
Building the AI you trust

# Intelligent Sharing of Explanation Experiences by Users for Users

https://isee4xai.com/

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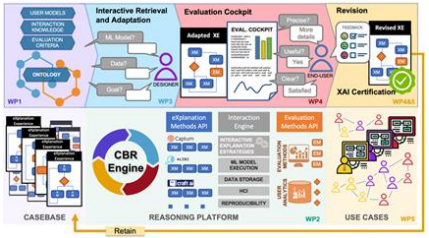
# Our proposal to the XAI challenges

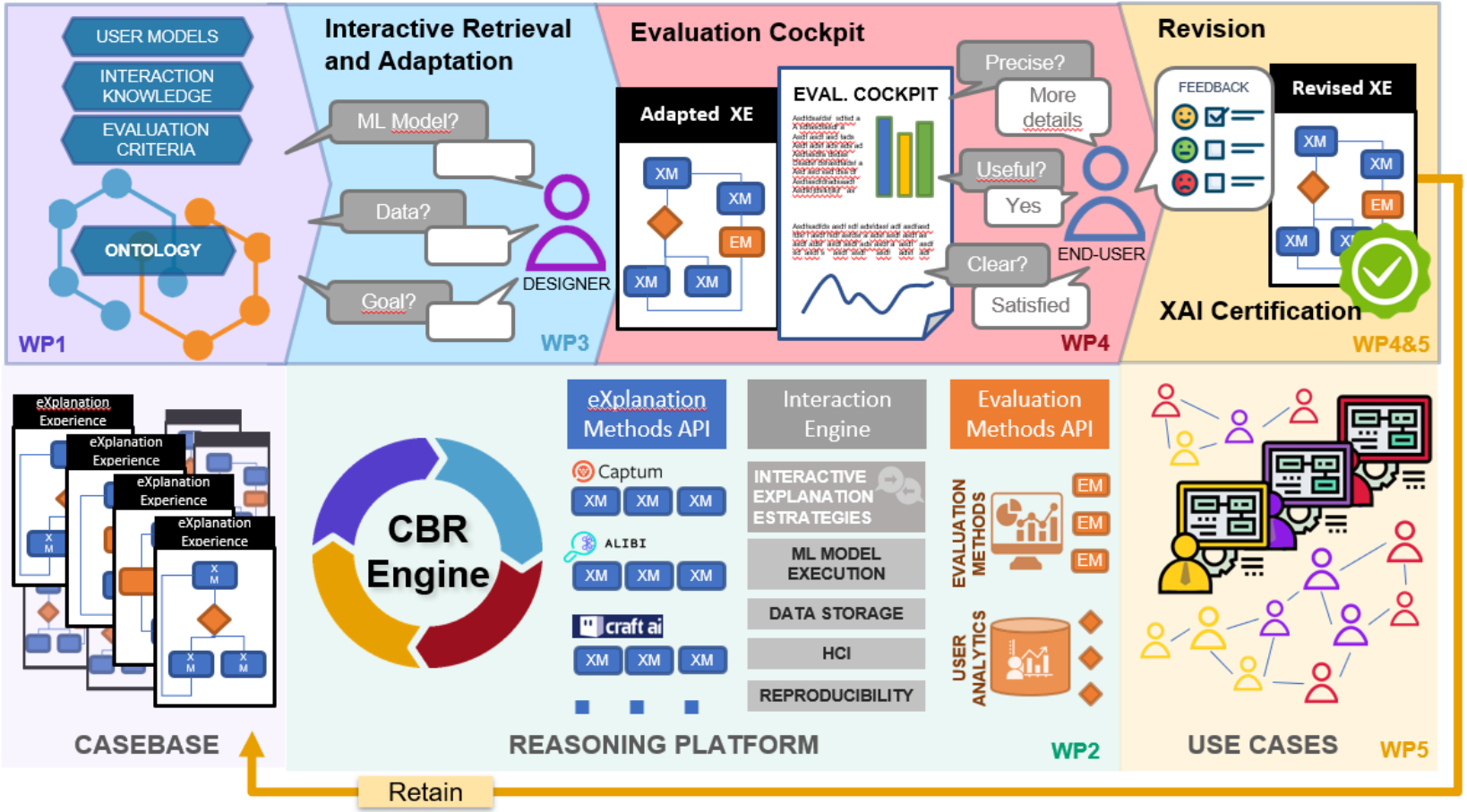



➢ **Provide the AI community with an unifying platform**,
underpinned by case-based reasoning (CBR),
in which successful experiences of
applying an explanation strategy to an ML task
can be captured as cases and retained in a case base for future reuse.

**Cases will encode knowledge** about the decisions made by a user and the effectiveness of the XAI strategy.

➢ iSEE will **recommend** how best to explain ML predictions to other users in similar circumstances

- Build an understanding of how organisations judge the quality and success of explanations
- Build a platform and an evaluation conversational module


USER MODELS
INTERACTION KNOWLEDGE
EVALUATION CRITERIA
ONTOLOGY
WP1
Interactive Retrieval and Adaptation
ML Model?
Data?
Goal?
DESIGNER
WP3
Evaluation Cockpit
Adapted XE
XM
EM
EVAL. COCKPIT
Precise?
More details
Useful?
Yes
Clear?
Satisfied
END-USER
WP4
Revision
FEEDBACK
Revised XE
XAI Certification
WP4&5
eXplanation Experience
CASEBASE
CBR Engine
eXplanation Methods API
Captum
ALIBI
craft ai
Interaction Engine
INTERACTIVE EXPLANATION ESTRATEGIES
ML MODEL EXECUTION
DATA STORAGE
HCI
REPRODUCIBILITY
Evaluation Methods API
EVALUATION METHODS
USER ANALYTICS
REASONING PLATFORM
WP2
USE CASES
WP5
Retain

# iSee Story in 2 minutes

Video from the iSee web site (click on the logo, then the triangle)

https://isee4xai.com/
https://youtu.be/XGvv2QeU0k8

Video : iSee in action on a real world use case about radiology diagnosis explanation experience:

https://www.youtube.com/watch?v=k1tNC9XEJZk&ab_channel=iSeechist-era

# Why is Evaluating Explanation Complex?

Users have different goals they wish to achieve when receiving an explanation

- What an end-user expects will be very different from a developer for example
- The purpose is subjective

As a result, explanation can take many different forms:

- Either in how it is constructed
- Presented
- Or the level of contextual knowledge it incorporates

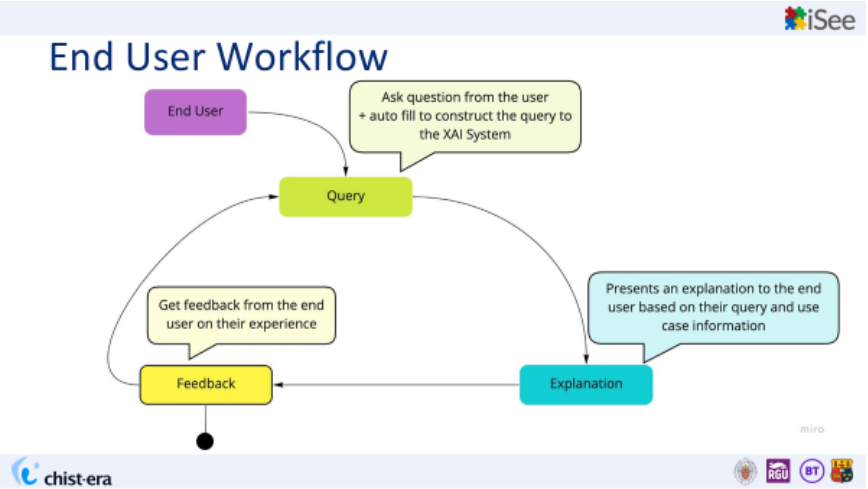
Different ideas of what makes an explanation successful

# A framework for co-creating

**Co-creation of explanation strategies** (conversational adaptation) between machine and users

**Evaluation of the utility** of the explanation from a human-computer interaction and social angle, as well as the perception of it by end user.

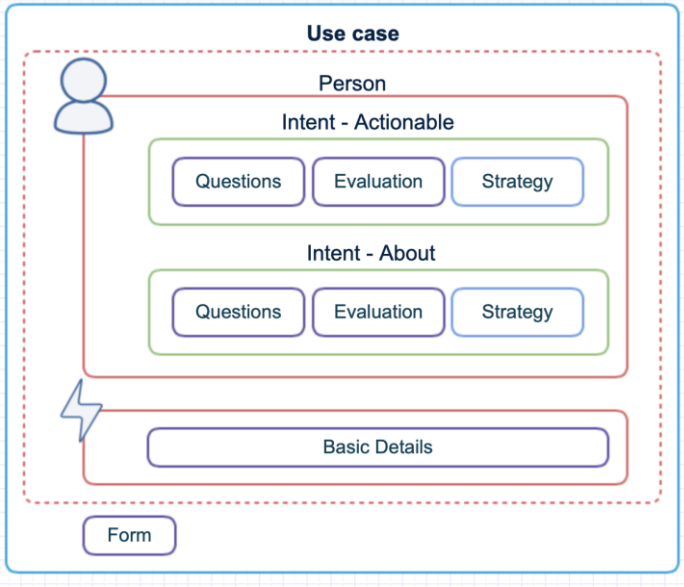
| Design User | End user |
| --- | --- |
| A domain expert who is responsible for the AI system | A user of the AI system or other interested party |
| • Create use case<br>• Define users, Intents, and AI features<br>• View use case analytics | • View use case details<br>• View explanation for a query<br>• Give feedback on a query |



# Use case onboarding

**Goal** : Test the Implementation of a specific use case using the ontology

**Design**




- Manage Usecase - iSee (chamath.me)
- Copy of iSee Cockpit Work Flows - diagrams.net

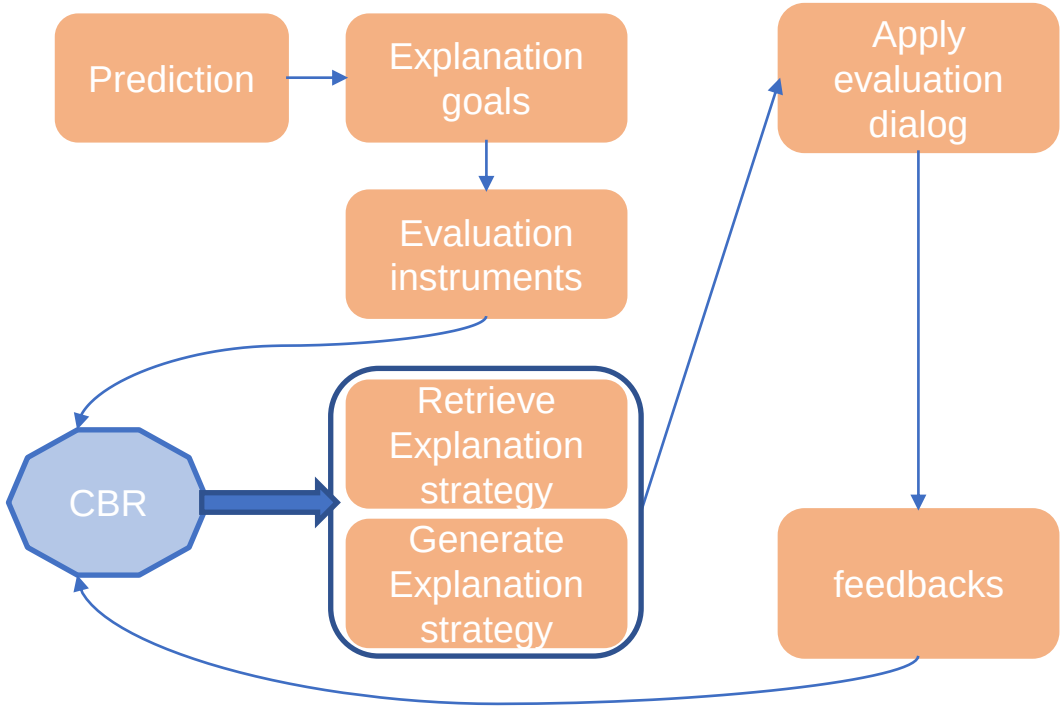
# Case

- Used to represent an Explanation Experience
- How Explanation strategy satisfies explanation needs

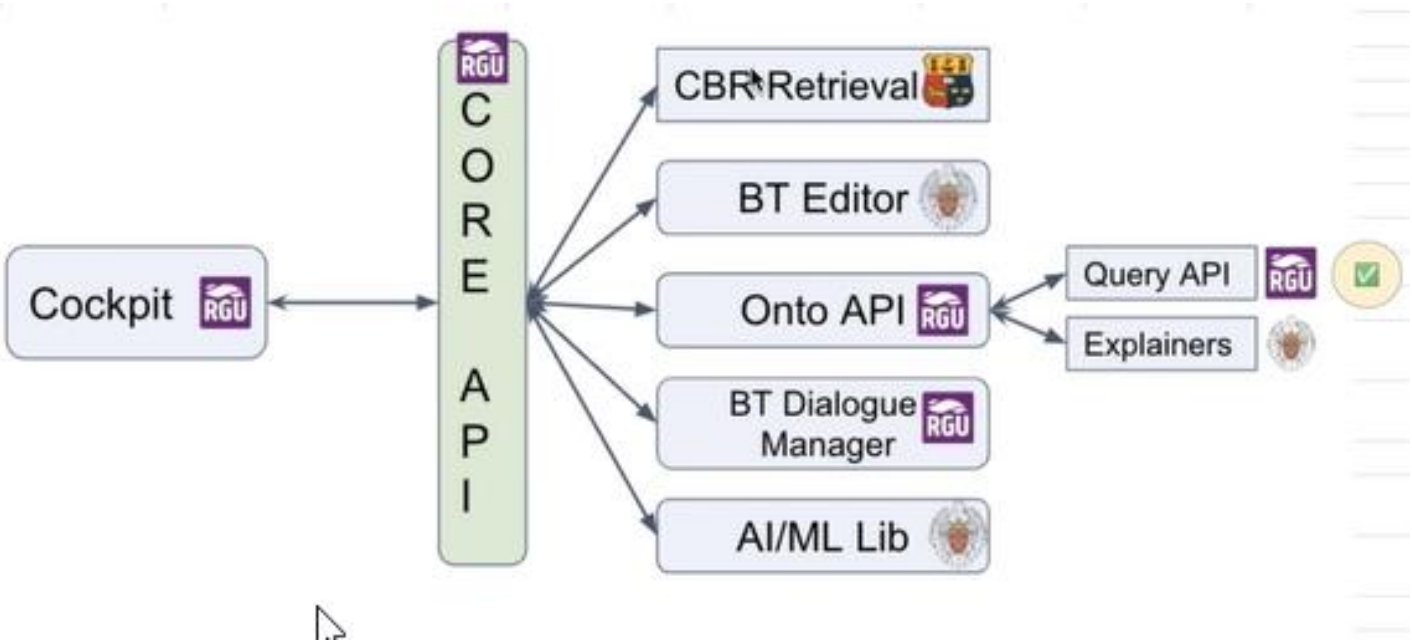
- **Query** : Problem, AI task and goal assessment, Explanation needs.
- **Case solution** : Explanation strategy
  - Workflow of several evaluation artifacts, represented by BehaviourTrees
- **Case result** : Evaluation, user feedbacks (through the cockpit on how it meets the needs)

# A typical path…

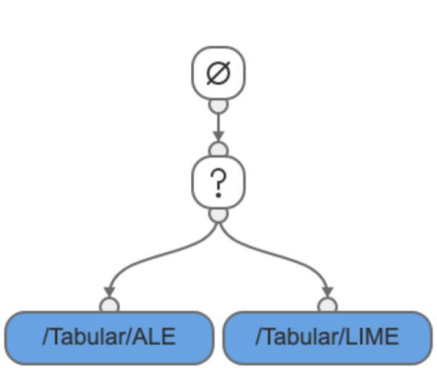
- Example-based, post hoc
- Feature importance-based,
- SHAP
- Global confidence,
- LIME
- Local accuracy
- Text summarisation
- Saliency maps



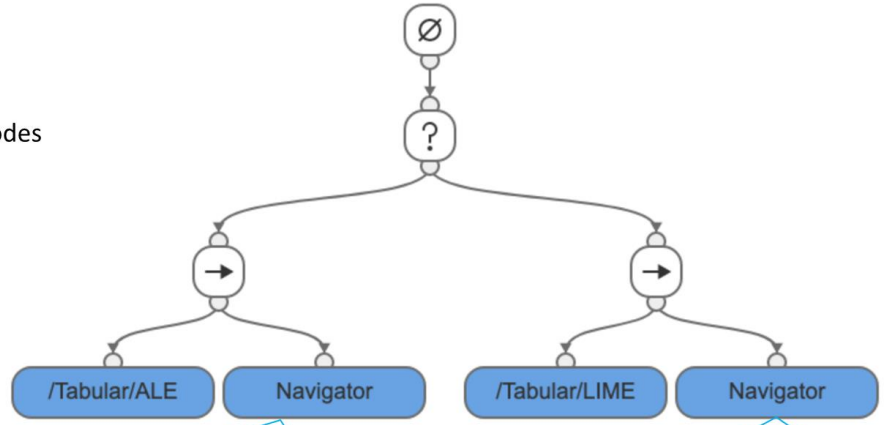
# Supporting components in iSee platform



# Conversational evaluation : Example1




Adding navigator nodes



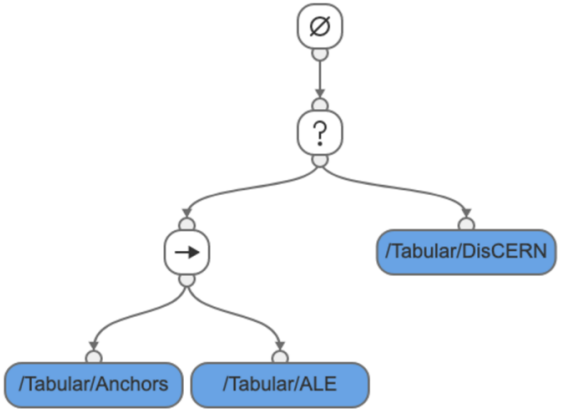

Bot: Does this explanation answer your question?
- Yes, I'm happy (success, exit)
- Yes/No, I need a different explanation (go to LIME)
- Yes/No, I have other questions (exit, go to Need)
- I don't agree with this explanation (disagreement, go to disagreement)

Bot: What do you think?
- Yes, I'm happy (agreement, exit)
- Yes/No, I have other questions (exit, go to Need)
- I don't agree with this explanation (disagreement, exit, go to disagreement)

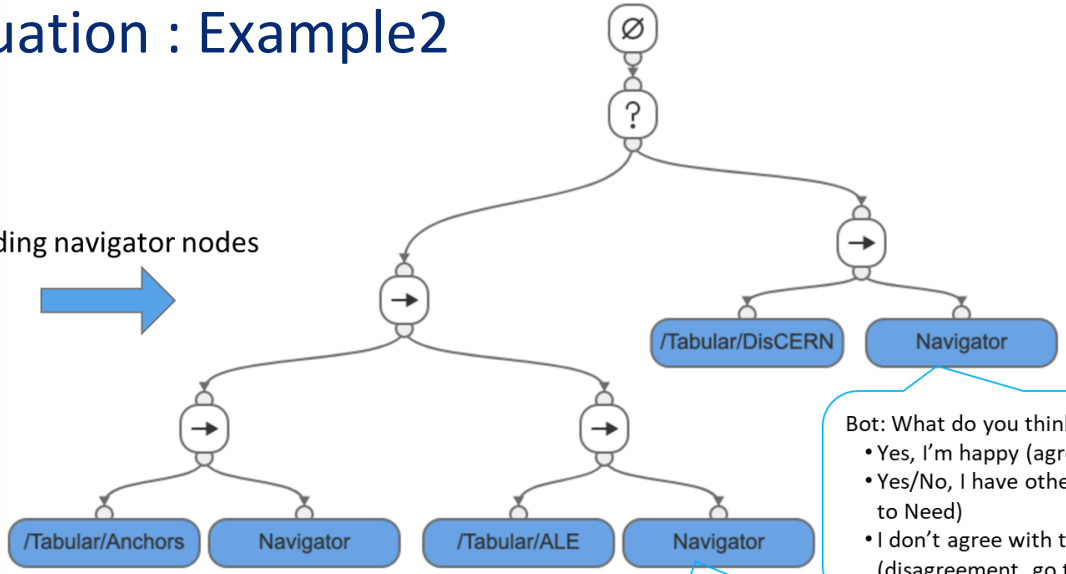
# Navigation based Relationships between Explainers

| Navigation | Traditional BT | Scenarios | Navigation Question |
|---|---|---|---|
| Sequence | | | |
| Priority | | | |
| Leave | Any composite with one child | 1. User has gone through all explainers in the current intent and other intents<br>2. User wants to leave | 1. Thank you for using iSee. That's all the explanations I can provide for you today. Would you like to take a questionnaire to evaluate your explanation experience.<br>2. Do you think we answered your question? **Yes/No I'm happy to leave** |
| Replacement | Priority node with two or more children | 1. Current parent is priority with right siblings → show other explanation<br>2. There are other intents → user needs to select a different question/intent | 1. Do you think we answered your question? **No I would like a different explanation**<br>2. Do you think we answered your question? **No I would like to ask a different question** |
| Variant | Sequence node with two or more children | 1. Current explainer has other presentations → show other presentation<br>2. Current parent is sequence with right sibling →show other explanation | 1. Do you think we answered your question**? Yes, I would like a different visualisation**<br>2. Do you think we answered your question**? Yes, I would like a more explanation** |
| Complement | Explainer with Sequence node with two or more children | 1. Current explainer has other presentations → show other presentation<br>2. Current parent is sequence with right sibling → show other explanation | 1. Do you think we answered your question**? Yes, I would like a different visualisation**<br>2. Do you think we answered your question? **Yes, I would like more explanation** |
| Supplement | | 1. Current parent is sequence with right sibling → show other explanation | Do you think we answered your question? **Yes, I would like more information** |
| Disagreement | | 1. There are other intents → user needs to select a different question/intent | What would you like to do next? **Ask new question** |

# Conversational evaluation : Example2




Adding navigator nodes



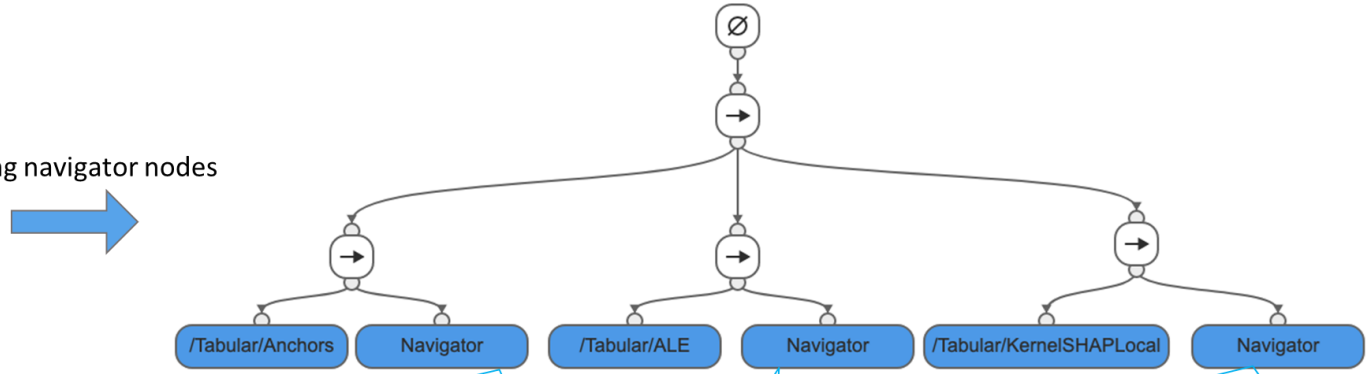

Bot: What do you think?
- Yes, I'm happy (agreement, exit)
- Yes/No, I have other questions (exit, go to Need)
- I don't agree with this explanation (disagreement, go to disagreement)

Bot: Does this explanation answer your question?
- Yes, I'm happy (agreement, exit)
- Yes, I need a more explanation (go to ALE)
- No, I need different explanation (go to DisCERN)
- Yes/No, I have other questions (exit, go to Need)
- I don't agree with this explanation (disagreement, go to disagreement)

Bot: What do you think?
- Yes, I'm happy (agreement, exit)
- Yes/No, I need a different explanation (go to DisCERN)
- Yes/No, I have other questions (exit, go to Need)
- I don't agree with this explanation (disagreement, go to disagreement)

# Conversational evaluation : Example2

Adding navigator nodes



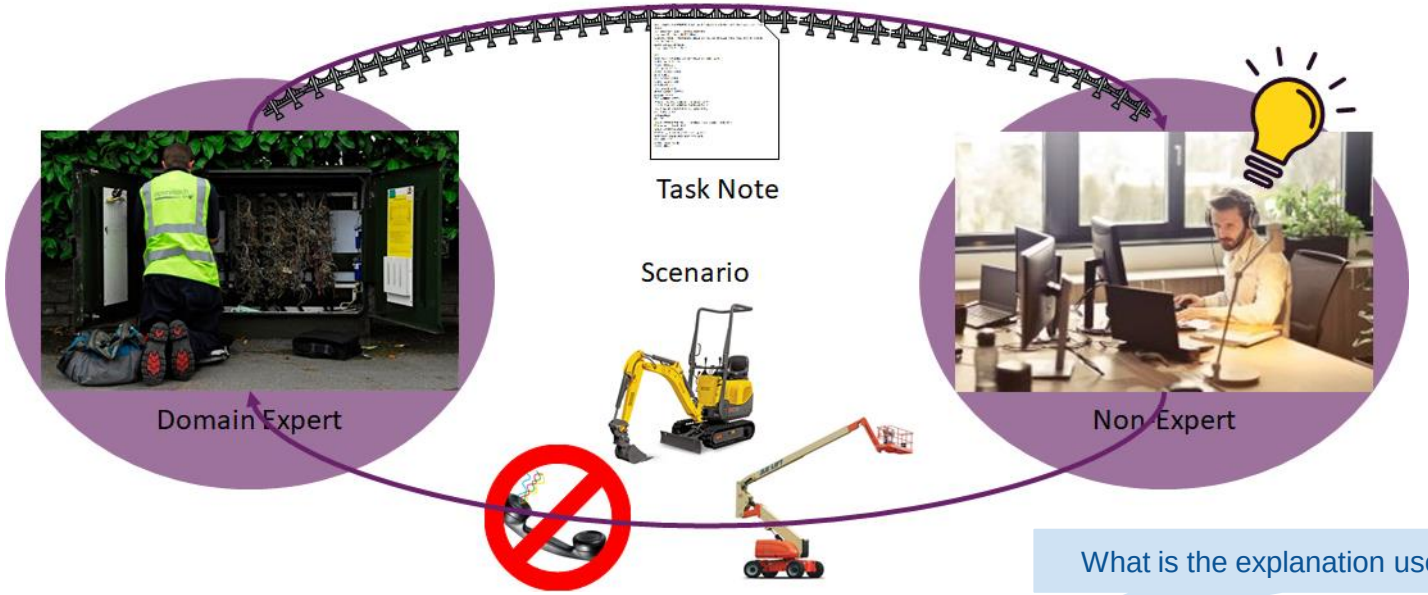

Bot: Does this explanation answer your question?
- Yes, I'm happy (agreement, exit)
- Yes, I need a more explanation (go to ALE)
- Yes/No, I have other questions (exit, go to Need)
- I don't agree with this explanation (disagreement, go to disagreement)

Bot: What do you think?
- Yes, I'm happy (agreement, exit)
- Yes, I need a more explanation (go to SHAP)
- Yes/No, I have other questions (exit, go to Need)
- I don't agree with this explanation (disagreement, go to disagreement)

Bot: Do you think we answered your question?
- Yes, I'm happy (agreement, exit)
- Yes/No, I have other questions (exit, go to Need)
- I don't agree with this explanation (disagreement, go to disagreement)

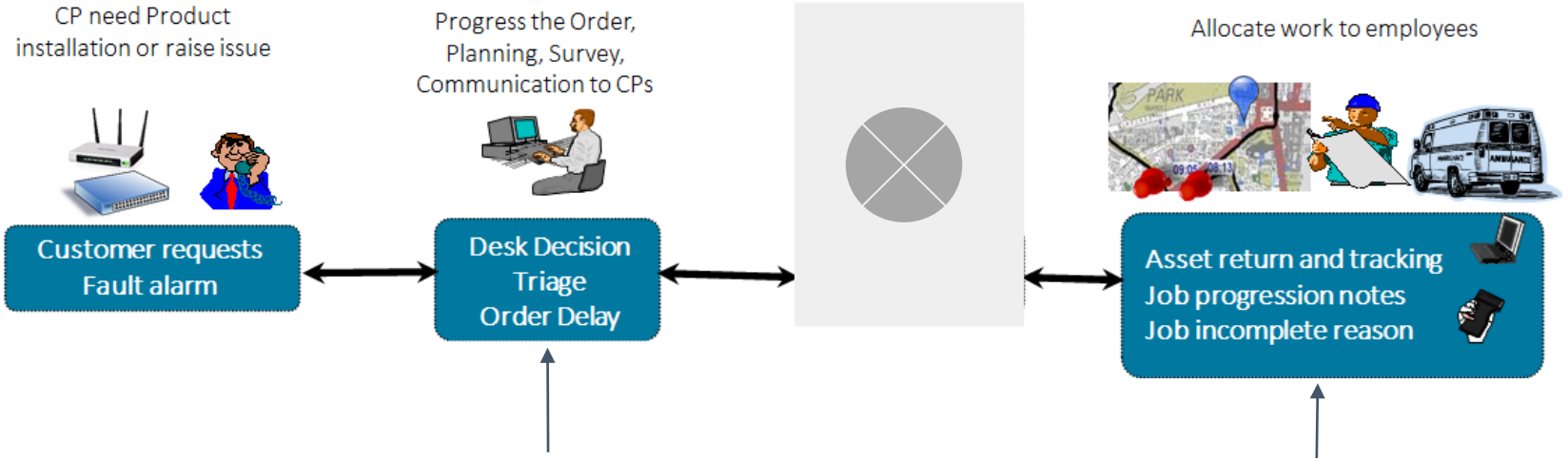
# Example 2: Telecom Engineering Domain

Agents are responsible for supporting engineers in the field by organising task intervention and allow progress of complex tasks.




What is the explanation used for (goal)

# Example 2: Telecom Engineering Domain



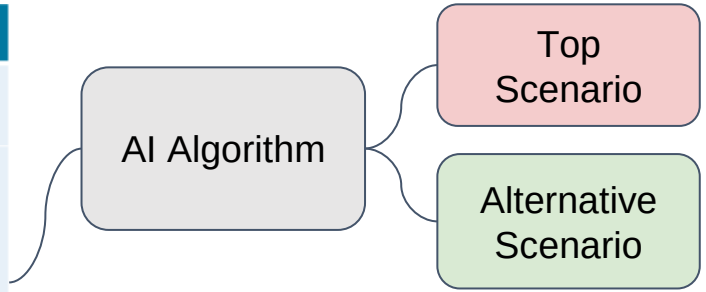

An AI system to support desk agents in deciding on Next Action and help Triage process.

An AI system to predict potential Failure cause to field engineers ahead of starting the Fibre tasks

What is the explanation used for (goal)

# Example 2: Telecom Engineering Domain

| Eng Notes |
| --- |
| I cannot complete this task because No dig done yet. Please pass to CSS queue Id 00000. |
| Incomplete asst eu paid for the pole to be removed 13monthsago this is new build he has put duct to base of pole and ha s requested that a juf4 box or jb23 be put there and the 2 d ucts be jointed to fed his property will need bt to arrange jointing and supply of new box and pole removal before any work can be complete this has been on going for 13 months bt have said they need wayleave from el to feed off existing l |
| InCompleteReason:Tree cutting required to access DP. Picture s attached. Internal wiring and PCP jumpering complete.,Upst reamSpeed:,DownstreamSpeed:,Tested:1,NotTestedReason:,Demo Pe rson:Mr. dave,DoorColor:,Questions:closureNotes:Eclipse test |




Dig Required

| | |
| --- | --- |
| Dig Required | 84% accurate |
| C017 D- Pole Validation | 55% accurate |
| Traffic Management | 75% accurate |

What is the explanation used for (goal)

A planner may be interested in
-Why does the AI believe this action is required ?
-What are the other possible actions supporting the top one ?

An expert may be interested in
-Key facts and relevance weights
-Numerical information presented in NLG text

# Example 2: Telecom Engineering Domain

| Eng Notes |
| --- |
| I cannot complete this task because No dig done yet. Please pass to CSS queue Id 00000. |
| Incomplete asst eu paid for the pole to be removed 13monthsago this is new build he has put duct to base of pole and ha s requested that a juf4 box or jb23 be put there and the 2 d ucts be jointed to fed his property will need bt to arrange jointing and supply of new box and pole removal before any work can be complete this has been on going for 13 months bt have said they need wayleave from el to feed off existing l |
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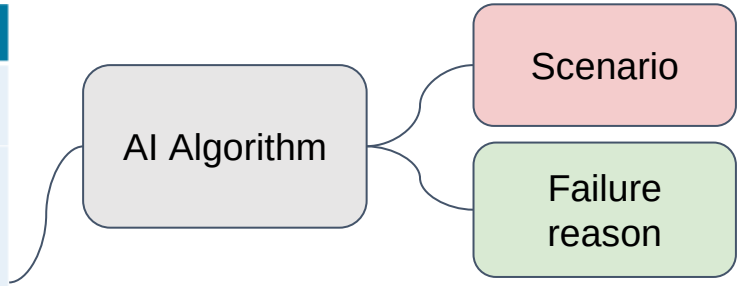



Pole validation

External Event :34%
Dangerous animal :10%
Time constraint:20%

An engineer may be interested in

-A summary of the action to be done (Aerial cable required)

-Actions made on similar past task to allow progression and closure

-Some contextual knowledge about Hazards (tree, pole renew)

-How likely is the algorithm to be correct ?

-Confidence measures

-Human-in-the-loop

What is the explanation used for (goal)

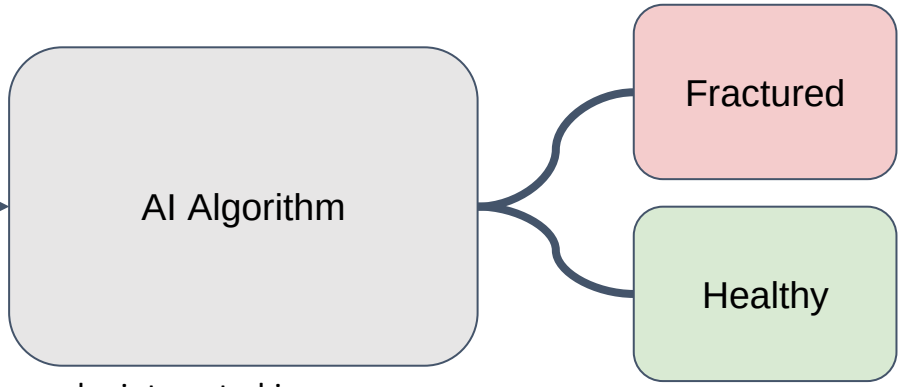
# Personas and Intents(telecom use case)

- Planner
- Explanation is decision-support
- About / Education
  - *“Why has this recommendation been made ?”*
  - *“What are other notes that led to the same action ?”*
- Mental Model
  - *"Why do you think this is the next network task?"*
- Performance
  - *“How do I know the system works effectively?”*
  - *How confident is the AI model ? what are the other possibilities?*
- Developers
- Explanation as an auditing tool
- Debugging
  - *"How has this prediction been made?"*
  - *"How has this explanation been generated?"*
  - *Which inputs led to this result?*

# BT Telecom – Planner (desk based agents - admin), engineers

- (sequence) Confidence Score: how confident is the AI system about the prediction?
  - Technique: Euclidean distance to similarity between the query and the recommended case
  - Explanation type: Statistical explanation
- *Would you like alternative explanation? Yes/No (*)*
- (sequence) Confidence score of k nearest neighbours
  - Technique: Euclidean distance to similarity between the query and the nn (Bruno)
  - Explanation type: NN explanation + Statistical explanation
- (priority) Would you like some thing else? Yes/No (*)
- (sequence) Feature attribution explanation word level of the recommended case
  - Technique: tf-idf vector comparison (Bruno)
  - Why recommended based on words
- (sequence) Sentence attribution explanation
  - Technique: tf-idff vector comparison but based on words form previous (Bruno)
  - “Reason” why they are similar: reason being a sentence

# Example 1: Medicine and Health Domain




95% accurate

A doctor may be interested in:

- Why does the AI believe there is a fracture?
- Saliency Mapping
- Graphical Representation
- Little contextual knowledge required

A patient may be interested in:

- How likely is the algorithm to be correct?
- Confidence Measures
- Numerical information presented in NLG text
- Some contextual knowledge required

Who is the explanation for?

# Example 2: Anomaly Detection Domain

The use of AI models within cybersecurity response aims at helping cyber SOC members automatically respond to cyberattacks both faster and more efficiently.

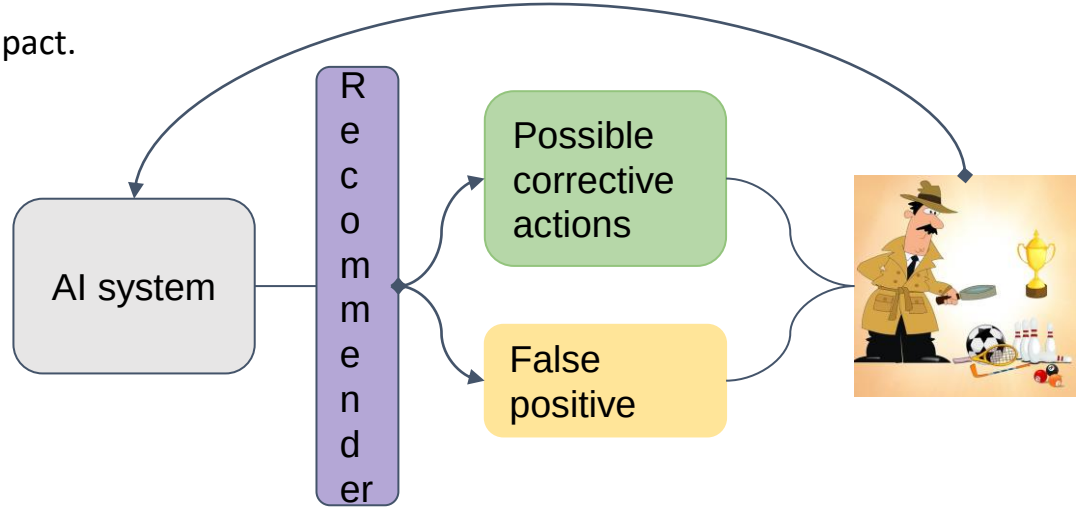
Goal is to improve task performance, business impact.

Expert Analyst may be interested in:

- ❑ Why the result
- ❑ Counterfactuals, probability, post-hoc
- ❑ External knowledge required
- ❑ Why a certain action was suggested
- ❑ General model behaviour
- ❑ Local AI system behaviour

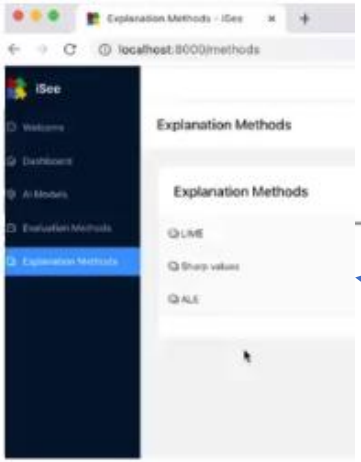
Manager may be interested in :

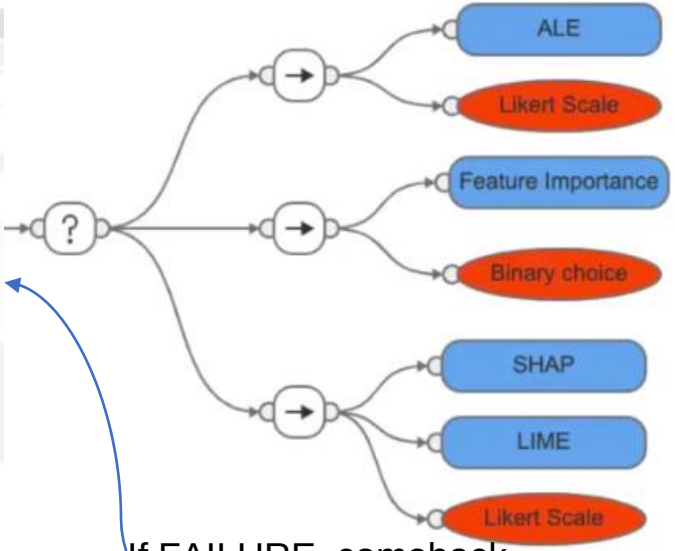
- ❑ Global understanding of AI system
- ❑ How effective it may be if performed
- ❑ Graphical representation



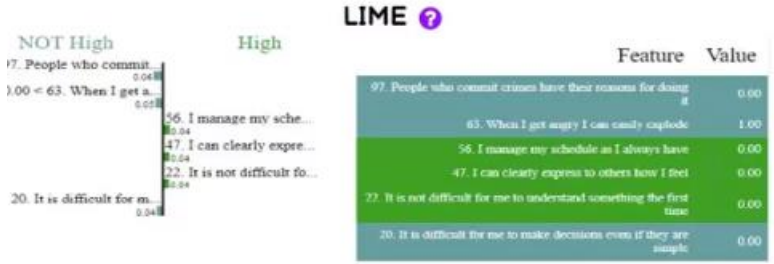

What makes an explanation a success

# User experience of explanation








If FAILURE, comeback and try another from the catalogue

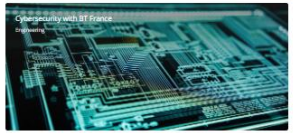
"This explanation helped me to answer one or more of the questions I had." Strongly Disagree ○ ○ ○ ○ ○ Strongly Agree

"This explanation was difficult to understand." Strongly Disagree ○ ○ ○ ● ○ Strongly Agree

"I'm satisfied with the information I got from this explanation" Strongly Disagree ○ ○ ○ ● ○ Strongly Agree

# Do you wish to contribute with methods for the library  or use cases ?





- The goal of iSee project is to apply the platform to real problems such as Anomaly Detection in production line, Cyber Threat Detection, Telecom Diagnosis, Radiology diagnosis, Natural Event prediction.
- Since explanation goals and utility is very inherent to the use case and the user profile, we are looking for inputs from both users of AI or explanation system, practitioners of explanation methods.

Contact us at hello@isee4xai.com

# Use case onboard path

Version 4th July 2022

# UC Progress line


Maturity

Business needs

Models

AI/Human goal

Explainers

User intent

Explanation strategy

Questions for evaluation

Model available : upload it (pkl)

Explanation strategy exists : upload it (beh tree?)

No explainer : skip to retrieval step

reusable explainer available : add to isee catalog with the WP2 team

Cockpit :retrieve strategy « image »

Build or Review the evaluation questions script ?

connect to iSee conversation layer

AI model in iSee :

Using Chatbot , query the model through iSee and answers questions to provide feedbacks

AI model not in iSee :

Download Chatbot version connecting the external model to the iSee API and answers questions.
Transfer the feedback to iSee team or through iSee API/private git repo.?

# UC Progress line with co-creation


Maturity

Business needs

What makes AI trustworthy,

What makes explanation a success,

Models

AI/Human goal

Explainers

User intent

Explanation strategy

Questions for evaluation

Model available : upload it (pkl)

Explanation strategy exists : upload it (beh tree?)

No explainer : skip to retrieval step

Reusable explainer available : add to isee catalog with the WP2 team

Co-creation designer

Cockpit :retrieve strategy « image »

Build or Review the evaluation questions script ?

connect to iSee conversation layer

AI model in iSee :

Using Chatbot , query the model through iSee and answers questions to provide feedbacks

AI model not in iSee :

Download Chatbot version connecting the external model to the iSee API and answers questions.

Transfer the feedback to iSee team or through iSee API/private git repo.?

Collaborative evaluation – end user

Each UC can bring multiple cases into  Cockpit / ontology instantiation / json formatted case / platform

V1 : case retrieval for the invent validation goal -> implement UC with this goal (no explainer provided in input)
V2 : case revise/ for the Xplainers strategy recommendation goal → implement UC with this goal (explainer provided in input)

**Consumer of case-based explanation strategy and explainers**
Use cases have an AI (black box) system (with/without training data)
situation1 [AI system + explanation goals, no explainer]
situation2 [dataset + AI system, no explainer]

iSee helps retrieving one of the existing explainer (retrieve and reuse from the iSee case base).
Will be using iSee to evaluate or certify their models.

**Producer of case-based explanation strategy or explainers**
Use cases have an AI (black box) system (with/without training data)
situation3 [data set + embedded AI-explainer]
situation4 [dataset + AI system, dedicated external explainer]

Helps populate the case base with new explainer without experiences.
Not using iSee to evaluate or certify their models.
iSee helps finding reusable explanation methods and build strategies