

BACKGROUND

Training Needs Analysis (TNA) is performed by Lockheed Martin's trainers to train employees on new equipment. This involves extracting **KSA statements** from training manuals. Manual extraction (mining) has some problems:

- Time consuming
- Biased extraction

1 STORY GENERATOR

STORY files have the ".story" extension. They are handled like ".txt" files.

SOFTWARE SOLUTION

Use Machine Learning to mine KSAs from training documents:



INPUT PDF Training Manual **SYSTEM** Our ML Application **OUTPUT** List of KSAs

WHAT IS A KSA?

Short sentence describing a singular teaching point:

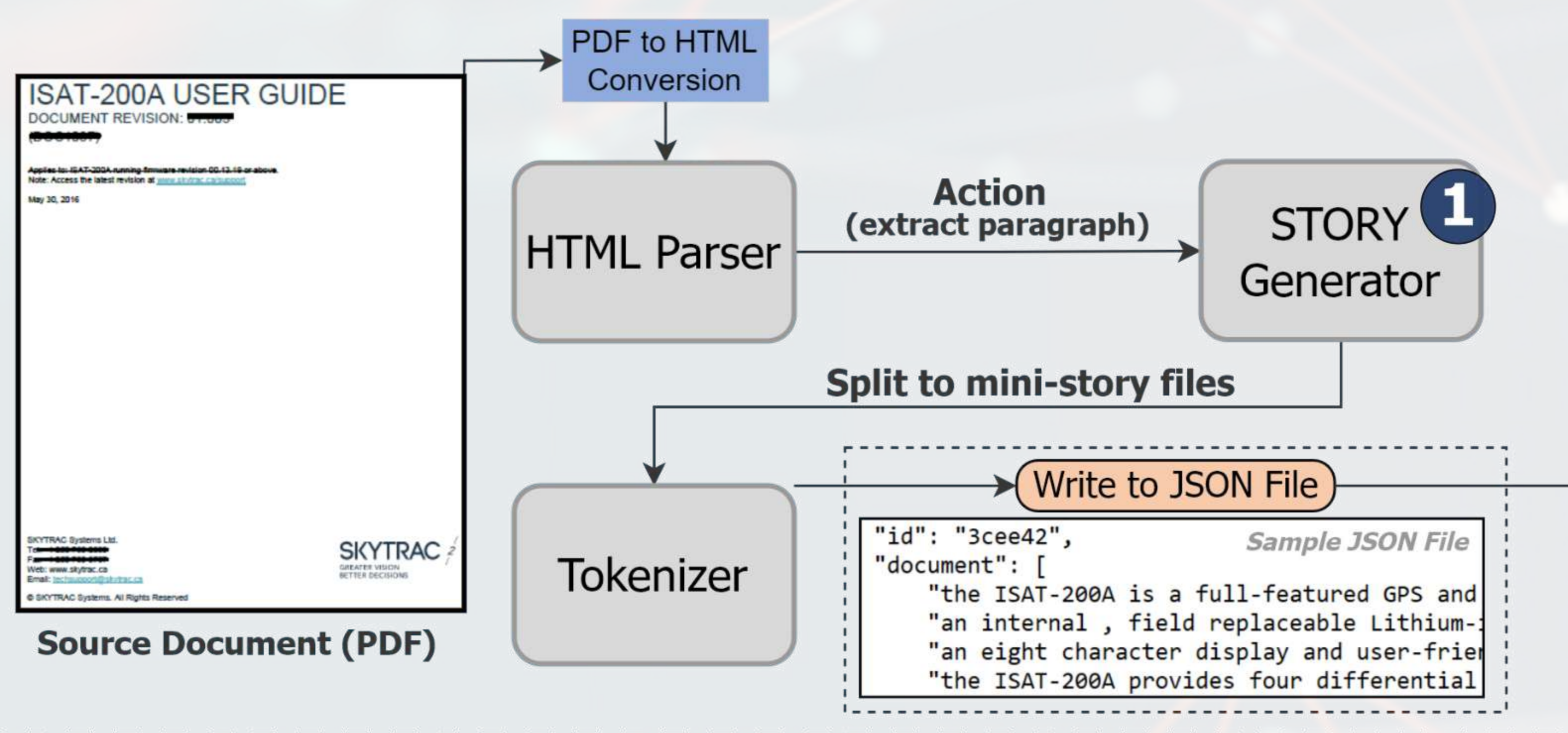
Knowledge Skills Attitudes

Example KSA: **Describe** the **radar**.
Verb + Noun

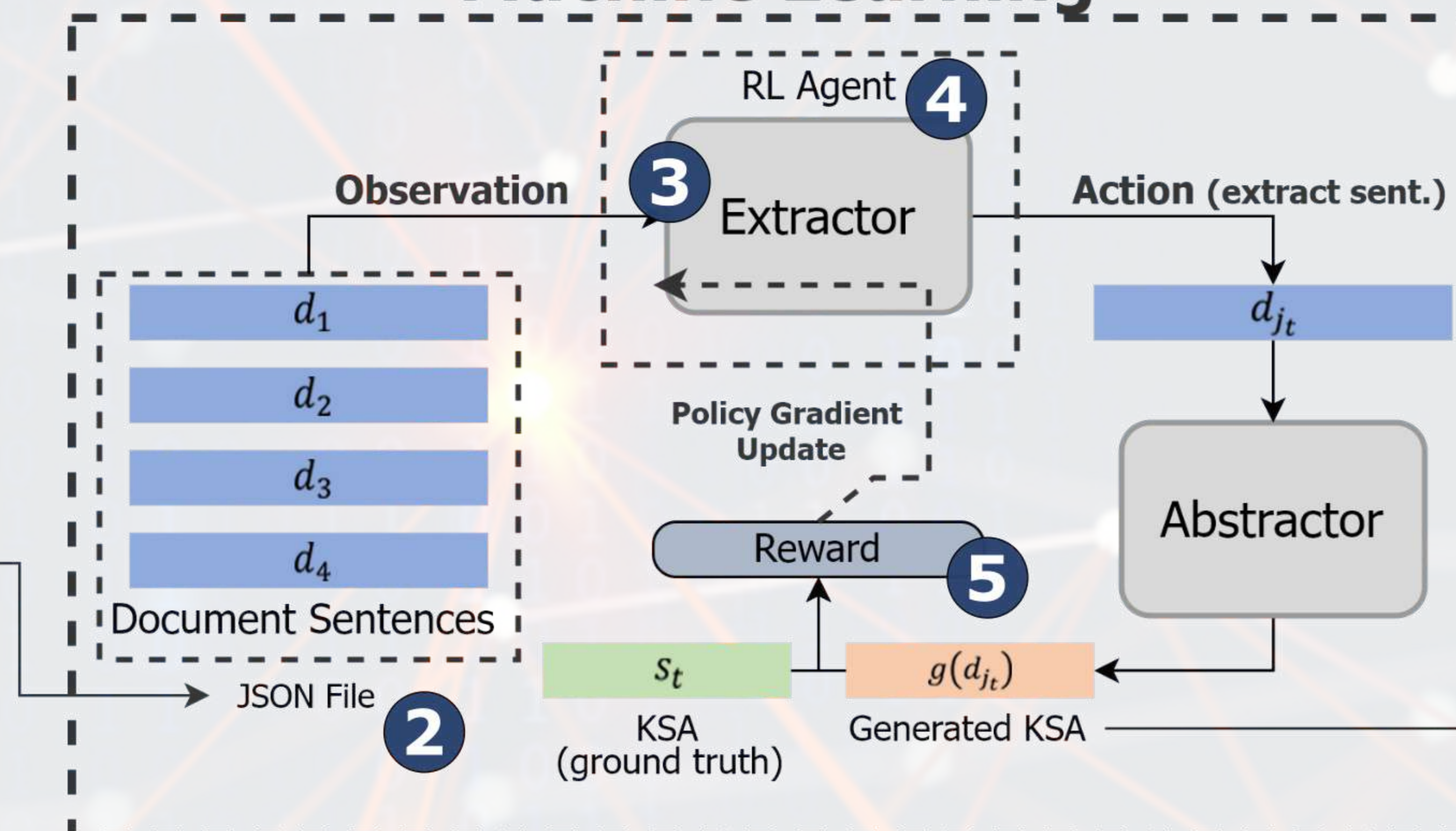
PROGRAMMING TOOLS



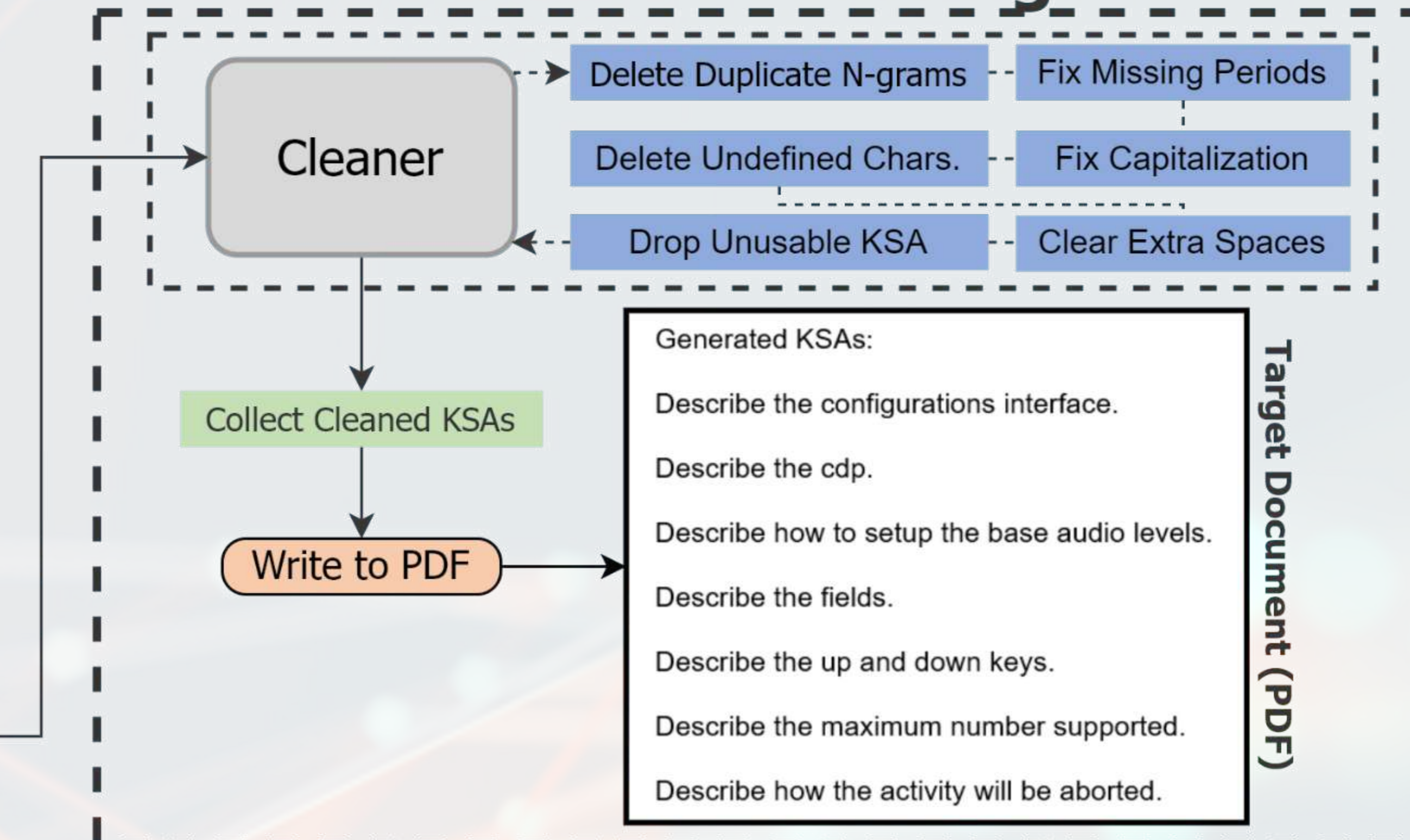
Input Processing



Machine Learning



Post-Processing



2 JSON FILE FORMAT

The training set, the input of the ML module, is in the JSON file format. Note that all d 's and s_t are raw sentences.

3 EXTRACTOR

For each ground-truth KSA sentence, we find the most similar document sentence d_{j_i} before

4 RL AGENT

We propose a hybrid extractive-abstractive architecture, with policy-based Reinforcement Learning (RL) to bridge together the two networks. The RL better models the language structure and makes parallelization possible.

5 REWARD

At each extraction step, t , the RL agent observes the current state to extract a document sentence, d_{j_t} , and receive a reward after the abstractor summarizes the extracted sentence, $g(d_{j_t})$. For good KSAs the reward will be high. If a bad sentence is mined, though the abstractor will still produce a compressed version of it, the summary will receive a low reward and the action is discouraged.

REFERENCES

- <https://www.passionateinmarketing.com/wp-content/uploads/2021/08/ai-2-1.jpg>
- <https://www.mynorthern.com/wp-content/uploads/2020/01/laptop-icon-blue.png>
- <https://www.picpng.com/language-logo-python-png-44976>
- https://commons.wikimedia.org/wiki/File:Jupyter_logo.svg
- [https://en.wikipedia.org/wiki/Anaconda_\(Python_distribution\)#/media/File:Anaconda_Logo.png](https://en.wikipedia.org/wiki/Anaconda_(Python_distribution)#/media/File:Anaconda_Logo.png)

CONCLUSION

- Project achieved:
- Trainable Machine Learning model
 - Fast mining of source documents (PDFs)
 - Simple user interface

THANKS

Special thanks to Allie Munro, Matt Moy, and the Department of Electrical and Computer Engineering