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Corporate Overview

Explanation of the AI Consulting Framework, Methodologies and Select Examples

By combining the latest trends in artificial intelligence with proven Cloud technologies, smooth and painless integration awaits.

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General Public

Not Confidential

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This proposal and supporting materials contain confidential and proprietary business information of Lemay.ai. These materials may be printed or photocopied for use in evaluating the proposed project, but are not to be shared with other parties. This proposal is intended to be an overview of described services and not a price guarantee. A complete and detailed quote will be provided once infrastructure and team responsibilities will have been established.



Background

Transparency and rationale—every step of the way.

Lemay.ai is a specialized consultancy that provides artificial intelligence, machine learning, and deep learning solutions to SMBs and enterprises in a commercial context. Our company is led by two entrepreneurs, Mathieu Lemay and Daniel Shapiro, PhD, performing research and development and rapid deployment of solutions in the field of Artificial Intelligence/Deep Learning (AI/DL). We have delivered AI/DL products to both private and public sector clients, and have performed research in the AI/DL fields of natural language understanding, automated data segmentation, sentiment analysis, recommendation systems, text/image similarity and more.

Currently, our bilingual team holds 5 patents, 8 certifications, and over 35 publications.

Over the course of the last two years, we have refined our AI Consulting Framework, which allowed us to successfully deploy multiple projects, many of them showcased and explained in this document. This rapid deployment framework allows for flexible, iterative, and continuous deployment of project prototypes and solutions, while ensuring production-ready quality upon integration and hand-off with the client's team.

We look forward to working with you, and helping you execute your vision.

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The Value System and Ethics of our Approach

We uphold a value system based on a firm belief that technology of any kind should be used to empower and augment the human capacity, while respecting our ethical duty to uphold public welfare and ethics.

Prevention of discrimination by understanding dataset biases

Lemay.ai believes in equality of gender, race, sexual preference, and physical ability. By providing the team with a multicultural, multilingual milieu, we continuously encourage awareness and empathy across team members, which translates into deployments respectful of social considerations and cultural sensitivities.

In the context of ethical artificial intelligence, this translates into extra care taken to ensure there are no unethical biases in our expert and decision-making systems by carefully examining training datasets to eliminate biases based on gender, race, sexual preference, physical ability, or any other basis that may be considered unethical in the context of the deployment.

A focus on human augmentation, not replacement

We understand the concerns surrounding the replacement of humans with machine-learning systems. We also understand that artificial intelligence systems, at present, are restricted to mimicking existing behaviours,

and even then imperfectly. Therefore, we maintain a strict focus on augmentation of human workers to allow them to perform more tasks, and take care to identify areas and points where humans should be kept in-the-loop to monitor the process.

Defensive design with safety first

Our team's diverse experiences in cybersecurity, medical devices and defense solutions inspires us to continuously evaluate risk at all levels of development and integration. This vigilance is displayed in the following activities:

- designing user interfaces where users are provided with the right questions to ask, not given explicit answers;
- monitoring solutions post-deployment for resilience and expected performance; and
- following best practices in information technology security to ensure that client data and intellectual property remain secure.

Our Clients

„Thanks to their continued efforts, we are now applying to the SEC on our path to market.“

- Samer Obeidat, founder and CEO, Investifai

We believe that we become part of the client's success story when we undertake a project. From strategy to delivery, we hold ourselves accountable to the client's mission and vision.

„I'm happy to recommend the services of Lemay.ai for natural language-based artificial intelligence consulting needs.“

- Lorraine McKay
Co-Founder and CMO
HRSG

„To date, the team at Lemay.ai has proven they are able to provide excellent artificial intelligence consulting services and insights. They have created real value for our client companies, supporting the goals of the [IBM I3] program.“

- Caroline Croft
Manager, Venture Programs
Invest Ottawa

„Throughout these projects, Lemay.ai has provided insights and added value. [...] Their team has been a pleasure to work with and I would be happy to work with them in the future.“

- Leor Grebler
CEO
Unified Computer Intelligence Corporation

„MNP has strategically chosen Lemay.ai as its go-to partner for rapid AI deployment, and has been consistently impressed with the scope and quality of solutions they have developed for us. [...]“

Without hesitation, I fully recommend Lemay.ai for your potential business venture. “

- Michael Melville
Senior Consultant
MNP LLP

„Throughout the project, Lemay.ai provided project updates and articulate feedback on our ideas.“

- Vincent Vomero
Founder and CEO
Foxy AI

Our AI Consulting Framework

We want to ensure a successful deployment on every project we undertake. Our framework mitigates both the development risks by ensuring the comprehensiveness and applicability of the data used, and the integration risks during deployment and client hand-off.

Clarity of scope

Lemay.ai makes a commitment to ensure all parties involved with the engagement are aware of and in agreement with the scope of the larger project at hand.

Clarity of engagement

Lemay.ai makes a commitment to ensure all parties involved with the engagement are aware of and in agreement with the portion of the tasks to be included as part of the engagement.

Data audit and contextual awareness

Lemay.ai makes an extensive commitment to audit, validate, and deeply understand the available data and broader context. This allows early identification of possible unintentional or unethical biases and any data-based impediments to achieving desired project outcomes.

Stage-gated control

Every Lemay.ai project includes multiple stop points and milestones so that stakeholders can maintain flexible control over the project's evolution. This integration of agility in the delivery of our services allows Lemay.ai to rapidly adapt to changing business priorities.

Deliverable-based milestones

The delivery model used by Lemay.ai focuses on delivering actionable value at every phase of the work performed. Each phase is only considered complete when an agreed-upon item of value is delivered to the client;

typically insights, predictive models, or detailed reports and hand-offs.

Risk mitigation

Lemay.ai's approach is based heavily on software development best practices that mitigate and reduce project risks. In particular, Lemay.ai focuses on delivering well-defined and predictable components, and ensuring exceptional quality of those components.

Intellectual property ownership

Lemay.ai's consulting engagements are focused on building a bespoke solution for the client, based on and guided by their own imagination and designs. We bring our full commitment to both executing the clients' vision and ensuring that they retain complete ownership (as well as our future discretion) when building these solutions.

Knowledge transfer

In relation to the previous point, Lemay.ai takes care to deliver a solution that not only works, but that can also be built on at the client's discretion. Part of this process involves a detailed knowledge transfer session with every client, to ensure that they have the tools at their disposal to own their own solution.

Project Phase	1	2	3	4	5
Strategy					
Solution Architecture					
Implementation					

Phase 1: Project Definition and Assessment

We engage in thorough discussions, with a range of involved stakeholders to outline the fundamental business objectives of each project. Establishing and clarifying this common basis of understanding across objectives, scope, constraints, budgets, and timelines communicates our desire for each project to succeed, and sets the stage for a surprise-free work plan as early as possible. A preliminary solution architecture is proposed. This mapping guides Lemay.ai in advising the client organization in the identification of necessary computational and storage resources required for project success.

Phase 2: Data Audit and Awareness

We first perform a deep evaluation of the relevant available data internal to the client organization in order to communicate the current state of useable data. This verification and quantification of available inputs ensures a smooth machine learning engagement while providing data-based corporate insights. Further discussions are held at the completion of the data awareness phase to reassess the expected results and success metrics discussed at the beginning of the engagement, and re-evaluate the feasibility of and expected effort to achieve them.

Phase 3: Machine Learning Experimentation & Implementation

Lemay.ai's technical expertise takes the spotlight in this phase of the project, as we relieve our clients of the bur-

den and risk of research and experimentation to develop technical models that perform to desired specification.

A system that compliant to project goals and previously agreed performance standards is the core deliverable of this phase after Lemay.ai performs a statistically-backed validation of the system's applicability and generality. Only we can guarantee the system's ability to perform safely and ethically in the real world is it considered ready for delivery.

Phase 4: Solution Deployment

By having started with the expected project outcomes, we ensure a smooth integration and implementation in the client's desired infrastructure, including the need for load-balancing, containers, virtual servers, and the corresponding scalable microservices.

After the deployment of the solution, we detail and complete the final report — containing the solution architecture, design rationale, and performance results as measured by the success metrics.

Phase 5: Ongoing Monitoring

Following our solution's initial hand-over, and depending on the client organization's needs, we perform periodic informal check-ins with the client organization's stakeholders and technical team to verify the ongoing success the solution provided, and that the team acquired full ownership of the solution.

Lemay.ai as a Trusted Partner

We believe in the long-term success of our partners, customers and work performed. As such, it is in our nature to strive for long-term relationships with select, key partners founded on mutual trust, integrity and honesty.

Commitment to pragmatic problem solving

Our work's focus is on improving business outcomes and delivering actionable value to our client stakeholders. For each engagement we accept, whether individually or in partnership, we place an emphasis on rightsizing the scope and solutions to the business context and constraints.

Success through collaboration

Our gamut of competencies allow us to partner with a complementary fit to your organization's service and product offerings. With partnership flexible terms purely based on joint success, we set out to play to each organization's strengths while supplying a unified experience to the partnership's clients. Fair play and clear division of labor make for easy and reproducible engagement models.

Open communication, one call away

We make ourselves reachable & responsive to all parties involved. Maintaining a steady flow of information between all project stakeholders is how we deliver quality fast. In the spirit of our values, we won't shy away from challenges, difficult topics, and sharing excitement about new opportunities for doing business. Proactive and challenging ideas stem forward due to our unwavering curiosity in the field and our belief in building something greater than the sum of its parts.

Proven track record

Lemay.ai is a Top Tier AI Supplier to the Canadian Federal Government. We are also an NVIDIA Preferred Solutions Advisor.



Canada



Supporting AI Across the Organization

A change in strategy requires focus, insight, diligence, and commitment. Engaging with Lemay.ai reduces the cost of potential mistakes and reduces risk in experimenting with new technologies.

AI Readiness Assessment

Analyze the potential gaps in skills, knowledge and problem solving that your skill may have as you undertake your digital transformation. This assessment combines online forms to be filled by the team to interviews with leadership to properly assess where your team is and where they want to go so that we can properly set up an action plan on how to get there, with less risk and less costs.

Education and Training

Artificial intelligence changes daily and its shockwave will be felt for years to come. Is your organization capturing this momentum?

Lemay.ai runs a number of classroom and workshop activities for technical staff, directors, and leaders to ensure that today's technologies can power tomorrow's ideas.

Project Support

Smooth projects come from clarity of scope and execute. A stage-gated, deliverables-based approach to project execution reduces volatility by answering the right questions earlier in the engagement.

Our AI consulting framework allows us to work with our clients and partners at the strategic, architectural, and implementation levels of concern.

Strategic Leadership

What are the technologies that are shaping your industry? What new insights can be unlocked from within your data warehouse?

A good strategy will help support and justify your decisions when a situation is unclear, or a choice has to be made between two non-ideal outcomes. A bad strategy can coerce you into logically bad choices given the information presented to you. Prevent troublesome decisions by adhering to strong fundamentals.

Digitization Strategy

Bring your organization into the 21st century by keeping up-to-date (and ahead of the competition) with the best practices applicable to your industry. This includes process mapping, capability assessments, clearly defined measures of success and deliberate control of project scopes.

Example Project

Job Posting Analysis for Candidate Matching

The Lemay.ai team was engaged to develop a data labelling strategy as well as multiple predictive models for assisting human resources recruiting tasks. This was achieved by parsing job postings, extracting competencies, and scoring them based on sentence classification followed by expressed competency regression.

Project Scope

As part of building a larger HR recruiting solution, Lemay.ai's team was responsible for the development of the data capture, data transformation and AI-based evaluation modeling required for the platform to operate. The scope of the project also included developing and deploying an endpoint which would allow the client to directly submit a job posting and retrieve a scorecard of competencies described in the job posting.

Complexity

This solution required a multi-model approach including a combination of classification and regression models as part of the solution. We first developed the initial sentence classification, providing the assessment and filtering of each sentence in a job posting. After the preliminary filters were executed, a second segment was added using a supervised machine learning predictive model to classify each sentence into predefined categories.

The deployment of the solution included the web server which performed the classification of competencies

from the job postings submitted to it. The webserver separated each sentence in the document and performed an initial coarse classification of each sentence followed by a fine classification. Properly classified sentences were then passed on to the competency regression engine which associated each sentence with a competency label and a competency intensity score.

Outcomes

The project led to successful classification of the first 67 target competencies selected by the client. The first classification models had an average accuracy of over 87%. The multi-model ensemble was deployed on the client production servers following Stallion.ai's appointment to facilitate the technical handover of the solution. This initiative led to the creation of a data science division to continue additional works within the client's organization immediately following the completion of the engagement. The client successfully deployed the solution commercially (as per the press release, see Appendix A2 (b)).

Example Project

Voice Recognition and Solution Integration

During the engagement, Lemay.ai was asked to develop a number of prototype systems for the detection of trigger words in voice recognition systems, recognition of voice commands, and the implementation of a media box solution.

Project Scope

Although many smaller engagements were accomplished, the largest deliverable was a media box solution, intended to be produced by a telecommunications company in Florida. The goal of this specific project was to build and show a functional proof-of-concept that could be assessed by senior management in order to be moved to production. The end user would need to be able to use the remote control device both as a manual input and as a voice command channel, dictating commands relevant to the experience of movie watching, television tuning, and adjusting settings.

Complexity

The solutions were implemented on a programmatic integration with DialogFlow (formerly API.ai), which permitted the client to daily update the entities and intents of the system based on movie availability, channel subscription packages, and desired level of functionality.

- A glue-logic server was built to act as an intermediary between DialogFlow's APIs and the technical team's list of media content
- The structure of entities and intents was generated and updated to match with the desired functionality

(which evolved with the time in the project)

Outcomes

Across various projects, we successfully deployed various smart microphone prototypes and proofs-of-concepts for our client to use. These technologies also included web services, user portals for smart microphones, and voice integration to existing tools. An end-to-end implementation of voice integration for a TV set-top box prototype was carried out as part of the engagements on which we were contracted. Among other prototypes shipped to clients under the same master agreement were 2 digital hotel assistants prototypes were developed along with a child-friendly kids' toy, and 2 generic voice recognition prototypes. Lastly, a part of the services we provided included a custom smart microphone circuit based on the Conexant CX20921 Digital Signal Processor.

Specifically for the media box solution, 32 settings, 158 channels, and over 1000 movies and TV shows were selectable by voice alone.

Example Project

Deep Learning Engine for Investment Portfolios

Although quants and high-speed traders make a quick buck, they also lose money just as fast. Our client wanted to build long-term growth in value by reducing both trading fees and market risk.

Project Scope

The team was tasked with developing an integrated predictive model for low-frequency trading of exchange traded funds (ETFs). The expectation was that the artificial intelligence solution provided by the team would handle the transformation and processing of data to perform assessments of the financial market. The scope of the project also included developing the solution's endpoint which would allow predictive calculations made by the model to be translated into trading actions handled by direct system interfaces.

Complexity

During the engagement, the team attempted a combination of standard predictive models and strategies (such as LSTM and 1D-CNN models, buy-and-hold and value trading, etc.), but all proved unsuccessful in beating a buy-and-hold strategy, due to the financial philosophy of the client in highly diversified, low-frequency trading (one trading event per day, or less).

Active research and development led to a selection of models with attention layers which allowed the automated portfolio balancing platform to exceed buy-and-hold and some other benchmarks.

Outcomes

Investifai now possesses a predictive model that achieved annualized returns of 8.7% per year over 11 years of backtesting, with a Sharpe ratio of 0.76; the industry average for financial vehicles is typically less than 3% annualized returns for any Sharpe ratio above 0.5. The model also presently outperforms a buy-and-hold strategy against 10 years of backtesting.

The client is licensed by the Securities and Exchange Commission (SEC) and registered as an investment advisor, and in parallel, attempting to collect approximately \$1B in management from various funds.

Example Project

Augmenting Automated Valuation Models

The client wanted to investigate the effect of the addition of images to an automated valuation model for improving real estate closing price estimates. This required the initial build of a custom valuation model and the expansion of features to include image recognition.

Project Scope

The project collected all of the real estate listings in the Massachusetts area (available to the client) to first predict the tentative closing prices of homes for sale. Then, following up on the standard AVM foundation, an image recognition classifier was implemented to detect key features inside the house pictures, which were then fed as inputs to a third model.

Complexity

The base AVM was built on numerical information (square footage, number of bathrooms, etc.) and categorical information (house style, neighborhood, closest school, etc.), which was augmented by the IRS neighborhood data. There were various image classification libraries which were used (ResNet, VGG, etc.) to assess stability and performance of multiple image sets. The third model was a comparatively simple DNN which adjusted the price from the AVM based on the combinational predicted outputs of the selected image classifier.

Outcomes

The base AVM predicted a price within 10% of the actual price, over 89% of the time (a directly comparable improvement to Zillow's Zestimates feature).

The client launched his platform, FoxyAI, back in March 2018.



Terms & Conditions

The following terms and conditions are our usual terms. Please contact your sales representative for any changes or concerns.

§ 1 - Term

The parties acknowledge and agree that this Agreement came into effect on the date indicated by Contractor in Article 11 herein, and it shall continue in full force and effect until terminated by either party in accordance with the provisions of Article 6 herein.

§ 2 - Services

The Contractor will aid in the design and development of artificial intelligence solutions and other tasks specified by the Company to the Contractor. The Contractor will provide the following services:

- Design advice and assistance as to development of the products and services of the Company as requested from time to time;
- Strategic advice and assistance as to development of the business of the Company as requested from time to time;
- Advice and assistance to the CEO and other senior officers on projects as requested from time to time.

The Contractor shall take direction as directed by Company's Board of Directors. The activities to be performed will be in accordance with those listed and described in the agreed upon statement of work. Additional services or amendments to the services described above may be agreed upon between the parties moving forward.

§ 3 - Compensation

Subject to providing the services as outlined above, the Contractor will be paid the sum of \$300 CAD per hour, plus HST. This rate of \$300 per hour applies only to the services outlined above, and not to any extensions of this agreement. The Company will be invoiced monthly in the first week of each month for

services rendered, with payment due within 30 business days of receipt of the invoice. Any amounts owed by the Company under this Agreement that are not paid when due may bear interest (applied at the discretion of the Contractor), from the time the payment was due until the time paid, at a rate of 10% per annum compounded monthly.

§ 4 - Relationship

The Contractor will provide the Contractor's services to the Company as an independent contractor and not as an employee.

Accordingly:

- The Contractor agrees that the Company shall have no liability or responsibility for the withholding, collection or payment of any taxes, employment insurance premiums or Canada Pension Plan contributions on any amounts paid by the Company to the Contractor or amounts paid by the Contractor to its employees or contractors. The Contractor also agrees to indemnify the Company from any and all claims in respect to the Company's failure to withhold and/or remit any taxes, employment insurance premiums or Canada Pension Plan contributions.
- The Contractor agrees that as an independent contractor, the Contractor will not be qualified to participate in or to receive any employee benefits that the Company may extend to its employees.
- The Contractor is free to provide services to other clients, so long as such other clients are not in competition with the Company and so long as there is no interference with the Contractor's contractual obligations to the Company.
- The Contractor has no authority to and will not exercise

Terms & Conditions

or hold itself out as having any authority to enter into or conclude any contract or to undertake any commitment or obligation for, in the name of or on behalf of the Company.

§ 5 - Confidentiality and Intellectual Property

The Contractor hereby represents and warrants to the Company that it is not party to any written or oral agreement with any third party that would restrict its ability to enter into this Agreement or to perform the Contractor's obligations hereunder and that the Contractor will not, by providing services to the Company, breach any non-disclosure, proprietary rights, non-competition, non-solicitation or other covenant in favor of any third party.

The Contractor hereby agrees that, during the term of this Agreement and for one (1) year following the termination hereof, the Contractor will not (i) recruit, attempt to recruit or directly or indirectly participate in the recruitment of any Company employee or (ii) directly or indirectly solicit, attempt to solicit, canvass or interfere with any customer or supplier of the Company in a manner that conflicts with or interferes in the business of the Company as conducted with such customer or supplier.

§ 6 - Termination

The Contractor agrees that the Company may terminate this Agreement at any time without notice or any further payment if the Contractor is in breach of any of the terms of this Agreement.

The Company may terminate this Agreement at any time at its sole discretion, upon providing to the Contractor 14 calendar days advance written notice of its intention to do so or payment of fees in lieu thereof.

The Contractor may terminate this Agreement at any time at its sole discretion upon providing to the Company 14 calendar days' notice of Contractor's intention to do so. Upon receipt of such notice the Company may waive notice in which event this Agreement shall terminate immediately.

§ 7 - Obligations Surviving Termination of this Agreement

All obligations to preserve the Company's Confidential Information, Intellectual Property and other warranties and representations set forth herein shall survive the termination of this Agreement.

§ 8 - Entire Agreement

This Agreement, together with the Confidentiality and Proprietary Information Agreement, represents the entire agreement between the parties and the provisions of this Agreement shall supersede all prior oral and written commitments, contracts and understandings with respect to the subject matter of this Agreement. This Agreement may be amended only by mutual written agreement of the party.

§ 9 - Assignment

This Agreement shall inure to the benefit of and shall be binding upon each party's successors and assigns. Neither party shall assign any right or obligation hereunder in whole or in part, without the prior written consent of the other party.

§ 10 - Governing Law

This Agreement shall be governed and construed in accordance with Ontario law. If any provision in this Agreement is declared illegal or unenforceable, the provision will become void, leaving the remainder of this Agreement in full force and effect.

Thank you.

