

AI Contract Review

Cycle Three Report

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1.0 System Metaphor (Bickerton)

The Office of Sponsored Programs at Auburn University reviews all potential external contracts, proposals, and awards to determine whether the university can negotiate or approve them. Staff members are currently required to review each contract manually, which is time-consuming, arduous, and inefficient. Our team's goal is to design an artificial intelligence program that reviews all incoming contracts, flags conflicts within them, and suggests alternative wording in accordance with the university's guidelines. This program will streamline the contract review process for OSP staff members and learn from successful contract negotiations to strengthen its functionality.

2.0 Cycle Intent (Bickerton)

For this cycle, we will continue development on the audit scanner and move into introducing the "learning from negotiations" user story. Our program for learning will be a basic binary classification model that determines whether or not a document has been flagged by our software. While this is a basic implementation, later groups can further develop the existing code into a more robust program, using our version as a starting place. As this is the last cycle, we plan to implement these new ideas while simultaneously polishing up the software for easier access in later semesters.

3.0 User Stories (Green)

3.1 User Stories Defined

Document Scanning

- Summary: As a contract reviewer I want a tool that scans agreements to find problematic language to increase the speed at which my department operates.
- Description: This feature should scan an agreement and search for problematic language and clauses that are not acceptable. The scanned agreement should be compared to the FAR Matrix and Contract T&Cs Matrix to flag these issues for review or removal.
- Planned Hours: 12
- Planned this cycle: 12
- Actual: 18
- Actual this cycle: 6
- Coders: Aiden Green
- Testers: Aiden Green
- Reviewers: N/A
- Status: In Progress

Create an Installer

- Summary: As a contract reviewer I want a tool that can be easily installed on my machine without significant technical knowledge.
- Description: This feature should be a basic installer that can easily and quickly install our software package on the user's machine.
- Planned Hours: 10
- Planned this cycle: 10
- Actual: 10
- Actual this cycle: 2
- Coders: Jay Scott
- Testers: N/A
- Reviewers: N/A

- Status: Complete

Sub-Agreement Scanner

- Summary: As a contract reviewer I want a tool that can scan a sub-agreement contract to determine if there have been any findings from an audit.
- Description: This feature should build off of the already-existing GUI and allow the user to submit multiple PDF agreements/questionnaires and return which files need to be reviewed.
- Planned Hours: 15
- Planned this cycle: 10
- Actual: 15
- Actual this cycle: 10
- Coders: Aiden Green
- Testers: N/A
- Reviewers: N/A
- Status: In Progress

Suggest Alternative Language

- Summary: As a contract reviewer I want a tool that can suggest alternative language for the problematic language that has been flagged instead of having to manually search for it.
- Description: This feature should use approved AU alternative language documents to suggest alternative language to a document reviewer when encountering flagged problematic language and clauses.
- Planned Hours: 15
- Planned this cycle: 5
- Actual: 5
- Actual this cycle: 0
- Coders: Aiden Green
- Testers: N/A
- Reviewers: N/A
- Status: In Review

Learning from Negotiations

- Summary: As a contract reviewer I want a tool that can learn from past negotiations and provide better and more accurate suggestions to more quickly and consistently lead to successful negotiations.
- Description: This feature should retain information gained from past negotiations and learn from its successes and failures to improve performance in the future. (There are many instances where the same types of negotiations have to be made with the same companies, this will allow some steps to be skipped, thus saving time.)
- Planned Hours: 30
- Planned this cycle: 30
- Actual: 20
- Actual this cycle: 20
- Coders: Catherine Bickerton
- Testers: Catherine Bickerton
- Reviewers: N/A
- Status: In Review

Risk Assessment

- Summary: As a contract reviewer I want a tool that will give me an overall risk rating for a contract so I can make appropriate risk assessments during a negotiation.
- Description: This feature should take into account all risk factors for a given contract and provide past relevant information to assist reviewers in a manual risk assessment. This will be useful when the negotiations do not follow a typical format.
- Planned Hours: 40
- Planned this cycle: 0
- Actual: 0
- Actual this cycle: 0
- Coders: N/A
- Testers: N/A
- Reviewers: N/A

- Status: Not started

Gathering Documentation

- Summary: As a contract reviewer I want a tool that has a basic understanding of negotiation and contract approval.
- Description: In order to train the artificial intelligence to properly flag and negotiate contract terms, the team is gathering both basic public documents and OSP-specific contracts to give the AI a basic understanding of the contract negotiation process.
- Planned Hours: 5
- Planned this cycle: 0
- Actual: 5
- Actual this cycle: 0
- Coders: N/A
- Testers: N/A
- Reviewers: Catherine Bickerton
- Status: Complete

4.0 Design Documentation (Green)

4.1 Language

We are the second semester of students assigned to this project and all of the existing code-base is written in Python. We have all decided that it will be easiest to remain with this language, as we are all confident in our Python knowledge. Python also has many readily available machine learning libraries, such as scikit-learn, that we can make use of for the more complicated portions of this project.

4.2 Architecture

This project will take in the text of a given document and process it in many different ways to speed up the contract review process. Currently (for a simplified layout description), there is a simple GUI where the user can select a desired

document, save it, and then scan it. When the user selects the 'scan' option the main operation of the script begins, which is as follows: the contract is converted to a .txt file (this makes the document easier to deal with), the script to flag problem language is then ran (using the FAR (Federal Acquisition Regulation) Clause Matrix and T&Cs Matrix that load on GUI open), the scanned contract is then converted back to a docx file, and then the contract is annotated when back in its original state.

Towards the end of this cycle we have added another feature to this tool. Our customer needed something to scan lengthy subcontracting agreements to see if there are any findings from an audit. We will use the same GUI as the other scanning feature, but just add another option where the user can enter multiple PDFs and have them scanned for specific questions related to the audit.

5.0 Meeting Minutes (Bickerton)

5.1 Cycle Intent Meeting with Client (03/26/2024)

- Both teams met with Darren May to discuss cycle intent. We determined that completion of the audit scanner, GUI adjustments, and the creation of a learning model were in our best interests for this cycle.
- Attendees: CB, JS, DM, TW, LR
- Time: 11:00 - 11:15 (15 minutes)

5.2 Status Meeting with Client (04/02/2024)

- Both teams met with Darren May and gave initial updates on cycle development. May provided the orange team with more documents for learning while the blue team floated an idea of making the implementation into a server-client model.
- Attendees: CB, LR, TW, DM, JS
- Time: 11:00 - 11:05 (5 minutes)

5.3 Status Meeting with Client (04/16/2024)

- The orange team met with Darren May to discuss cycle updates. May provided the team with his Github username so that he could be kept in the loop with development documents and code. We planned to finish our cycle 3 deliverables and get another updated working version to Darren by next week for the OSP to use and test before another group joins the project
- Attendees: CB, JS, DM
- Time: 11:00 - 11:15 (15 minutes)

6.0 Management Plan (Scott)

6.1 Task Assignments

For this cycle, Catherine Bickerton researched and found several public databases of contracts that could be used to train an AI for the contract negotiation user story, and continued to work on documentation and ensure the team stays on track. Aiden Green finished working on the audit scanner user story and successfully merged the changes to the main github branch. Jay Scott successfully merged the installer branch and resolved an issue with temporary files being cleared too frequently. Luke Robinson looked into additional datasets that could potentially be used for training an AI for the contract negotiation user story.

6.2 Development Schedule

Cycle 3 was spent mostly cleaning up any major unresolved issues and preparing to deliver a final beta product to Darren and the OSP for usage and feedback for the next group that takes on the project. The audit scanner user story was successfully completed and merged into the main github branch so that the blue team can update the GUI to be able to utilize this new feature. There was also some additional cleanup regarding temporary files being cleared too early causing issues when attempting to upload multiple files. Some progress was also made gathering some public datasets that could potentially be used to train an AI for the contract negotiation user story in the future.

7.0 Source Code

https://github.com/Ktmking111/AI_Contract_Review_Spring2024

8.0 Lessons Learned (Robinson)

As with all cycles in this development process, this one taught us more about what the development in the real world demands. After receiving feedback on our first deliverable to our client, we set out to resolve these needs and continue developing features that our client needed.

After the first release of our software to our client was not as successful as we had ambitiously hoped, we had more realistic expectations moving forward. This development cycle we sought to deliver a tool that could meet the most basic needs, and then could be fine tuned as time goes on to ensure that the software meets all of our clients requirements defined through testing. Thus this cycle much of our efforts were focused towards the usability of our tools. Utilizing the tools that made up our software had been something we considered to be easy to understand because of the amount of time we had spent working with them, but for our client who does not have the same amount of time to dedicate to becoming familiar with our codebase, the software needs to be easy to use, and the output files easy to gather the useful information from.

With all of this, communication has continued to prove itself to be very important. On top of the feedback on the performance of our software that was much needed, we needed to communicate about how expectations might shift moving forward. As we reworked some of these flaws, we had to shift time and effort away from features we had initially hoped to put more time into this semester. This meant continuing to communicate with our client about what they feel our time would be best spent on and which features will need to be saved for a future team to work on.

As we wrap up Cycle 3 and the semester we can reflect on the many lessons learned about the software development process in the real world. Communication both with team members and our client is essential. A continuous development and feedback cycle is a good way to ensure we are meeting the needs of our clients. And maintaining a clean remote repository is essential to working in a group. All of these

are lessons we will take with us as we move into the software industry and continue our learning process.

9.0 Test Results (Green)

In the most recent release of last semester's code there had been an accumulation of problems which eventually led to some of the Problem Language highlighting not working as well as it did in the previous versions. We went back to a previous version and it was working better but still not great. Using Jaccard Similarity to flag Problem Language produced a lot of potential problem language, but with a very low similarity (most around 15%). I didn't believe this was very helpful, so I found another way to do it with Sklearn's TF-IDF (Term Frequency–Inverse Document Frequency) Vectorizer. This is essentially a weighting system that determines how “important” a word is to a document. With this method I seemed to get a higher confidence on some of the things that seem like they should be caught. The issue is we still don't have an unmarked and fully marked document to test on so we know for sure what we need to catch.

Jaccard:

[POTENTIAL PROBLEMATIC LANGUAGE DETECTED]

Notice.

Problem Category: Insurance

Common Problems: Notice of Cancellation

Preferred Language: []

Why: None

1st response to Sponsor: Auburn University does not issue 30 days' notice of cancellation.

Confidence: 0.3333333333333333

TF-IDF with Cosine-Similarity:

[POTENTIAL PROBLEMATIC LANGUAGE DETECTED]

Notice.

Problem Category: Insurance

Common Problems: Notice of Cancellation

Preferred Language: []

Why: None

1st response to Sponsor: Auburn University does not issue 30 days' notice of cancellation.


Confidence: 0.5797386715376658

[END POTENTIAL PROBLEMATIC LANGUAGE]

10.0 Future Work (Bickerton)

We believe we've developed strong additions to this project and are optimistic about its future. We will provide ample documentation and instruction for later groups, share valuable information and insight, and make sure this project's continuation goes smoothly in new hands.

11.0 Presentation Slides

 AI Contract Cycle 3 Presentation


12.0 Sponsor's Approval

13.0 Previous Cycle Docs/Grade Sheets


 AI Contract Spike Report

 Spike Presentation

 AI Contract Cycle 1 Report

 AI Contract Cycle 1 Presentation

 AI Contract Cycle 2 Report

 AI Contract Cycle 2 Presentation