¹ and
morphine for the pain¹. Still
tachycardic² and new meds¹ have
been ordered in the medchart. still
for pulse checks for one full minute¹.
Still awaiting echo²
this afternoon³. His
BP is just normal² though he is
scoring MEWS of 3 for the tachycardia².
He is still for monitoring¹.

PATIENT INTRODUCTION:

1. GivenNames/Initials: Ken
2. LastName: harris
3. AgeInYears: 71 yrs old
4. Gender: He
5. CurrentBed: bed three
6. UnderDr: 6.1. LastName: Dr Gregor
7. AdmissionReason/Diagnosis: arrhythmia

MY SHIFT:

1. Status: chest pain
2. OtherObservation: tachycardic; BP is just normal; scoring MEWS of 3 for the tachycardia

APPOINTMENTS:

1. Status: was done; was reviewed by the team
2. Description: ECG; echo
3. Time: this afternoon

MEDICATION:

1. Medicine: anginine; morphine for the pain; new meds

FUTURE CARE:

1. Goal/TaskToBeCompleted/ExpectedOutcome: for pulse checks for one full minute; still for monitoring

1. So much data!

- But very little of it labelled and useful for supervised learning

2. So many pre trained models!

- But most of the time they do not quite do what you need in your project

3. So many algorithms!

- But a library alone will not allow you to implement the solution you need

1. **No coding** required
2. Accessible to **Subject Matter Expert**
3. Generate training dataset in **days** rather than months
4. Find out biases and dataset quality issues **quickly**
5. Generate high quality ready-to-use **ML models**

**We want to make AI applied to language
fast and accessible to everyone**

About kairntech

Created in January 2019, France & Germany



Experience

20+ years in industry contexts from IBM, Xerox, TEMIS, INRIA

Skills

AI, Natural Language Processing & Software Engineering.

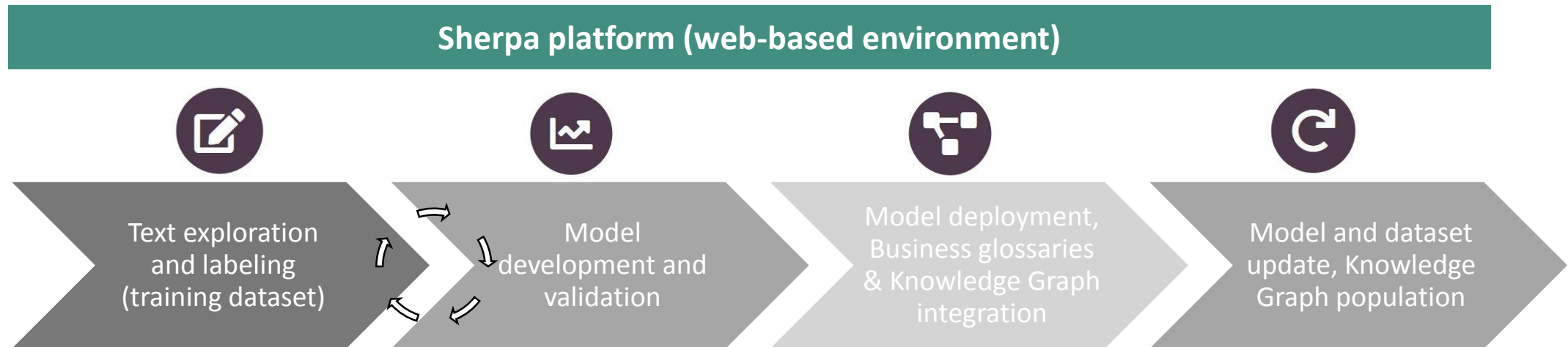
Thank you!

Want to learn more?

info@kairntech.com

www.kairntech.com

Sherpa platform combined with advanced Professional Services



Professional Services

- Feasibility study
- Content & data collection, parsing, cleaning...
- Methodology & guidelines definition
- Text labeling & training dataset validation
- Model optimization

Professional Services

- NLP pipeline & Knowledge Graph integration
- Feedback loops implementation
- Model monitoring & training dataset update
- AI Service implementation & deployment
- Ongoing support