JusticeAI Release Summary

Iteration 13 - Final Release

Team Members

Name and Student ID	GitHub ID	Number of story points that member was an **author** on.
Lance Lafontaine 26349188	lancelafontaine	32
Arek Manoukian 21710389	arekmano	48
Sylvain Czyzewski 27066333	vynny	50
Samuel Campbell 26457959	Samuel-Campbell	73
Taimoor Rana 26436110	taimoorrana1	35
Mihai Damaschin 27177895	mihaiqc	45
Zhipeng Cai 21346482	choitwao	62

Project Summary

JusticeAI (ProceZeus) is a web chat bot that aims to facilitate access to judicial proceedings involving specific domains of law. Users will have the ability to converse with the chatbot, describing in detail the situation for which they wish to pursue litigation. The system, which will leverage the power of machine learning and natural language processing, will guide the user through a process wherein they'll be prompted with a series of questions relating to their potential case allowing the system to ultimately determine, based on provincial jurisprudence, whether the user has a valid case worth pursuing in the judicial system. Alternatively, the system may also suggest remedies in lieu of legal action if it is deemed unlikely to be in the user's best interest.

Additional Links

Documentation (Alt) - Project documentation, generated from READMEs

Poster - The poster used in the EV foyer presentation

Presentation Slides - Slides for final release presentation to professor

Velocity

Project Total: 70 stories, 361 points over 30 weeks

[Iteration 1 (1 stories, 3 points)](#)

Iteration 1 involved meetings and arrangements with the product owners and stakeholders, as well as time for planning and setup and the initial chatbot interface was completed.

[Iteration 2 (3 stories, 48 points)](#)

Iteration 2 was the first iteration where the team started working on higher value user stories. While work on the infrastructure was still being performed, user stories were being completed. During this sprint, a user was able to interact with the system on a public domain.

[Iteration 3, (5 stories, 51 points)](#)

Iteration 3 was where we laid down the infrastructure to get information from the user related to their claim. This includes a front-end where the user can input information by text and uploads files. We also started preliminary work to extract data from precedents so it can be used by our machine algorithms.

[Release 1 aka Iteration 4, (4 stories, 29 points)](#)

Iteration 4 contained a significant amount of research, which was incorrectly estimated in difficulty. As such, less user stories points were completed. During this sprint, Landlord/Tenant problem classification was improved as well as initial work on ML was started (fact and decision clustering)

Release 1 Total: 13 stories, 131 points over 8 weeks

[Iteration 5, (5 stories, 32 points)](#)

Iteration 5 was where delivered tangible predictions to users of our system. The primary focus of this sprint was to deliver a system which can predict, based on user input, whether or not the lease must be terminated.

[Iteration 6, (6 stories, 18 points)](#)

Iteration 6 was where we created a fully-functional beta sign system that we could have advertised during our guerilla marketing campaign. This process collected user's questions

and email addresses, which added significant value by informing us of our user's needs and demands.

[Iteration 7, (6 stories, 27 points)](#)

Iteration 7 was where we completed the beta version of the application. This milestone allowed a user to sign up to the website from whom we can gather data about common landlord/tenant concerns from various social media outlets. This feature would have allowed us to focus on adding functionalities that will offer the most value to the average user based on feedback obtained.

[Release 2 aka Iteration 8, (7 stories, 35 points)](#)

Iteration 8 was where we added a functionality that allowed the system to give an [estimate of the amount of money a user may receive](#) if they took someone to court over unpaid rent. Furthermore, while not being displayed, we were able to install [similarity between precedents' functionality](#). Additionally, [FAQ questions](#) from the [LikeHome](#) website were added for extra value to the user, providing terse answers for common questions such as how to sublet an apartment and send a demand letter to a landlord.

Release 2 Total: 23 stories, 112 points over 8 weeks

[Iteration 9, (6 stories, 30 points)](#)

Iteration 9 was where we added new machine learning prediction functionality for an additional claim category (retaking a rental), refactored NLP data for better input classification by splitting landlord and tenant data into separate classifiers, and the addition of basic optical character recognition functionality would have allowed for leases to be parsed for data that will eventually be used to obtain facts, resulting in the user being able to skip answering certain questions normally asked by the chatbot.

[Iteration 10, (3 stories, 13 points)](#)

Iteration 10 was where we implemented measures to increase prediction accuracy. This was done by giving the user the option to answer more questions after getting the first prediction. In addition, improving user experience by adding a progress bar indicating how many questions are left to answer was also added. On the ML side, additional classifiers were added, including the 'tenant expulsion' and 'retaking the rental' classifiers.

[Iteration 11, (10 stories, 32 points)](#)

Iteration 11 was where we added a dashboard that allowed users of the system to see more detailed information about the predictions they've been given. The dashboard is accessible

after being given at least 1 prediction, displays the probability that the predicted outcome will occur if the case is taken to court along with a table outlining how previous court cases compare to the user's problem. In addition to the dashboard, claim predictions that were not able to be implemented into the NLP system in previous iterations (tenant expulsion, retaking the rental) were added.

Iteration 12, (9 stories, 22 points)

Iteration 12 was about polishing certain aspects of the user experience in order to make the product feel more fleshed out. This included changes to the user interface to make it more stable, fix any errors detected during team demos, and rewriting the bots questions and responses to sound more natural. In addition to this, certain functional aspects of the system such as the regex library for extracting dates from our precedents were revised to provide more accurate predictions.

Release 3, Iteration 13, (6 stories, 21 points)

Release 13 was focused on fixing any major bugs before handing over the project as well as writing detailed documentations for each component of the system (ML, NLP, Frontend and Backend).

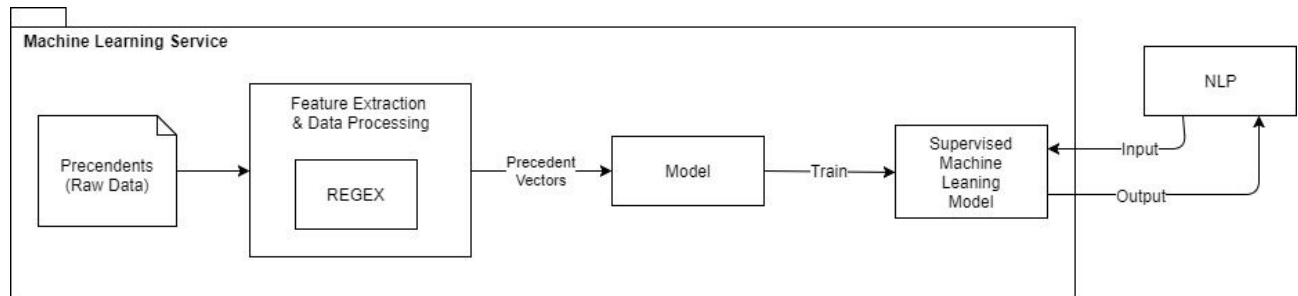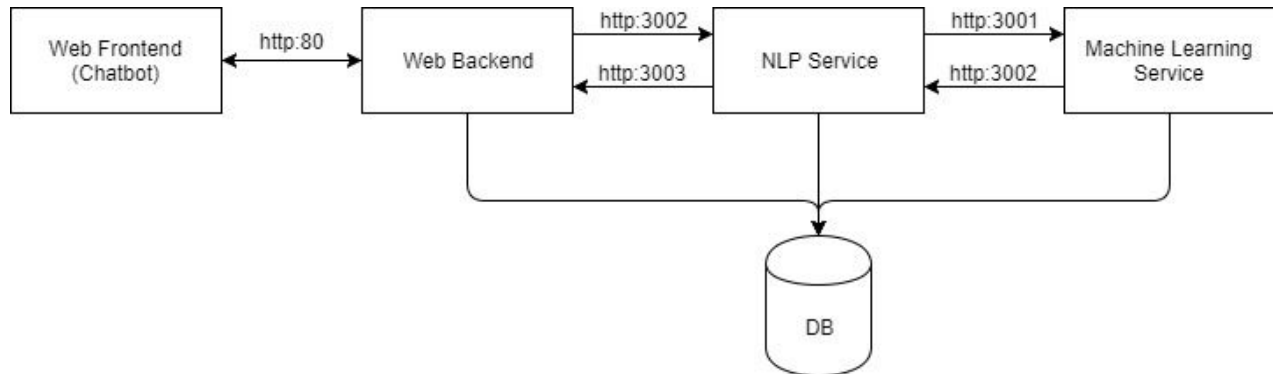*Release 3 Total*: 34 stories, 118 points over 11 weeks

Overall Architecture

Tooling and Infrastructure

Component		
Tool	Language	Purpose
Web Frontend		
Element UI	HTML/CSS/JS	Front end styling and layout
Vue.js	Javascript	Web application framework
Web Backend		
Flask	Python 3	Backend HTTP server
Flask SQLAlchemy	Python 3	SQL ORM
Flask Marshmallow	Python 3	SQLAlchemy model to JSON conversion
NLP Service		
RASA	Python 3	Intent, entity extraction, classification, etc.
SciKit-Learn	Python 3	Text vectorization, covariance estimation for outlier detection
Machine Learning Service		
Keras	Python 3	Supervised Learning
Tensorflow	Python 3	Neural Network Machine Learning
SciKit-Learn	Python 3	Supervised Learning
Database		
PostgreSQL	SQL	Data persistence

No change in technology or infrastructure has occurred since the previous release.

Architecture Diagrams

Web Frontend (Chatbot) ←→ http:80 ←→ Web Backend ←→ http:3002 / http:3003 ←→ NLP Service ←→ http:3001 / http:3002 ←→ Machine Learning Service → DB

Machine Learning Service

Precedents (Raw Data) → Feature Extraction & Data Processing [REGEX] → Precedent Vectors → Model → Train → Supervised Machine Leaning Model

NLP → Input / Output

Domain Model
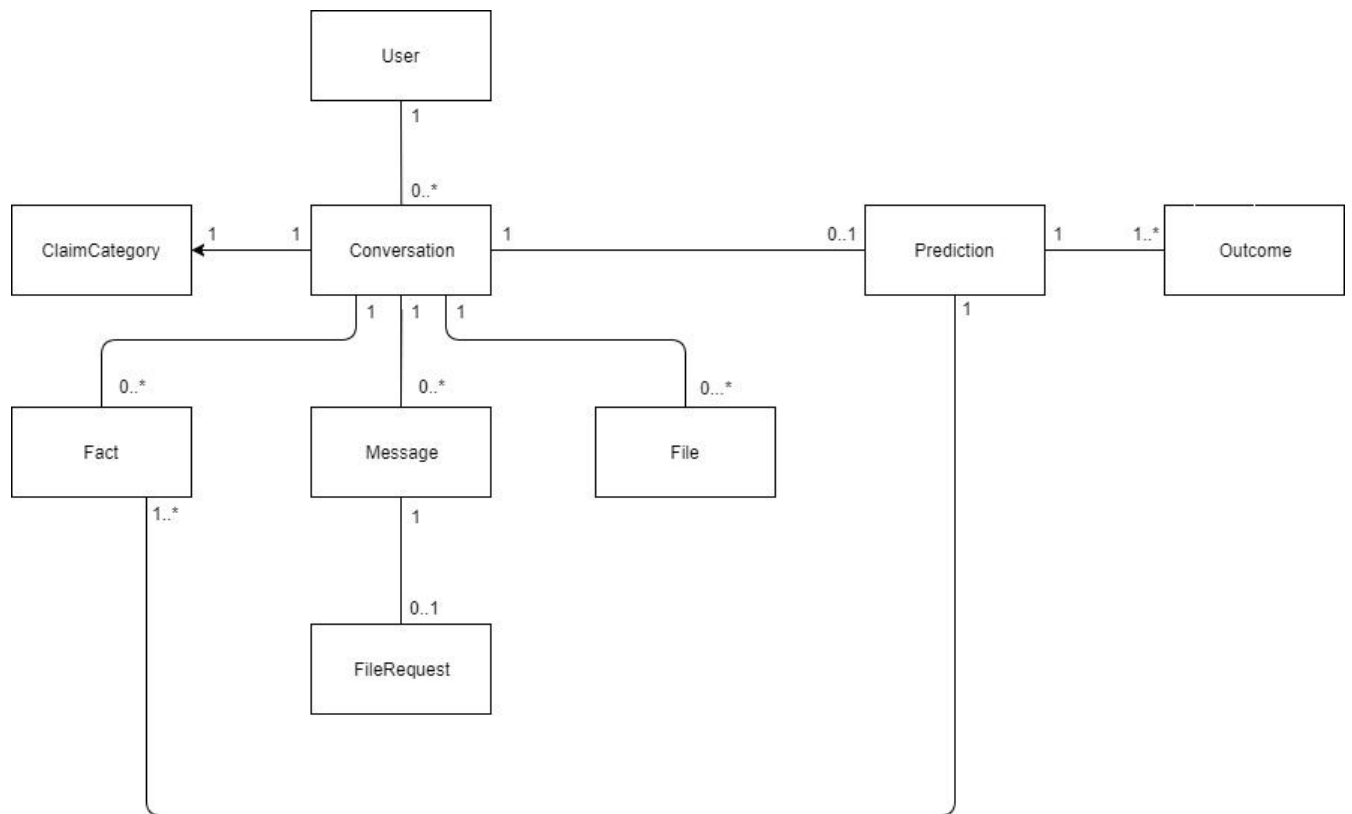
Entity-Relationship (ER) Model

Conversation

PK	id: Integer
FK	current_fact_id: Integer
	name: String(40)
	person_type: Enum(PersonType)
	claim_category: Enum(ClaimCategory)

Message

PK	id: Integer
FK	conversation_id: Integer
FK	relevant_fact_id: Integer
	sender_type: Enum(SenderType)
	timestamp: DateTime
	text: Text
	possible_answers: Text
	enfore_possible_answer: Boolean

Feedback

PK	id: Integer
	feedback: Text

Fact

PK	id: Integer
	name: String(50)
	type: Enum(FactType)
	summary: String(60)

File

PK	id: Integer
FK	conversation_id: Integer
	name: String(50)
	type: String(50)
	path: String(50)
	timestamp: DateTime

FileRequest

PK	id: Integer
FK	message_id: Integer
	document_type: Enum(DocumentType)

FactEntity

PK	id: Integer
FK	fact_id: Integer
	value: String(255)

Relationships: messages, files, relevant_fact, current_fact, file_request, facts

Naming and Code Style Conventions

All Python code throughout the project is checked against PEP 8, the official style guide for Python code. All Javascript code throughout the project is checked against the default ESLint style guide.

These style guides were chosen primarily due to their standardization and ubiquity in their respective communities, which would allow for developers familiar with these language to easily understood our conventions.

Code

Top 5 Most Important FIles

File Path	Purpose
multi_output_regression.py	Wrapper to predict multiple outcomes using the regressors
similar_finder.py	Model used to predict most similar cases to a user's inputs.
multi_class_svm.py	Wrapper to predict multiple outcomes using the classifiers
nlp_controller.py	Central point of interaction in the nlp_service with RASA classifier and other services
fact_service.py	Key point of fact resolution and mapping within the system

Testing and Continuous Integration

Each story needs a tests before it is complete. If some class/methods are missing unit tests, please describe why and how you are checking their quality. Please describe any unusually aspects of your testing approach.

Top 5 Most Important Tests

Test File Path	What is it testing
similar_finder_test.py	Testing the functionality of finding similar cases to a user's inputs
multi_output_regression_test.py	Testing the multiple predictions functionality using the regressors
multi_class_svm_test.py	Testing the multiple predictions functionality using the classifiers
fact_service_test.py	Testing service responsible for determining which facts to ask next
nlp_integration_test.py	Tests core functionality of intent classification with its data

We use TravisCI for continuous integration, which can be viewed [here](). No major architecture or technology changes related to continuous integration or deployment have occurred since Release 2.

To keep track of our Code coverage, we use the free [CodeCov]() service. Every time a new build is completed successfully on Travis CI, the resulting line coverage is uploaded. At the time of this writing, our line coverage is at 70.98%, with a total of 124 unit tests. The test breakdown per service is shown below.

Service	Number of unit tests [Release 2 #]	Line coverage % [Release 2 %]
ML Service	40 [51]	71.06% [79.76%]
NLP Service	53 [30]	63.92% [66.38%]
Web Client	36 [27]	96.55% [97.38%]
Backend Service	18 [16]	67.48% [65.80%]
Total	147 [124]	70.98% [76.63%]
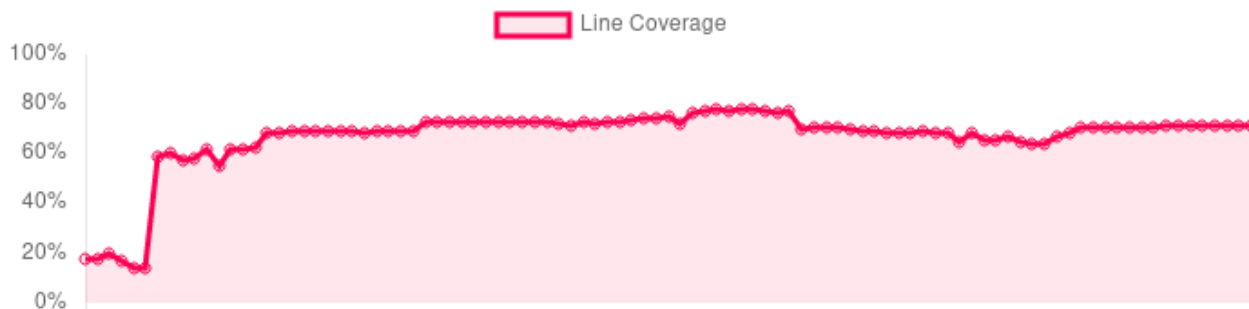
Line coverage % of the JusticeAI source code throughout the entire span of the project

Retrospectives

Sprint retrospectives

What went well:
- The work submitted was high quality
- Everyone did their part
- The workload was lesser due to us putting the finishing touches on the project on time which gave us more breathing room to complete the work for other classes afflicting us with less stress
- The documentation is well done and concise

What didn't go well:
- The work submitted should have been submitted earlier to give more time for reviewing the pull request

How we could improve:
- Give reminders over slack to teammates urging the pull request to come in sooner

Release retrospectives

What went well:
- The work submitted was high quality
- Visitors at the capstone demo were impressed and we got a possible investor

What didn't go well:
- Less work than Release 1 and 2 was done
- Noticeable burnout due to other classes for team members with heavier schedules

How the release could have been improved:
- Organize more fun activities and something to look forward to other than constant continuous straining work (e.g. having beer together)

Project retrospectives

What went well:
- We are extremely proud of our project and learned complex material while still delivering on requests and not offloading work to an API
- The team worked extremely well with little to no incidents
- The project is marketable and provides concrete real life value
- The amount of work done is unreal

What didn't go well:
- The cases came in much too late
- We did not receive as many beta users as we had anticipated
- The second data that we received much too late could have substantially improved the results of our machine learning results but arrived too late to divert course while still accomplishing our objective in a timely manner
- The marketing plan we had was not properly executed (beta_client & beta_server) which prevented us from pinpointing exactly what the current generation needed to know regarding leasing
- The vision for the final product often changed and the team felt like too many resources were spent into stories that are not reflected in the final product (especially regarding the UI)
- Legal aid and expertise was lacking throughout most of the project, which may limit the applicability of our system to the law domain

How the project could have been improved:
- Acquire data and domain knowledge before starting the project
- Build the beta to gather data first then build the product based on trends we observe
- Obtain low fidelity mockups throughout the project for the UI and design as requirements change
- Market the product in a more ad-hoc manner as opposed to planning it all at once

Appendix I. Revised Analogical Case Study
Revisions to original submission have been highlighted

ProceZeus is a web chatbot that aims to facilitate access to judicial proceedings involving the tenant and landlord domain of law (regulated and administered by an entity in Québec called the Régie du logement). Users will have the ability to converse with the chatbot, describing in detail the situation for which they wish to pursue litigation. The system, which will leverage the power of machine learning and natural language processing, will guide the user through a process where they'll be prompted with a series of questions relating to their potential case allowing the system to ultimately determine, based on provincial jurisprudence determined from precedents, whether the user has a valid case worth pursuing in the judicial system. Alternatively, the system may also suggest quick remedies instead of legal action if it is deemed unlikely to be in the user's best interest.

Given that the application of artificial intelligence to the domain of law is an extremely recent endeavor, there are very few well-documented cases. Most companies in this specific field are privately-funded startups with secretive technologies and little to no evidence to support their public claims of success with AI in law. There exists a system somewhat similar to ProceZeus in concept, founded in Montreal, called Botler AI [1]. It, however, does not target the same legal domain nor can our team find any usage of AI despite the inclusion in the name. The system is a chatbot which specialises in helping users immigrate to Canada under a specific immigration act. The system supposedly allows users to communicate with it using natural language and responds in a conversational format.

Unlike Botler AI, which allegedly only assists with acquiring specific resources concerning immigration and determining whether or not a person is eligible for immigration, ProceZeus attempts to make predictions about the outcome of legal proceedings using previous hearings from its domain. Furthermore, ProceZeus concentrates on a precise analytical understanding of the English language whereas Botler AI's current offering is a form generator running through a predetermined dialogue.

After numerous field tests of the Botler AI platform, we have observed that the product is in its nascent stages as we've been unable to produce a scenario where the application genuinely helps accomplish the goal of aiding in immigration application. On top of the missing outcome, the ProceZeus team has attempted with numerous permutations to activate the application's intelligent design (AI) in order to simulate a different questioning pattern with no success. The application does not seem to ask a user for a clarification of his input even in its most basic form. While being backed by experts such as Dr. Yoshua Bengio, a key researcher in the field of deep learning, Botler AI's current offering leaves much to be desired, and so far has shown to be nothing but a series of inputs to be put in a regular internet form bearing the adornment of a dialogue driven, intelligent chat bot. Due to various comments by Mr. Amir

Moravej's, creator of Botler AI, concerning Donald Trump, its timing in the current political climate and its complete lack of advancement in the past months in combination with its astonishing press coverage [2], one might argue that the product resembles more of a political statement than a rigorous engineering challenge.

Furthermore, as of April 9th 2018, user text input was deprecated in favor of drop down menus and "Yes" or "No" buttons seemingly giving up on an extremely important component of AI, Natural Language Processing, thus reducing the challenge even further. The tool also incorporated a "Sexual harassment" [3] (Johnson, 2018) section where victims of either of those two crimes can input the information about their incident(s) and follow a stream of questions that possess *very light* permutations (e.g. asking the user to select which kind of contact there has been from a drop down menu *if* the user previously answered that there was contact made between him or her and the aggressor). The tool does not generate a possible outcome to the case using AI.

Numerous tests were made using the application which *never*, no matter the email of the user or their input, generated and sent the incident report to him after working through 10 minutes of questioning. The fact that Botler AI attempted to touch another domain of law while not having perfected the previous one leads us to reinforce our opinion of Botler AI as being a sociopolitical statement.

Although Botler AI share many intended similarities with ProceZeus, the tool has been released to the public at large in what the ProceZeus developer team deems a nonfunctional state. It is clear that the role of artificial intelligence in the law domain is still being defined and we both need to tread carefully in the murky waters of law. There are many questions and ethical dilemmas in this space that have simply not been explored by any company or startup to date. However, this does not preclude us from drawing conclusions for possible sociological and economical issues that may arise within this ever growing sector.

As engineers, it is our responsibility, according to section 2, which treats with the duties and obligations towards the public, that we, in article 1, "must respect his obligations towards man and take into account the consequences of the performance of his work on the environment and on the life, health and property of every person"[2](Code of ethics of engineers, 2006) as well as consider, according to article 3, "that certain works are a danger to public safety, he must notify the Ordre des ingénieurs du Québec (Order) or the persons responsible for such work" [4] (Code of ethics of engineers, 2006) according to article 3 section 2. As such, we have debated the repercussions of our project and feel strongly that although no official standards for the application of AI on law exist, it will contribute to the greater good as the benefit to society will be quite sizeable due to the monumental strides in legal accessibility the application will provide.

Perhaps the most resonating issue common across all projects involving rapidly improving artificial intelligence and its wide scale adoption is the potential long term decrease in

available job positions. Specifically pertaining to our scenario, those affected would be individuals working in the domain of law. As our application (and other programs using similar techniques) develops, so will the interest of investors and companies wishing to cut costs by replacing personnel with computerized solutions. Automation, technology and AI is admittedly an extensive and unavoidable threat to job security and future employment prospects.

It is however important to emphasize that our application is not a lawyer and therefore its judgment may not under any circumstances be considered as legal advice. The team, with the aid of experienced lawyers, will ensure its users understand this important distinction. We do not intend to replace lawyers, but to act as a facilitator for citizens to inform themselves about the laws that govern their daily lives. We also do not intend to provide a service that is 100% foolproof. Our system provides a disclaimer to explicitly seek the request of a legal professional in order to confirm the information being presented.

Another sociological issue that affects all projects using precedents as data to train an artificial intelligence model is the possible bias that is further propagated by the tool. Given that historical legal cases are shaped not only by the law but by a variety of implicit socioeconomic factors. If ProceZeus were to only be trained on previous legal cases, it would be reinforcing the same biases on its current and future users. This is troublesome primarily because our artificial intelligence should serve all of its users with the same level of service and legal information regardless of previous conditions that may have led to skewed results. This issue will be specifically avoided in our project by incorporating a hardcoded decision tree where if a base set of facts are inferred, the application is able to provide rigid outcomes based on actual laws, as opposed to a simply behaving as a predictive model.

One last ethical concern that we have considered was our data privacy model. Botler AI directs the user to answer questions in such way that it is impossible to reveal sensitive information such as the user's real name or address (apart when filling the incident report where the application asks the user to not put in sensitive information). Given that there is the possibility of the user reveal personally-identifiable data to our service, we must ensure that we are handling their user with the utmost discretion. We've already begun the process of drafting privacy policies and an end user license agreement that is presented to the user as a disclaimer once they first begin using the system. Additionally, we have taken measures to implement modern application security practices, limit data access as much as possible, as well as architect our application in order to be able to erase user data after a set period of time. Finally, we have added measures within the system to automatically erase all sensitive information related to a user within a week; this is to ensure that their information can be used to anonymously improve the system's quality, while at the same time preserving users' privacy. These conclusions were drawn in order to both provide a valuable service to the user as well as protect their integrity and identity.

This analogical case study attempts to draw parallels with the ethical concerns of the Botler AI project with our own. Although the application of artificial intelligence to the domain of

law is a relatively new endeavor, this provides us with the opportunity to explore these contemporary issues in a way that impacts society positively. Some of the corollaries explored were our responsibility to provide accurate legal information without negatively impacting the legal profession, our willingness to not propagate any biases that may impact specific individuals negatively, and our commitment to providing a useful service that does not infringe on the user's right to privacy. We feel as though these values are ones that embody the duties of any practicing engineer and influence our decision in the creation of a product that will serve to provide accessible legal information to everyone.

Works Cited

[1]   "Botler AI," Botler AI. [Online]. Available: https://botler.ai/login. [Accessed: 9 April 2018].

[2]   Lohr, S. (2017). A Trump Dividend for Canada? Maybe in Its A.I. Industry. [online] Nytimes.com. Available at: https://www.nytimes.com/2017/05/09/technology/a-trump-dividend-for-canada-maybe-in-its-ai-industry.html [Accessed 9 May 2017].

[3]   Johnson, K. (2018). Botler.ai launches sexual harassment detection bot for U.S. and Canada. [online] VentureBeat. Available at: https://venturebeat.com/2017/12/06/botler-ai-launches-sexual-harassment-detection-bot-for-u-s-and-canada/ [Accessed 9 Apr. 2018].

[4]   Code of ethics of engineers. (2006). 3rd ed. [ebook] Quebec, p.1. Available at: http://oiq.qc.ca/Documents/DAJ/Lois/TheCodeofEthicsofEngineers.pdf [Accessed 14 Nov. 2017].

Appendix II. Public Perceptions of Technology

Artificial intelligence has been a subject of contention since the first AI research workshop was held on the campus of Dartmouth College in 1956. Machine learning and AI has existed for much longer than the term has been popular, but largely laid dormant until a boom in the 21st century. This marked an era when machine learning algorithms could be successfully explored and tested due to the anticipated arrival of computer hardware allowing its implementation in everyday consumer applications.

Advancements in artificial intelligence and its implementation in ever increasing amounts of software solutions have made it a topic that appears frequently in the public spotlight. While hollywood enjoys injecting fear into the minds of the population with threats of AI singularity, the reality is that industry leaders are only starting to wrap their minds around simpler forms of AI implementations that make their way into consumer products.

The aforementioned advancements in artificial intelligence and natural language processing technology have allowed for the creation of conversational digital assistants (e.g. Google Assistant and Siri) that help people with a variety of tasks ranging from mundane to complex. Both voice and text based forms of these digital assistants have already largely become part of the public ethos, being easily accessible and capable of delivering assistance in an immediate and friendly fashion.

Chatbots are becoming an increasingly more popular way of delivering services to people online. As more consumers demand engaging ways to access real time services, businesses are hastily attempting to incorporate some form of chatbot application into their offering. Mikael Yang, CEO of ManyChat claims that "..as a customer communication technology, chatbots will transition from the early adopter stage into the beginning of early majority" [1]. As improvements in interaction based AI models are seen, chatbots are quickly becoming a widely adopted way to deliver automated services to people worldwide, as they remain accessible at any time.

Businesses are not the only institutions that benefit from the rising popularity of online chatbots. Areas of public and professional services, such as a the domain of law which ProceZeus focuses on, are also being revolutionized with the introduction of services delivered via chatbot implementations. As early as 2015, a chatbot service by the name of DoNotPay has helped contest "More than 400,000 parking tickets, with an estimated value of over US$10 million...most of which were successful" [2]. This has the potential to be seen as something that threatened the livelihood of professional lawyers. However, over 500 lawyers have actually benefited from the DoNotPay chatbot "to not only assist clients, but also to assist with internal firm processes." [2].

While chatbots certainly cannot in their current incarnations serve as a replacements for professionals in various fields, they can serve to offload repetitive work. Lawyers may deal with many of the same problems from clients on a daily basis. By conversing with these individuals, chatbots can gather information about their problem more effectively allowing professionals to spend more time on cases and less time on data gathering. As Joshua Browder, creator of a chatbot that helps refugees seek asylum says: "The benefit of a chatbot comes from the fact that many people are really terrible at describing their legal problems...The chatbot can translate human input into legally correct input." [3]. Law firms are not too concerned with being made obsolete through the introduction of legal chatbots. As journalist Steve Lohr puts it, "tasks..like advising clients, writing legal briefs, negotiating and appearing in court, seem beyond the reach of computerization, for a while." [4]. Chatbots employing NLP and AI techniques are already being used by law firms, as they are "useful in scanning and predicting what documents will be relevant to a case" [4]. As an added benefit, chatbot implementations are helping people feel like they get their money's worth, or as lawyer James Yoon puts it "people are willing to pay for [his] experience. 'What clients don't want to pay for is any routine work.'" [4].

In summary, chatbots have in a rather short timespan gone from completely unheard of to ubiquitous. Their ability to mimic human behavior has made them a viable alternative to traditional ways of interacting with users such as web sites and emails. Their relatability and efficiency has made them very popular with businesses as a method of increasing consumer engagement as well as with professional vocations as a method of increasing worker productivity and customer relations. As AI and NLP technology continues to improve, it becomes increasingly likely with each passing year that chatbots will become an unavoidable yet welcome part of everyday life thanks to the convenience they offer.

<u>Works Cited</u>

[1]   M. Newlands, "These 5 Experts Share Their Predictions For Chatbots In 2018," Forbes, 27-Dec-2017. [Online]. Available: https://www.forbes.com/sites/mnewlands/2017/12/27/these-5-experts-share-their-predictions-for-chatbots-in-2018/#42e4d4691530. [Accessed: 11-Apr-2018].

[2]   M. Kowalski, "Watch out, human lawyers: Chatbots have potential to revolutionize law," Financial Post, 29-Aug-2017. [Online]. Available: http://business.financialpost.com/legal-post/watch-out-human-lawyers-chatbots-have-potential-to-revolutionize-law. [Accessed: 11-Apr-2018].

[3]   V. Li, "Chatbot apps help users communicate their legal needs," ABA Journal, Jul-2017. [Online]. Available: http://www.abajournal.com/magazine/article/talking_tech_chatbot_legal_services. [Accessed: 11-Apr-2018].

[4]   S. Lohr, "A.I. Is Doing Legal Work. But It Won't Replace Lawyers, Yet.," The New York Times, 19-Mar-2017. [Online]. Available:

https://www.nytimes.com/2017/03/19/technology/lawyers-artificial-intelligence.html. [Accessed: 11-Apr-2018].

Appendix III. Technology Assessment and Choice

Engineering practices always utilize core technical requirements to solve everyday life problems. Nevertheless, no matter how great an innovation is engineered, one can argue that its usability and ease of use is actually what determines a project's value as opposed to the research and development invested into the program. This bridge between the technical complexities of a system and its human interactions requires certain non technical requirements to be tackled during development. These elements include usability for users, adherence with legal doctrines, and measures taken to protect user provided data amongst other things. The development of JusticeAI, while technically challenging, encountered several periods during its development wherein non technical elements influenced the final implementation of the project. This writeup aims to provide a detailed account of some of these decisions, what led to them, and how they were ultimately addressed and integrated into the final solution.

People are often presented with lengthy and complicated contracts. Such end-user license agreements are often overlooked but their importance cannot be be discounted especially in domains dealing with sensitive information. The EULA provided by the system warns the user that all outputs predicted by the ProceZeus offer no legal professional advise. According the the Government of Canada, for one to practice the law, a person must obtain admission from the Canadian Law Society of a specific province or territory [1]. Given that Procezeus is neither a human nor a lawyer, the EULA serves as a necessary legal precaution. The user must first accept to the term and conditions before having any further access to the software.

Despite being inhuman, the strength of the software lies in its connection to people through its ease of comprehension. The vocabulary used in the domain of law can sound complex and ambiguous to those possessing elementary knowledge. Furthermore, the problem we all face is one in which everyone must abide by the law with not many of us truly understanding it. Our chatbot offers an approach to resolving cases using a casual vocabulary which allows users to understand the situation they find themselves in without having to perform rigorous research. Additionally, a challenge for many plaintiffs is knowing 'what' and 'how' to ask a demand due to the difficulties of formulating ideas into comprehensible sentiments. The flow of the conversation guides the user's thoughts into small and concise fragments. These small bits of information are then easy to use in order to evaluate a user's circumstance.

The conversational approach hints that the system must persist data about the discussion. Indeed, it is the case in order to create a more human feel to the chatbot. Nevertheless, privacy measures were dealt with high importance in order to provide the users with a confidential dialog. The underlying privacy stems from anonymity, therefore some features couldn't be implemented such as uploading a lease. If one were to tackle this task, the only plausible privacy measure would have been by the implementation of security through obscurity. With this, a user would be able to access their uploaded content using their

anonymous identity. However, the National Institute of Standards and Technology (NIST) in the United States strongly advise against this practice, as this technique offers very mediocre protection [2]. For this reason, the risk of data leakage and unauthorized recordings were mitigated.

Privacy issues, legal claims, and ease of use are aspects of a system which can be easily overlooked during production. Despite its oversight, it is always important to consider the non-functional requirements of a product in order to deliver value and a comfortable user experience. ProceZeus is a project which was developed with those ideas in mind through feedback of users and legal professionals. As the general population's faith in artificial intelligence grows with time, this chatbot will represents the first of many works of its kind to join the domain of law.

Works Cited

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