

PSYCHOLOGY LESSON FOR LLMS & HUMANS

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REIT (NSF GRANT)

Teaching AI to SD teachers

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UCSD CS DEPT

AGENDA

1. Your assignment
2. Planning a program/dialog
3. Implement the plan
4. Decision trees and forests
5. Getting serious about reliability
6. Hybrid architecture
7. Convomeld and Indica
8. iPython aliases

YOUR ASSIGNMENT

- keywords: `if`, `print()`, `input()`, `=`
- bonus keywords: `def`, `in`, `str.*()`

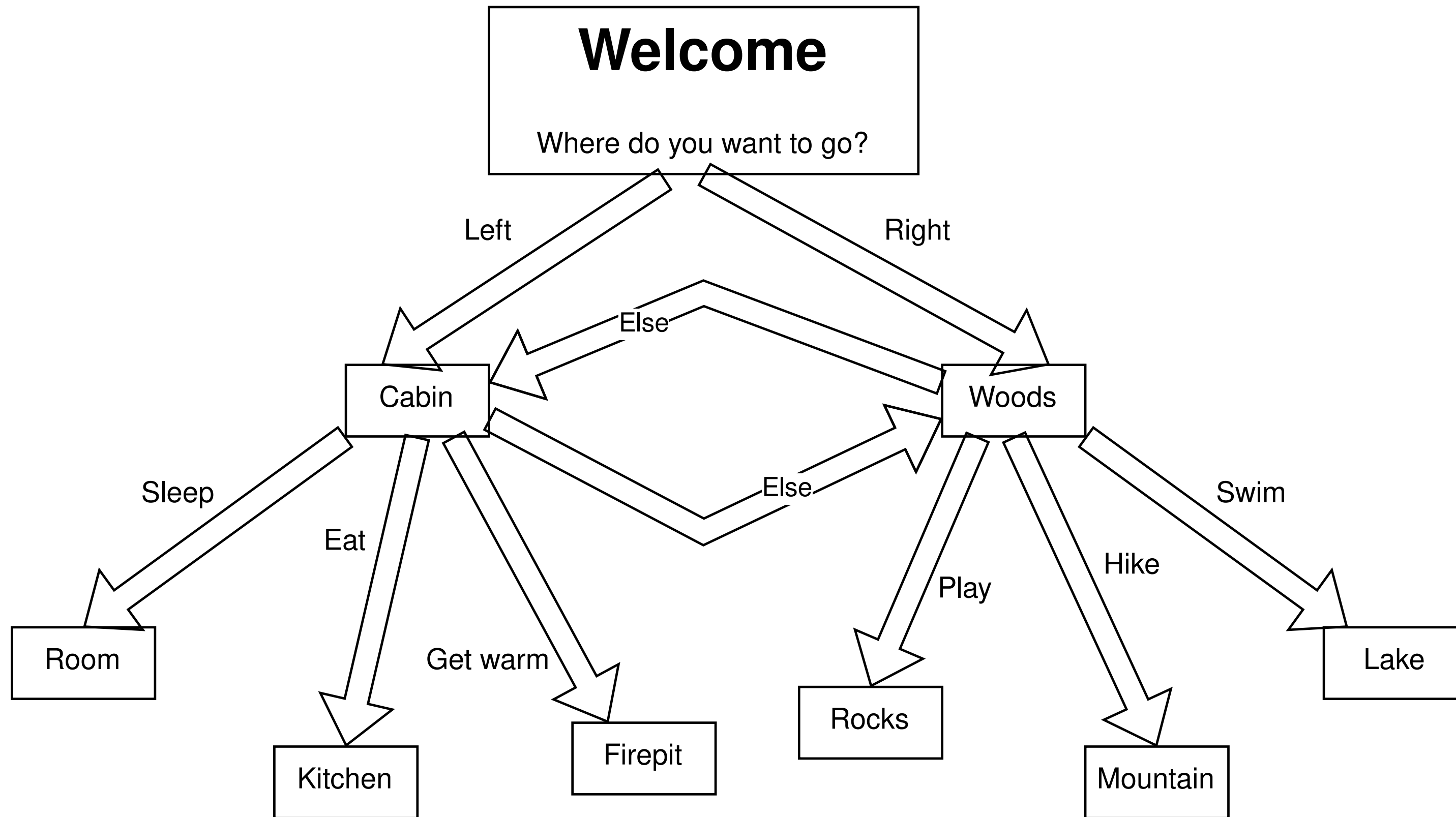
TEXT ADVENTURES AND DECISION TREES

GenX got their coding start with text adventures:

- *DnD*
 - Character sheets
 - Die rollers
 - Dungeon Masters
- *Oregon Trail*
- *Colossal Cave Adventure*
- *Rogue*

DIALOG PLAN

STUDENT DESIGN



HARD CODED TEXT ADVENTURE

```
print('You are a student at Mesa and you want to go swimming!')
resp = input("You're in SD, which way do you go (N/S)?")
if resp[0] == 'N':
    resp = input("You're in LA, Which way now (E/W)?")
    if resp[0] == 'E':
        resp = input("You're in Vegas. You lose ;(")
    elif resp[0] == 'W':
        resp = input("You're at the beach! You win! :-)")
    print('Invalid direction in LA. You lose!')
elif resp[0] == 'S':
    resp = input("You're in the TJ. Which way now (E/W)?")
    if resp[0] == 'E':
        resp = input("You're in the desert. You lose ;(")
    elif resp[0] == 'W':
        resp = input("You're at the coast! You win! :-)")
    print('Invalid direction in TJ. You lose!')
```


MORE NATURAL TEXT ADVENTURE

- `.lower()`
- `.strip()`
- `.replace(' ', '').replace('-', ' ')...`

AUTOMATION

- **Pylint** code quality score
- Open loop integration test

```
$ python -c 'print('N') ; print('W') ; | python game.py  
$ cat player_input.txt | python game.py
```

CLOSE THE LOOP WITH pexpect

```
import pexpect

child = pexpect.spawn('python game.py')

while child:
    child.expect('.*:')
    command = select_action(text) # 'north'
    child.sendline(command)
```

THOUGHTFUL FEEDBACK

R

E

P

L

THOUGHTFUL FEEDBACK

READ

E

P

L

THOUGHTFUL FEEDBACK

READ

EVAL

P

L

THOUGHTFUL FEEDBACK

R E A D

E V A L

P R I N T

L

THOUGHTFUL FEEDBACK

R E A D

E V A L

P R I N T

L O O P

MINDFUL GRADING

R E A D

E V A L

****P** LAY**

GET SERIOUS

- Phone tree
- Autocomplete
- Therapy - e.g. ELIZA, Wobot
- Chat ops
- Search
- RAG - LLM search
- Full monty - naked LLM - e.g. *Grok*, ChatGPT_
- CLI assistant (shy)
- Vibe coding assistant - e.g. *Copilot*, *Cursor*, *Aider*
- Massive homework crib sheet - e.g. *ClaudeCode*, *Gemma*

THERAPIST TRAINING

seq	role	text	category	sub_cat	created
0	counselor	Hello, welcome back. How was your week?	question		###
1	client	Honestly, the week was terrible; I've been in and out of the emergency room again with this pain, and it just keeps getting worse, even though the doctors can't find anything wrong. I'm starting to feel really hopeless and like nothing will ever get better. I feel like I'm just stuck in a cycle of pain and anxiety.	default		###
2	counselor	That sounds extremely overwhelming.			###
3	client	It's so frustrating to feel this way and not have any answers or relief from the pain, especially when it's impacting your life so much. I can understand why you'd feel hopeless. I am here to help you process these feelings and explore ways to cope.	default		###
4	counselor	How long have you been feeling this way?	question		###
5	client	It feels like I've been dealing with this for years now, but it's really ramped up in the last year, with these frequent ER visits and constant pain. Before that, I had some issues, but nothing like this that has just taken over my life.	default		###
6	counselor	I see you've been feeling this for a long time, but recently, it feels like it's gotten a lot worse. Is that correct?	reflection	simple	###
7	client	Yes, it's true. Every time it gets worse and the doctors just keep sending me home, I feel like there's no point anymore. It's just a waste of time and money.	narrowed perspective		###
8	counselor	Sounds like you've tried a lot and you're exhausted and you're wondering if there's even something that would work at this point.	reflection	feeling	###
9	client	It's always the same. I come here, they run the tests, and nothing changes. It's all just a waste of time and money.	narrowed perspective		

ARTIFICIAL INTELLIGENCE?

There's only one problem with AI...

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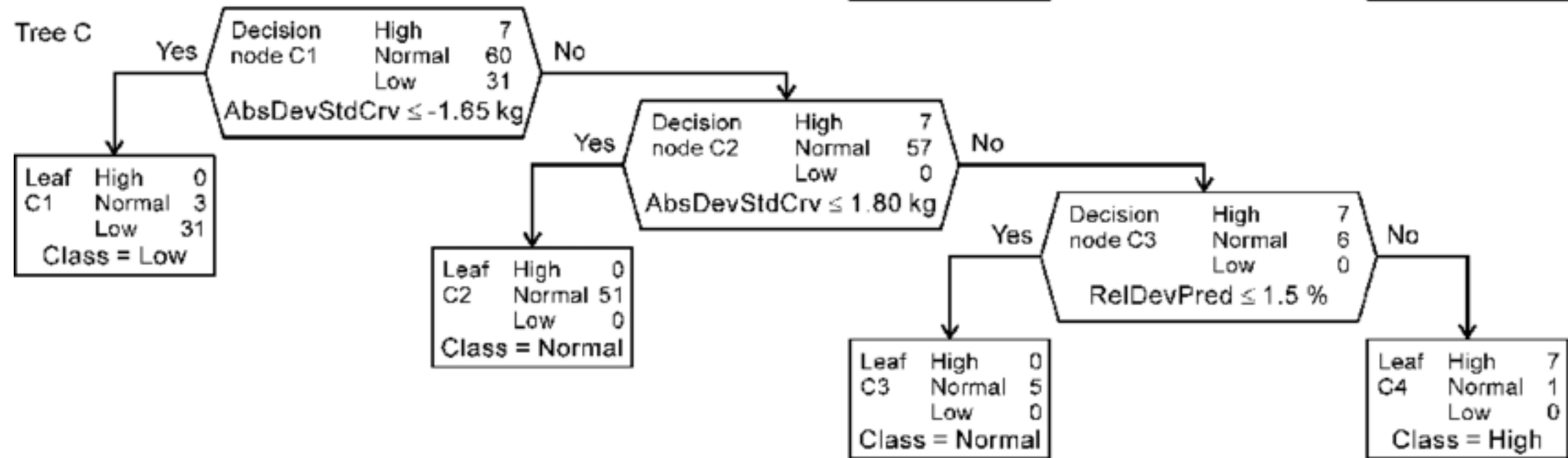
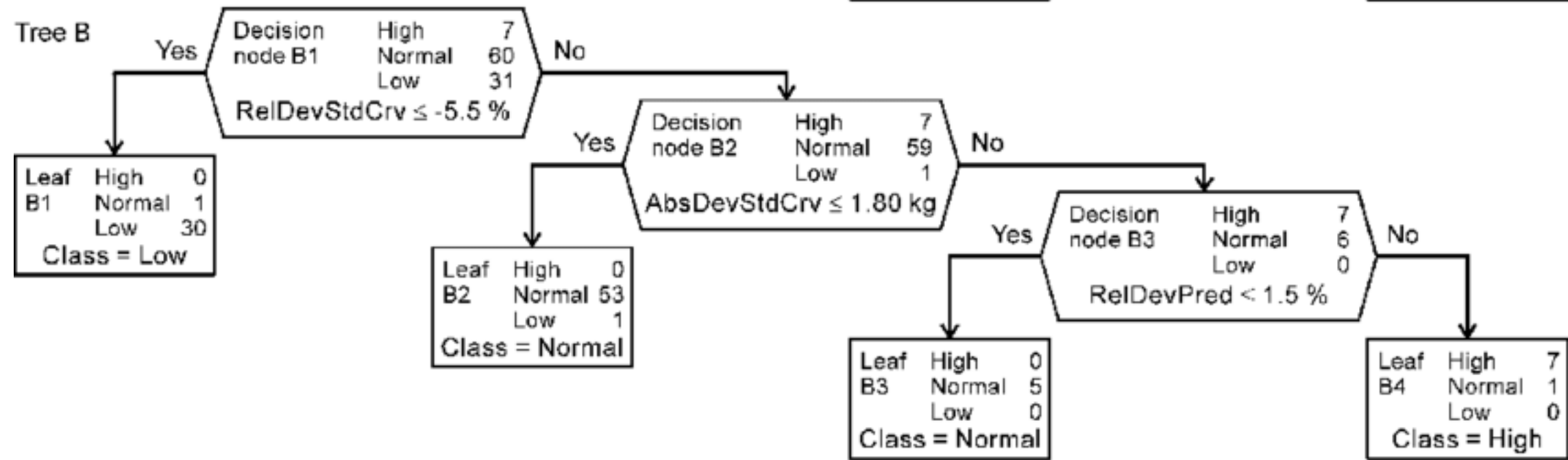
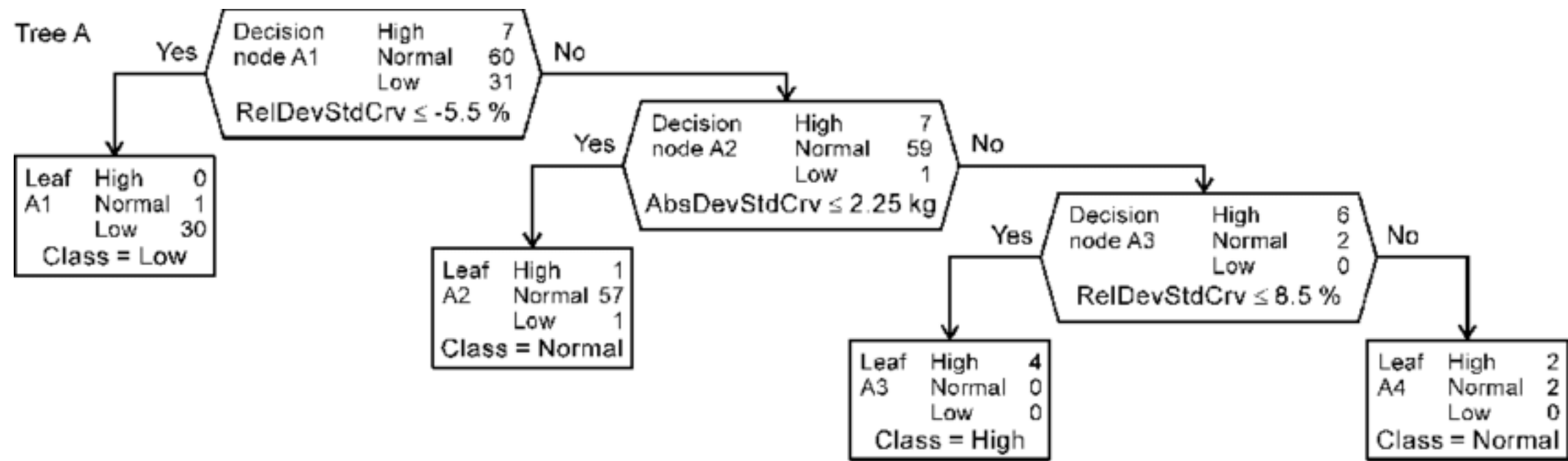
It's trained to not be dumb:

- Only knows about tokens NOT:
- Numbers
- Math
- Logic
- Counting
- Physical objects
- Common sense logic
- Geometry
- Rules

WHY?

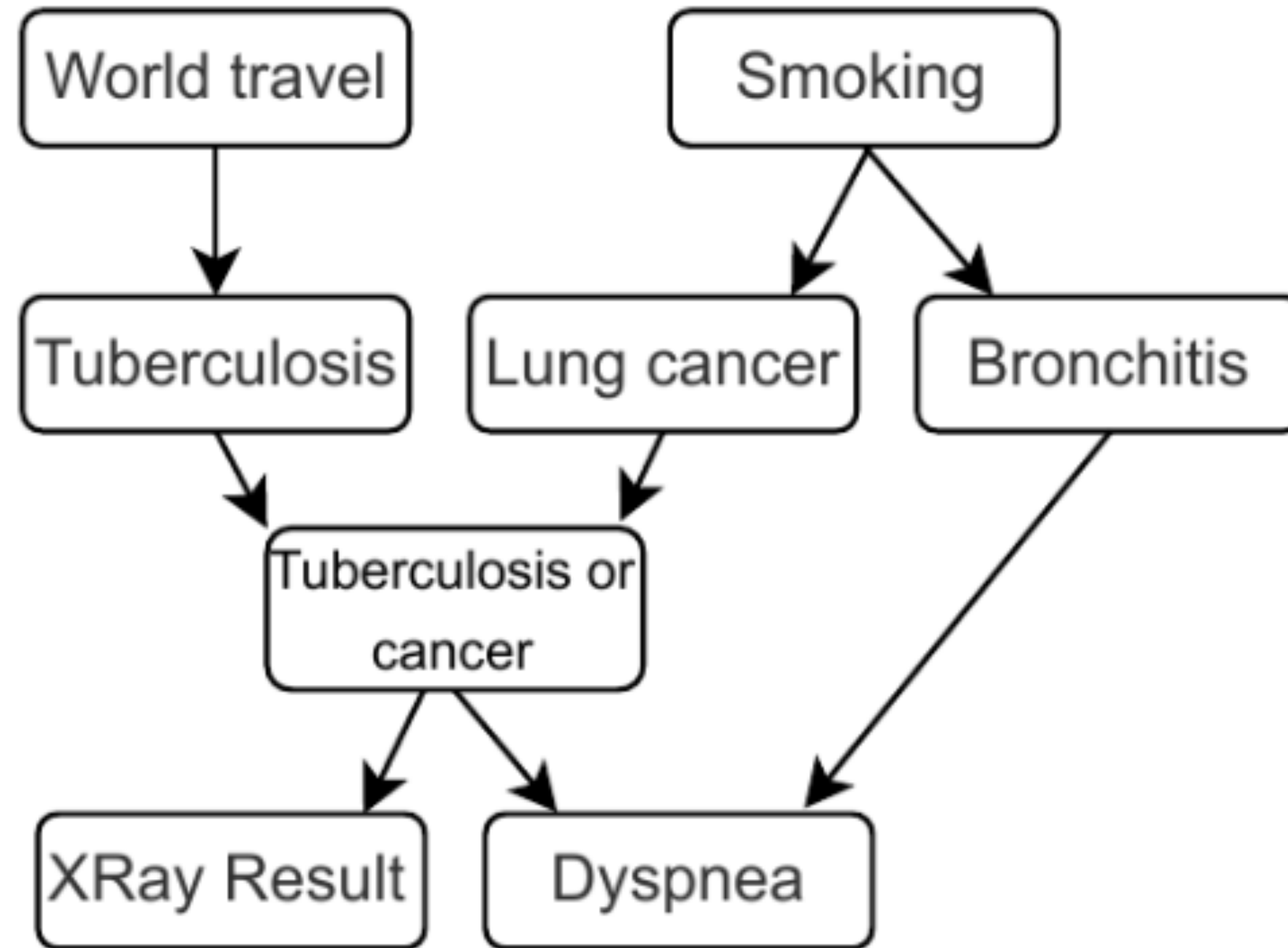
- Must give it a crib sheet
- Takes structured data and makes it unstructured and fuzzy
- Ambiguity
- Basically a fuzzy database

FDA CLASSIFICATION OF MILK NUTRITION



BAYESEAN NETWORK FOR MEDICINE

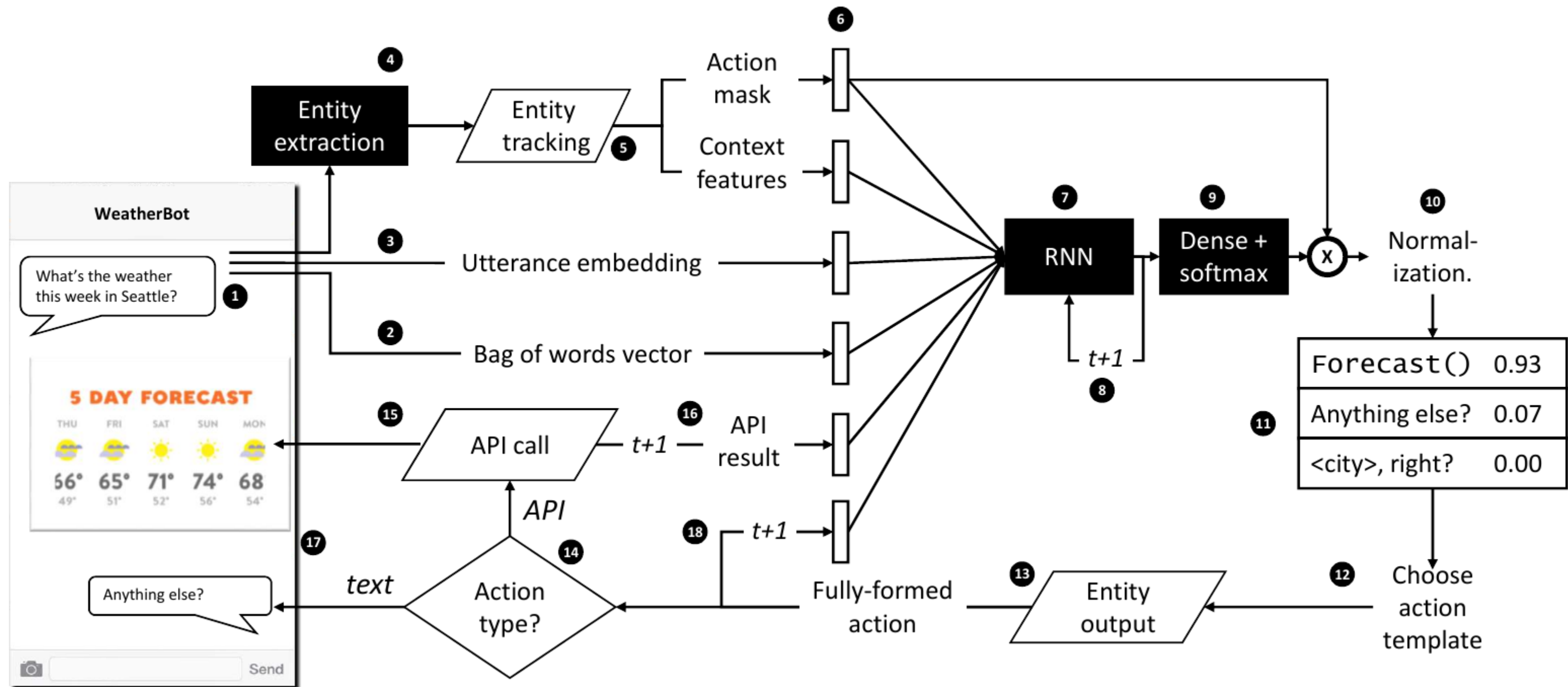
EXPERT SYSTEM FOR DIAGNOSING CANCER



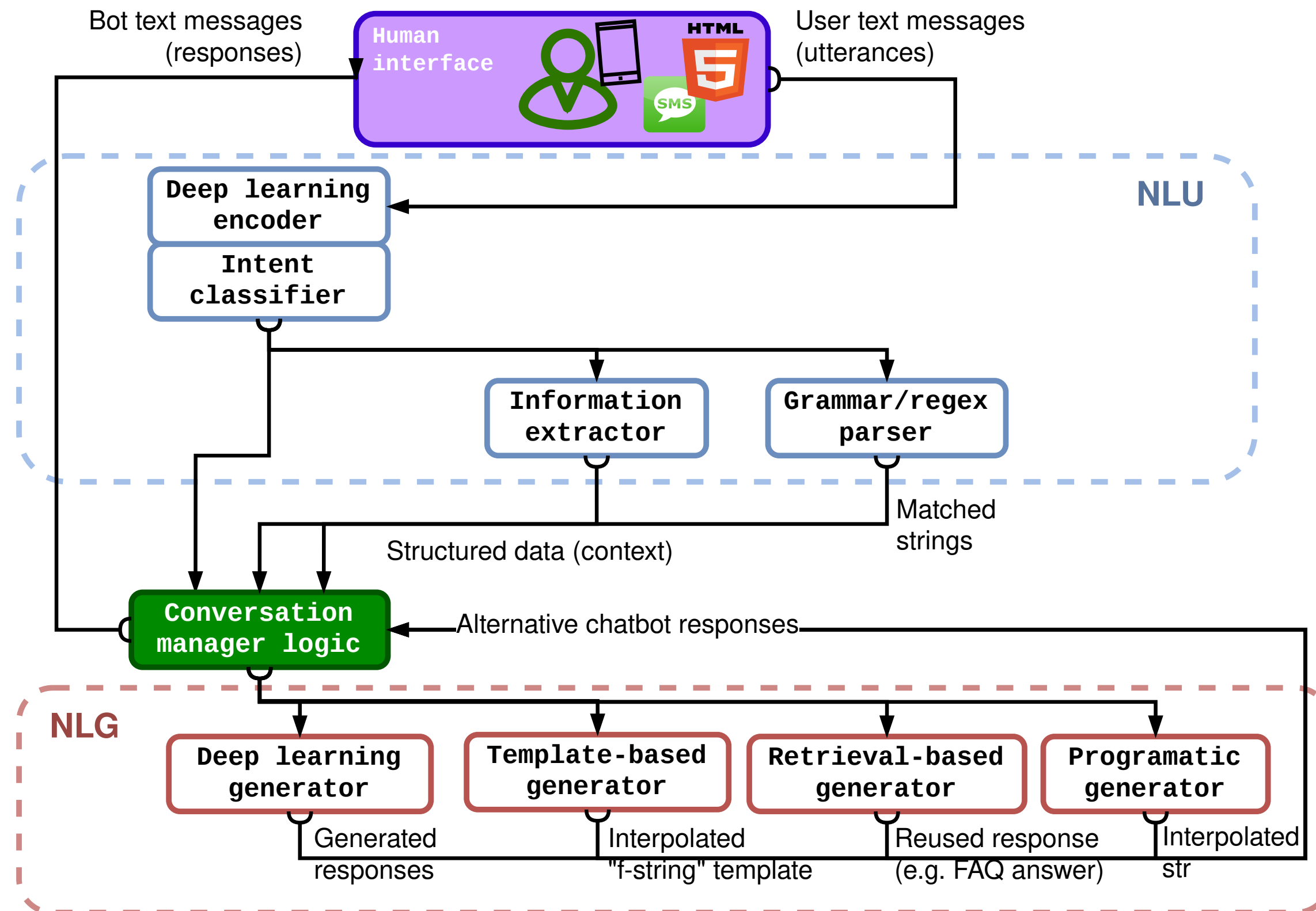
LEARNED DECISION TREES

- Random forest
- Neuromorphic programming (deep learning)
 - Decision root ball
- Bayesean belief networks, the book of why

HYBRID CODE NETWORKS



NLPIA HYBRID NETWORKS WITH FEEDBACK



CONVOMELD

- Merge conversation logs to create a dialog tree
- Plot the dialog plan network (graph)
- Load dialog plan to networkx
- Create drawio dialog plan diagrams w/ drawpy
- Execute the dialog plan

[GITLAB.COM/TANGIBLEAI/COMMUNITY/CONVOMELD](https://gitlab.com/tangibleai/community/convomeld)

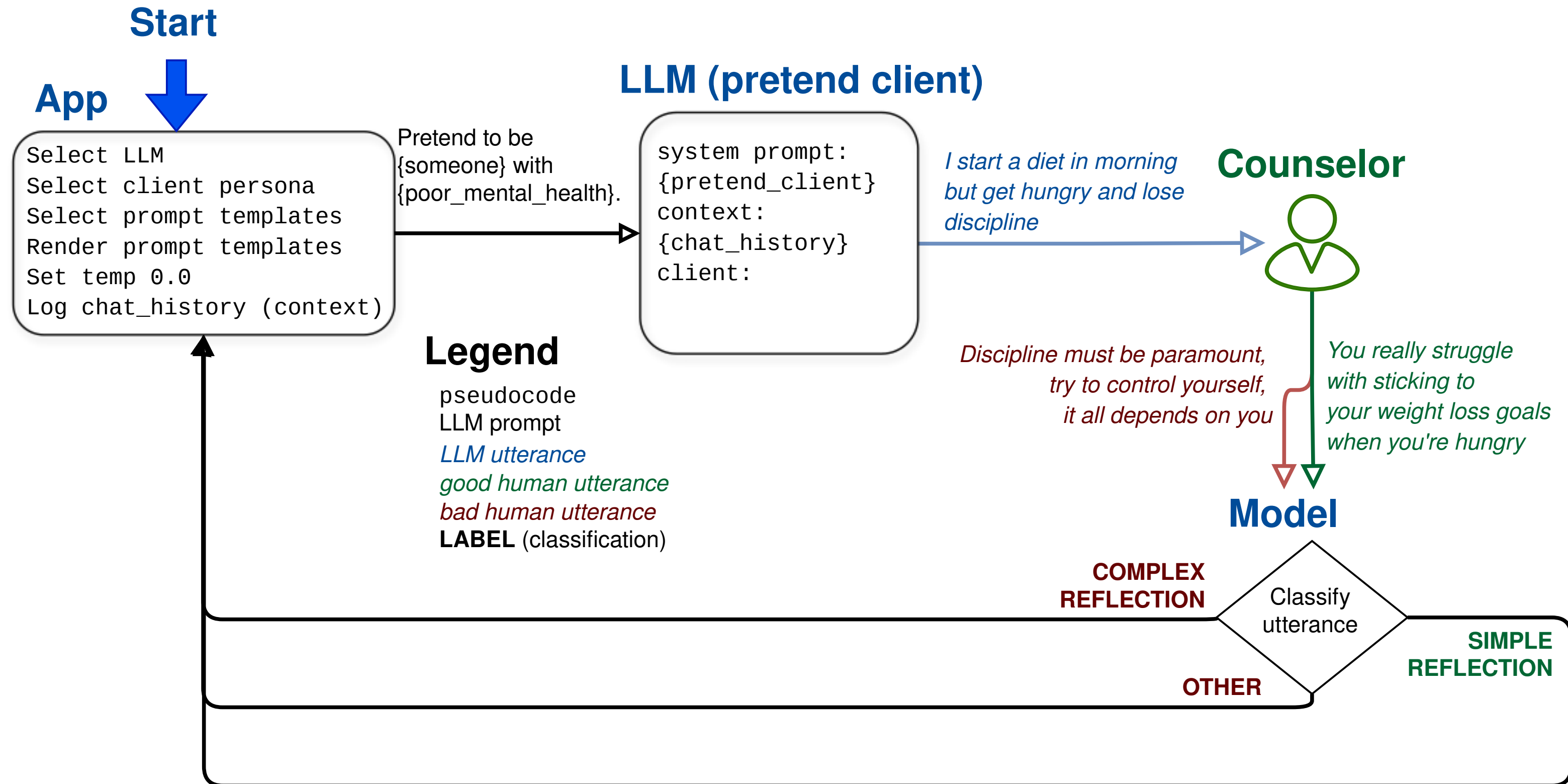
INDICA.CLUEO.NET

- Django admin wrapper
- Conversation logs
- Exercises
- LLM prompts

TODO:

- API for ConvoMeld

REFLECT-A-BOT



IPYTHON ALIASES

~/`.ipython/profile_default/startup/my_aliases.ipy`

```
%alias meld meld  
%alias subl subl  
%alias which which  
%alias wc wc  
%alias find find  
%alias curl curl  
%alias grep grep
```


LINKS

1. "PAIR: ... Counselor Reflection Scoring in Motivational Interviewing", Min et. al.
2. "Building a Motivational Interviewing Dataset.pdf", Pérez-Rosas et. al.
3. "Explaining Bayesian Networks in Natural Language using Factor Arguments." Oct 2024, by Jaime Sevilla et al
4. Decision-trees-for-the-Start-up-milk-classification
5. Indica Django App by Job Crowder & Jason
6. On the Biology of LLMs by Anthropic

