# INSTRUCTIONS

|  |
| --- |
| * Please make sure you are using the latest version of this form posted on  **https://www.mitacs.ca/en/programs/accelerate/proposal.** This link also provides an Accelerate Guide with detailed information onhow to write your proposal. * Please **do not modify, remove** text or instructions in each section/subsection **or reformat** this form in any way. A modified form will result in a delay in the internship evaluation process. * Send your draft proposal to your [Mitacs Business Development Representative](http://www.mitacs.ca/en/contact-us/business-development) **prior** to obtaining all signatures and submitting. * The proposal should be written and submitted **at least eight (8) weeks prior to the planned start date of the internship. For international travel, a minimum of 16 weeks lead time is required.** * The start date of the internship has to be **after** research approval and the **receipt** of the partner funds at Mitacs. * Partner funds can be sent directly to Mitacs in Canadian dollars prior to approval to expedite the process. * If applicable, proposals with a not-for-profit, hospital, or municipality as a partner organization must seek partner and project eligibility approval before proceeding. Please contact a [Mitacs Business Development Representative](http://www.mitacs.ca/en/contact-us/business-development) to discuss eligibility **BEFORE** submitting your application (see section 2.7). * If applicable, intern conflict of interest declarations must be received by Mitacs before submitting your application (see section 4.3.2). * If applicable, academic supervisor conflict of interest documentation must be submitted with your application (see section 4.1.1 for details). For more information, see Mitacs’s Conflict of Interest policy: <http://www.mitacs.ca/en/conflict-interest-policy>. * If you cannot see the items listed in the drop downs, please refer to Appendix C: Options and type the corresponding answer in the space provided. |

**Please note:** If required, your **Mitacs Business Development Representative** can assist you with:

* Identifying your Office of Research Services (ORS) or equivalent representative.
* Assessing the eligibility and completeness of the proposed research.

# APPLICATION CHECKLIST

|  |
| --- |
| **A complete internship application package must include the following:**   * The proposal **completed and signed** by all parties in Word format   + *The Mitacs Accelerate Memorandum* (Section 7) with signatures must be submitted as a scanned PDF   + Appendix A - Accelerate Intern Consent Form signed * Intern(s) CV (Any format is allowed. A [CV template](https://www.mitacs.ca/sites/default/files/uploads/page/mitacs_accelerate_intern_cv_template_2018.doc) is available on the Mitacs website) * Lead Academic Supervisor's CV for each participating academic institution **only** for projects with **6+ IUs** (CCV as per Tri-Council or other CV format) * Accelerate budget and invoicing schedule (Excel spreadsheet) * Any supplementary documents (as applicable)   **If your application involves an Accelerate International component, please note:**   * You must complete Appendix B – *Accelerate International* in addition to this entire application * International Pre-Departure Form and Code of Conduct and Ethics form may be forwarded to Mitacs after submission of your application; however, funds cannot be released and the internship may not begin until Mitacs receives these forms * Indemnity Agreement (as applicable) \*Please contact your Business Development representative to find out whether this document is required. * Visit the [Accelerate International website](https://www.mitacs.ca/en/programs/accelerate/mitacs-accelerate-international) to determine if there is any additional required documentation for the country you intend to work with   \* **An incomplete application or a modified form will result in a delay in the proposal evaluation process.** |

**Mitacs Accelerate Proposal**

### Research Proposal Summary

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| * 1. **Title of project:** | A smart banking conversational service | | | |
| * 1. **Type of project:** Please indicate (x)   Select all that apply | (\_) Accelerate | | | |
| (x) Accelerate Fellowship | | | |
| (\_) Accelerate Entrepreneur | | | |
| (\_) Accelerate International (Please also complete Appendix B) | | | |
| * 1. **Number of Internship Units:** | 9 | | | |
| * 1. **Keywords to identify reviewers:** (5-10 specific keywords; 50% technically related, 50% discipline-related) | Machine learning, Natural language processing, Smart conversational agent, Dialogue system, Smart banking service, Customer journey management and analysis, Customer support. | | | |
| * 1. **Academic discipline:** | Computer Science | | Information systems | |
| * 1. **Project priority sectors:** | Finance and Insurance | Information & Communications Technology | | Technology |

* 1. **List of participants:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Academic supervisor** | **Department** | **Academic institution** | **City and country location of academic institution** |
| Thang Le Dinh | Marketing and Information systems | Université du Québec à Trois-Rivières | Trois-Rivières (Québec) G9A 5H7 CANADA |
| **Partner organization(s)** | **Contact name at partner organization** | **City and country location of organization** | **Partner legal status** |
| Fédérations des caisses Desjardins du Québec | Nathalie Neriec | Québec | For Profit Private Corporation |
|  |  |  |

* 1. **Proposed work plan for internship unit(s) (IU):**

Please summarize the work plan for the project by showing which intern will work when. Each IU corresponds to one 4-6-month internship. This table provides a high-level overview of the proposed research project and information about intern(s) to the reviewers. Please refer to the [**Accelerate Guide: Writing your proposal**](https://www.mitacs.ca/sites/default/files/uploads/page/guide_to_writing_your_proposal_2019.pdf)for assistance.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Years** | | | | **Year 1** | | | **Year 2** | | |
| **Months** | | | | 1-4 | 5-8 | 9-12 | 1-4 | 5-8 | 9-12 |
| **Intern name** | **Degree program** | | **IU** |
| Do Dung Vu | postdoc | | 6 |  |  |  |  |  |  |
| Hang My Thi Vu | postdoc | | 3 |  |  |  |  |  |  |
| **Total** | | | **9** |  |  |  |  |  |  |
| **Total project funding** | | **$180000** | |  |  |  |  |  |  |

### Description of Proposed Research

* 1. **Project title:**

A smart banking conversational service

* 1. **Research Abstract** (Approx. 200 words):

Nowadays, the banking sector has undergone a massive transformation of its services from e-banking to smart banking, which implements modern technologies to provide a more innovative experience for customers. This project addresses the challenge of providing a smart banking conversational service as a new generation self-service in order to improve customer experience and satisfaction. The purpose of this research is to propose a novel framework for designing and building a smart service system, which can adapt and learn to implement an optimal and personalized dialogue strategy based on customer knowledge and interactive experience with human users. The framework, which is a reconciliation of the conversational dialogue management and the customer knowledge management approaches, includes a smart dialogue component and a context-aware knowledge component.

The *smart dialogue component* receives the user’s questions and then analyzes the requirements using machine learning algorithms and artificial intelligence techniques. When the user’s questions are classified as a demand, the service will make a personalized appropriate response that may include the answer, hint, process, or recommended product and service to satisfy user needs.

Moreover, the *context-aware knowledge component* to provide services for context recognizing and reasoning, which are capable of actively adapting and responding based on the circumstance of interests and user contexts. To this end, this component captures, manages and exploits different types of customer knowledge in order to understand the user contexts and recommend the best financial solutions and services for users.

* 1. **Background** and review of relevant prior work (minimum 500 words):

**Dialogue systems.**

Dialogue systems and chatbots, which are highly demanded in industrial applications and in the daily life, have become more and more important in today’s world [26]. Dialogue systems perform the interface between human and machine and serve the human problems as an assistant via conversation.

Based on the categories of applications, dialogue systems are commonly divided into two categories: Task-oriented dialogue systems and non-task-oriented dialogue systems [4]. The differences between task-oriented and non-task-oriented dialogue systems are for a given purpose and without a given purpose, respectively. *Task-oriented dialogue systems,* which aim at accurately handling users’ messages,are used to achieve better optimization performance in certain domains such as flight booking and restaurant reservation systems [1]. *Non-task-oriented dialogue systems*, which aim at performing the conversation with users without the task and domain restriction such as psychological support, medical aid, and language learning [19], are usually fully data-driven based on probabilistic generative models.

In general, the architecture of a dialogue system contains three main modules:

* *NLU (Natural Language Understanding) module* converts the raw user message into semantic slots, tighter with the classification of domain and user intention [6]. The NLU module manages three tasks: Domain classification, Intent detection, and Slot filling. Domain classification and intent detection belong to the same category of tasks. Deep learning methods are proposed to solve the classification problems of dialogue domain and intent [7][8].
* *Dialogue management module* has two submodules, including Dialogue State Tracking (DST) and Dialogue Policy Learning (DPL). DST iteratively calibrates the dialogue states based on the current input and dialogue history. The DST contains all essential information to be conveyed in the response [13]. DPL decides the next action of a dialogue agent based on the calibrated dialogue states from the DST. Supervised learning and reinforcement learning are mainstream training methods for DPL [14].
* *NLG (Natural Language Generation) module* converts the selected dialogue actions into surface-level natural language, which is usually an ultimate form of response. Deep learning methods were further applied to enhance the NLG performance. The language generation with fully data-driven without depending expert rules were argued at [16] based on RNNs (Recurrent neural networks) to learn response generation with semantic constrains and grammar trees [16].

**Dialogue systems for retail banking.**

Since retail banking conversations normally aim at getting information about the banking products and services than to accomplish a goal; hence, these conversations are not task-oriented but rather domain-driven. The information of these conversations mostly focuses on getting the rates, prices, investment, credit, purchase, transfer, account open and close. In the case of Canadian banking systems, the conversation can include both asking for information and solve some relevant problems to satisfy certain user’s requirements in both French and English.

On the other hand, to improve the business competition, most of the companies in the digital age are confronted with both the online and offline world [22]. Consequently, multi-channel management and customer experience have become the main differentiation and have turned into a management priority [23]. In particular, customer journey management, which aims at depicting the customer’s decision process by taking a customer perspective and at gaining a better understanding of customer experience is emerging in retail banking [24].

Smart banking is emerging solution for the banking sector to provide innovative services for the new and empowered consumers such as banker mobility, next-generation self-service, remote advisory, social computing, and the use of digital signage. As a matter of fact, there is still a little focus on models and frameworks for service systems that can support those smart banking services.

This research addresses the challenge of building a smart service system for supporting smart banking services in general, and offers a smart banking conversational service as a new generation self-service in particular.

* 1. **General objective** of the research project broken down into sub-objectives, activities, themes, or subprojects, as applicable:

After a tumultuous 2020, the banking industry is transforming itself not only deeply but also widely to adapt to the new reality of the world during and after the Covid-19 pandemic. Consequently, smart banking is emerging as a solution to become agile and proactively embrace innovation through modern technology such as artificial intelligence (AI) and big data. By using modern technology, the retail banking business can lower the cost of current systems and achieve a competitive edge in today’s challenging landscape. With the Internet explosion and new network innovation (5G and cloud computing), AI-based applications are applied everywhere in the financial and banking industries, not only to shift the way customers make a purchasing decision, but also to adjust the way in conducting business [20].

Besides, customer loyalty is considered a key factor to surviving and succeeding in many banking institutions. In the retail banking business, customer loyalty is influenced by perceptions of service quality and levels of customer satisfaction [21]. An AI-powered conversational service is one of the examples of a smart banking service, which is automating many routing customer service questions in the retail banking business, may boost customer experience and loyalty by providing 24/7 support and intelligent solutions.

This project aims at proposing a *framework for smart banking conversational services* (SBCS), hereafter called the SBCS framework that can provide a context-aware smart services, which is capable of actively adapting and responding based on user’s circumstance of interests. The SBCS framework includes a *smart dialogue component* and a *context-aware knowledge component.* The *smart dialogue component* is indeed a non-task-oriented dialogue system for the retail-banking business that aims at facilitating the intelligent conversation between users and the service. The conversation may cover different types of customer knowledge such as know-what (products, services), know-how (activities, processes), know-why (predictions), and know-who (recommendations) [25] [27]. The *context-aware knowledge component,* which aims at managing customer knowledge and at improving customer experience, is capable of learning, dynamically adapting, and making decisions based upon data received, transmitted, and/or processed to improve its response to a future situation [25].



Figure 1. A framework for smart banking conversational services

Furthermore, by learning from customer interactions, the SBCS can analyze and predict the users’ needs to target and serve them. Due to the impact of Covid-19 and the new transformation of user’s habits with remote working and social distancing, both customers and bank consultants might feel exhausted when they are working on the phone because of the long waiting line and overload phone calls. The SBCS may help users 24/7 in the fastest and effective way in order to improve customer engagement and satisfaction.

* 1. **Details of internships or subprojects:**

**Sub-project 1: Smart dialogue component**

**For each intern or subproject, provide the following mandatory information:**

* + 1. **Name of intern.**

Do Dung Vu

* + 1. **Specific objectives of the internship or subproject**. Clearly state your [sub-] objectives so reviewers can assess if they are achievable.

A *smart dialogue component* assumes the following functionalities: i) NLP (Natural language processing) tasks with multiple languages (French and English); ii) Recognize the elements of the user’s question; ii) Determine and process the relationships of these elements; iii) Query the knowledge base; and iv) Generate and show the response to the user. Consequently, the smart dialogue component includes the different modules for recognizing, analyzing user’s questions and for generating and recommending answers (Figure 2).



Figure 2. Smart Dialogue Component

Firstly, the *Natural Language Understanding module* receives the user’s questions and then analyzes their requirements using machine learning algorithms and artificial intelligence techniques.

Secondly, when the user’s questions are classified and understood, the *Dialogue management module* and *Natural Language Generation* *module* generates and recommends a response in a personalized and appropriate manner, which may include the answer, hint, process, or recommended products and services.

* + 1. **Methodologies**. Provide enough detail so reviewers can determine if the proposed methodology is appropriate and sufficient to achieve the [sub-] objectives.

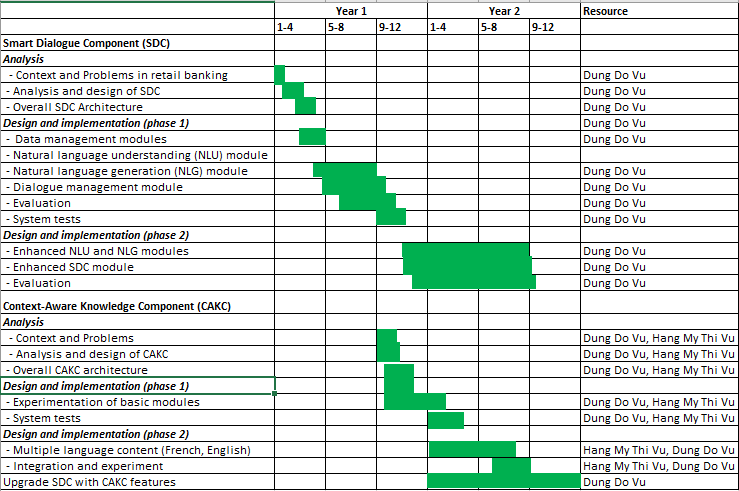
In terms of the research methodology, the design science approach, which is one of the most popular for research in the information system domain, is used to develop and measure artefacts of the smart dialogue system of the smart banking conversational service [2].

Design science is defined as designing and evaluating a process or artefacts to solve real scientific problems. An important aspect of design science is the emphasis on the demonstration and evaluation of artefacts [3]. By considering the design science methodology [2][3], the research design of this project consists of two phases. The project begins with the construction of the research artefacts of the proposed framework and then continues with the subsequent evaluation and applicability check of these artefacts.

Firstly, the project aims at on building the artefacts of the design science methodology, including constructs, method, and model [2][3]. The *constructs,* which associate with the key concepts related to the smart dialogue component, are extracted using the literature-based discovery. The *model,* whichis statements describing the relationships among constructs, are generated and formulated using the same strategy. The *method* is a set of activities performing a specific task in order to build the different modules of the smart dialogue component.

Secondly, to evaluate the proposed artefact, logical argument, case study and technical experiment evaluation methods can be used. Using *logical argument method*, the proposed approach can be compared with other relevant approaches at the conceptual level. Using *case study method*, the proposed framework can be experimented within a specific domain of retail banking business such as Personal and Business services. Using *technical experiment* aims at evaluating the effectiveness and efficiency of the service in analyzing user messages and understanding user intention.

* **Timeline**. We suggest using a Gantt chart to provide a timeline showing which task will be done when to achieve each objective.



* **Expected deliverables.** Each project requires the submission of a completed Mitacs Final Report and Mitacs survey at the end of the project**.** Please describe the additional expected deliverables of the project i.e. expected outcomes, results, documents (intern’s thesis, peer-reviewed journal, conference presentation).
* A literature review report about dialogue systems for the retail banking business
* A literature review report about customer knowledge management in the finance and banking business
* A framework for the Smart dialogue system with its’ components
* A system architecture proposal for smart banking conversational services
* A software prototype for the smart banking conversational service
* A report on the evaluation of the framework qualitatively
* A report on the evaluation of the framework quantitatively with regards to user tests
* Peer-reviewed conference or journal publications.
* A workshop about smart banking conversational services for Desjardins
* **Benefit to the intern.**

At Desjardins, the intern has a chance to collaborate with established banking experts, employees, customers, and researchers in the finance industry under a professional working environment.

Especially, the intern will work deeply in machine learning, deep learning, knowledge base, and ontology fields to build up a new smart conversational banking service. Moreover, he can access relevant/approval datasets and high-performance computational resources.

He also can perform their research and develop their models, which are used in real industrial products and services. The experimental framework for evaluating models is implemented by both the bank’s experts and the intern. He will suggest new ideas, analyze experiments, propose algorithms, and research solutions for more innovative banking services.

* **Interaction**. Indicate the percentage (%) of time during the project that the intern will spend on-site at the partner location and at the academic institution(s). Research should be carried out equally (50%) in the premises of the partner and the academic institution(s).

1. % of partner interaction: \_75\_\_\_ % **+** % of academic interaction: \_25\_\_\_ % = 100%
2. If different, please include a **justification**. NOTE: Theminimum interaction at either site is 25% with a maximum of 75%.

* **Partner interaction.** 
  + - 1. Provide a detailed description of the activities that will be performed on-site at the partner organization and the expected interaction with and supervision by employees of the partner organization. For **Accelerate Entrepreneur** applicants, please provide a detailed description of the activities that will be performed on-site at the pre-approved incubator, including the expected interaction with and supervision with incubator staff.

The interns will come to the partner organization four days per week and closely collaborate with members from the partner organization such as experts, end users, banking services, and participate in the relevant internal training of banking services.

* + - 1. Indicate the resources the partner organization will be providing to support the intern’s work at their premises. Include information about (1) space, (2) resources, and (3) expertise that will be provided by the organization to the intern. For **Accelerate Entrepreneur** applicants, please indicate the resources the pre-approved incubator will provide, including information about space, resources, and expertise.

The nature of working, which is knowledge capturing, sharing and applying, requires not only the traditional office (such as a desk, chair, monitor, personal computer, printer) but also team building and knowledge sharing. Desjardins offers interns high-performance computational resources and datasets under its security policy. On the other hand, some experts will help the interns to understand the real products, services, and evaluate the output of the research result.

**Sub-project 2: Context-ware knowledge component**

**For each intern or subproject, provide the following mandatory information:**

**Name of intern.**

Hang My Thi Vu

**Specific objectives of the internship or subproject**. Clearly state your [sub-] objectives so reviewers can assess if they are achievable.

The *context-aware knowledge component* aims at providing the capabilities to actively adapt and respond to the user’s needs and questions based on the circumstance of interests and user contexts. As mentioned in Figure 3, the context-aware knowledge component includes Data management, Knowledge management, and Context management modules.

The knowledge component captures customer data, transforms it into information and knowledge, and manages contexts of its application in order to help the Smart dialogue component to understand the user contexts and recommend the best banking and financial solutions and services for users.



Figure 3. Context-aware knowledge component

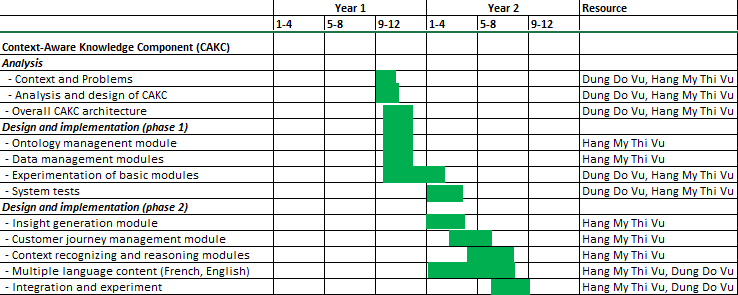
The context-aware knowledge component includes the following modules:

* *Context management module:* Context recognizing and reasoning for analyzing user behavior and context (i.e. User’s questions, considerations, time, location, etc.) and for generating relevance solutions to help users verify their problems and for predicting the potential problems and activities.
* *Knowledge management module:* Insight generation, ontology management, and customer journey management for customer knowledge management. The Knowledge management module takes advantage of a knowledge graph for storing a large amount of customer data. A semi-automatic process is applied to construct the customer knowledge graph [28]. This module also contains a reasoning engine exploiting the knowledge graph. By employing different business analytics techniques (e.g., descriptive, prescriptive, diagnostics), it helps to generate business insights from the results of the reasoning process. These insights can be used in the Context management module for being turned into actionable knowledge [25].
* *Data management module:* Real-time processing, data loading, and data ingestion for capturing and processing customer data from different sources. The Data management module is responsible for extracting, processing, and transferring heterogenous and obscure customer data from diverse sources into well-structured data. The data loading submodule deals with customer data from traditional enterprise systems [25]. Meanwhile, the data ingestion and real-time processing submodules deal with an enormous amount of customer data coming from open public data sources such as social networks, websites, or mobile devices [25]. The available data from this module is served as input for knowledge base construction.

**Methodologies**. Provide enough detail so reviewers can determine if the proposed methodology is appropriate and sufficient to achieve the [sub-] objectives.

Action Design Research (ADR) method will be used to build the context-ware knowledge component as an artifact that solves a practical issue [2]. The purpose of the method is to create design knowledge by building and evaluating an artifact in an organizational setting [5]. The ADR composes of four stages:

* *Problem Formulation*: The context-aware knowledge base, including its modules such as Context management, knowledge management and data management, will be designed with a participatory modeling approach.
* *Building, Intervention, and Evaluation*: The knowledge base will be developed and experimented to evaluate the quality of data and knowledge, and the performance of the knowledge base.
* *Reflection and Learning*: By continuously reflecting the results of ontology, the knowledge base will be extended and improved with multiple languages (French and English)
* *Formalization of Learnings*: A formalized learning will be derived in form of methodological guidelines applicable to a broader class of problems.
* **Timeline**. We suggest using a Gantt chart to provide a timeline showing which task will be done when to achieve each objective.



1. **Expected deliverables.** Each project requires the submission of a completed Mitacs Final Report and Mitacs survey at the end of the project**.** Please describe the additional expected deliverables of the project i.e. expected outcomes, results, documents (intern’s thesis, peer-reviewed journal, conference presentation).

* A literature review report about the context-aware knowledge component for retail banking business
* A framework for context-aware knowledge component with its modules
* A system architecture proposal for context-aware knowledge component
* A software prototype for the context-aware knowledge component
* A report on the evaluation of the framework qualitatively
* A report on the evaluation of the knowledge component quantitatively with regards to user tests
* The knowledge base with multiple language content (French and English)
* Peer-reviewed conference or journal publications.

1. **Benefit to the intern.**

This project aims to train highly qualified personnel in professional and transdisciplinary contexts in the field of information systems and artificial intelligence, in particular, knowledge management for AI-based applications.

This project is expected to contribute to the training of the postdoctoral researcher to develop her research and practical skills. It is hoped that the researcher will benefit from the perspectives and advice of the professor to prepare for an academic career.

1. **Interaction**. Indicate the percentage (%) of time during the project that the intern will spend on-site at the partner location and at the academic institution(s). Research should be carried out equally (50%) in the premises of the partner and the academic institution(s).
2. % of partner interaction: \_75\_\_\_ % **+** % of academic interaction: \_25\_\_\_ % = 100%
3. If different, please include a **justification**. NOTE: Theminimum interaction at either site is 25% with a maximum of 75%.
4. **Partner interaction.** 
   * + 1. Provide a detailed description of the activities that will be performed on-site at the partner organization and the expected interaction with and supervision by employees of the partner organization. For **Accelerate Entrepreneur** applicants, please provide a detailed description of the activities that will be performed on-site at the pre-approved incubator, including the expected interaction with and supervision with incubator staff.

The interns will come to the partner organization four days per week and closely collaborate with members from the partner organization such as experts, end users, banking services, and participate in the relevant internal training of banking services.

* + - 1. Indicate the resources the partner organization will be providing to support the intern’s work at their premises. Include information about (1) space, (2) resources, and (3) expertise that will be provided by the organization to the intern. For **Accelerate Entrepreneur** applicants, please indicate the resources the pre-approved incubator will provide, including information about space, resources, and expertise.

The same as intern # 1, the nature of working, which is knowledge capturing, sharing and applying, requires not only the traditional office but also team building and knowledge sharing. The intern may need high-performance computational resources and datasets under the security policy of Desjardins.

Besides, the intern also needs a coordinator of the project to help her to work with some experts for understanding the different types of knowledge, and for evaluating the output of the research result.

* 1. **Relevance to the partner organization and to Canada**:  
     Describe (1) the partner’s proposed role in the project, (2) how the partner will benefit from participating, and (3) how the Canadian community will benefit from this research.

By considering this project, Desjardins may create an innovative solution, which is the smart banking conversational service, including the smart dialogue component with multiple language services and context-aware knowledge component. Customers are seeking their needs or find solutions for their problems while chatting with the smart service, which adapts itself to customers’ personalized problems and considerations, and helps them to find adorable solutions.

From the customer’s perspective, the service is interactive and personalized that may have a huge impact on consulting and sales services in the retail banking business. Based on the context-ware knowledge component, the SBCS can apply the approach of one-to-one marketing and extended the framework for other smart services such as recommendations, customer journey management, and decision-supported.

This project will help, build, and evaluate the smart banking conversational service to improve the competition power, to reduce the cost of consulting and support, to serve new segments of customers without limits of language, time, and location. Users can use a new evolutional banking service with high quality in order to face the challenges related the Covid-19, ages, or remote area.

Furthermore, the SBCS would support users to find the right banking products/services at the right time in the right context to solve their problems in the right and simple way at low cost. This type of services can be considered as one of the first smart services provided in Canada.

* 1. **Project economic orientation (for submissions with an NFP, hospital, or municipality as a partner organization ONLY):**Describe the economic or productivity orientation of the project. NOTE: if any partner listed in this proposal is a not-for-profit (NFP) organization, hospital, or municipality, please contact a [Mitacs Business Development representative](https://www.mitacs.ca/contact-us/business-development) to discuss its eligibility before proceeding with your proposal submission.
  2. **Relationship (if any) to past/other Mitacs projects:**    
     Describe whether or not the current project is related AND provide specifics about the relationship (e.g. not related because it refers to a different research area OR if related: provide information about what has been achieved in past projects and how the current application complements other submissions).

**Write the previous project**

* 1. **References:**

[1] Santhanam S, Shaikh S (2019) A survey of natural language generation techniques with a focus on dialogue systems-past, present and future directions. arXiv preprint arXiv:190600500

[2] Alan R. Hevner, Salvatore T. March, Jinsoo Park, and Sudha Ram. 2004. Design science in information systems research. MIS Q. 28, 1 (March 2004), 75–105.

[3] Ken Peffers, Tuure Tuunanen, Marcus A. Rothenberger & Samir Chatterjee (2007) A Design Science Research Methodology for Information Systems Research, Journal of Management Information Systems, 24:3, 45-77

[4] Altinok, D. (2018). An Ontology-Based Dialogue Management System for Banking and Finance Dialogue Systems. ArXiv, abs/1804.04838.

[5] Sein, Henfridsson, Purao, Rossi, and Lindgren, “Action Design Research,” MIS Q., vol. 35, no. 1, p. 37, 2011.

[6] Li X, Chen YN, Li L, Gao J, Celikyilmaz A (2017b) End-to-end task-completion neural dialogue systems. arXiv preprint arXiv:170301008

[7] Deng L, Tur G, He X, Hakkani-Tur D (2012) Use of kernel deep convex networks and end-toend learning for spoken language understanding. In: 2012 IEEE Spoken Language Technology Workshop (SLT), IEEE, pp 210–215

[8] Tur G, Deng L, Hakkani-Tür D, He X (2012) Towards deeper understanding: Deep convex networks for semantic utterance classification. In: 2012 IEEE international conference on acoustics, speech and signal processing (ICASSP), IEEE, pp 5045–5048

[9] Sarikaya R, Hinton GE, Deoras A (2014) Application of deep belief networks for natural language understanding. IEEE/ACM Transactions on Audio, Speech, and Language Processing 22(4):778– 784

[10] Ravuri S, Stolcke A (2015) Recurrent neural network and lstm models for lexical utterance classification. In: Sixteenth Annual Conference of the International Speech Communication Association

[11] Ravuri S, Stolcke A (2016) A comparative study of recurrent neural network models for lexical domain classification. In: 2016 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), IEEE, pp 6075–6079

[12] Hashemi HB, Asiaee A, Kraft R (2016) Query intent detection using convolutional neural networks. In: International Conference on Web Search and Data Mining, Workshop on Query Understanding

[13] Henderson M (2015) Machine learning for dialog state tracking: A review. In: Proceedings of The First International Workshop on Machine Learning in Spoken Language Processing

[14] Chen H, Liu X, Yin D, Tang J (2017a) A survey on dialogue systems: Recent advances and new frontiers. Acm Sigkdd Explorations Newsletter 19(2):25–35

[15] Zhang Z, Li X, Gao J, Chen E (2019c) Budgeted policy learning for task-oriented dialogue systems. arXiv preprint arXiv:190600499

[16] Wen TH, Gasic M, Kim D, Mrksic N, Su PH, Vandyke D, Young S (2015a) Stochastic language generation in dialogue using recurrent neural networks with convolutional sentence reranking. arXiv preprint arXiv:150801755

[17] Zhou H, Huang M, Zhu X (2016) Context-aware natural language generation for spoken dialogue systems. In: Proceedings of COLING 2016, the 26th International Conference on Computational Linguistics: Technical Papers, pp 2032–2041

[18] Li Y, Yao K, Qin L, Che W, Li X, Liu T (2020b) Slot-consistent nlg for task-oriented dialogue systems with iterative rectification network. In: Proceedings of the 58th Annual Meeting of the Association for Computational Linguistics, pp 97–106

[19] Ritter A, Cherry C, Dolan WB (2011) Data-driven response generation in social media. In: Proceedings of the 2011 Conference on Empirical Methods in Natural Language Processing, pp 583–593

[20] P. Klaus and B. Nguyen, “Exploring the role of the online customer experience in firms’ multi-channel strategy: An empirical analysis of the retail banking services sector,” J. Strateg. Mark., vol. 21, no. 5, pp. 429–442, 2013.

[21] Z. Rahman, “Customer experience management — A case study of an Indian bank,” J. Database Mark. Cust. Strateg. Manag., vol. 13, no. 3, pp. 203–221, 2006

[22] K. N. Lemon and P. C. Verhoef, “Understanding Customer Experience Throughout the Customer Journey,” J. Mark., vol. 80, no. 6, pp. 69–96, Nov. 2016.

[23] C. Homburg, D. Jozić, and C. Kuehnl, “Customer experience management: toward implementing an evolving marketing concept,” J. Acad. Mark. Sci., vol. 45, no. 3, pp. 377–401, May 2017.

[24] S. Holmlid and S. Evenson, “Bringing Service Design to Service Sciences, Management and Engineering,” 2008, pp. 341–345.

[25] T. Le Dinh, N. Anh Khoa Dam “Towards Smart Customer Knowledge Management Systems”, ICCCI 2021 conference, Springer, K. Wojtkiewicz et al. (Eds.): ICCCI 2021, CCIS 1463, pp. 1–14, 2021. https://doi.org/10.1007/978-3-030-88113-9\_18

[26] L. T. Hien, L. Tran Thi Ly, C. Pham-Nguyen, T. Le Dinh, H. Tiet Gia and L. N. Hoai Nam, "Towards Chatbot-based Interactive What- and How-Question Answering Systems: the Adobot Approach," 2020 RIVF International Conference on Computing and Communication Technologies (RIVF), 2020, pp. 1-3, doi: 10.1109/RIVF48685.2020.9140742.

[27] T. Le Dinh, T. T. Pham Thi, C. Pham-Nguyen and H. N. Le Nguyen, "A knowledge-based model for context-aware smart service systems", Journal of Information and Telecommunication, 2021, DOI: 10.1080/24751839.2021.1962105

[28] Vu, T. M. H., & Tchounikine, P. (2020). Supporting teacher scripting with an ontological model of task-technique content knowledge. Computers & Education, 163, 104098. https://doi.org/10.1016/j.compedu.2020.104098

### 3. Declarations

**3.1 Will the proposed research be taking place outside of the lab or normal business environment?**

No

If yes, please complete the following section to indicate what (if any) impact there may be on the environment.

a. Main characteristics of the location (i.e. physical description and coordinates)

b. Principal activity(ies): for each activity, list the environmental elements affected

c. Are authorizations, permits, or licenses required to undertake any activity during the internship?

Yes\_\_\_ No\_\_\_ If yes, please list

Please note: Mitacs may request a copy of the report to ensure compliance.

**3.2**  **a.** **Does the proposed research involve living human participants whose data, or responses to interventions, stimuli, or questions by the researcher, are relevant to answering the research question?**

No

**b. Does the proposed research involve human biological materials, human embryos, fetuses, fetal tissue, reproductive materials, or stem cells\*\*?**

No

\*\* This applies to materials derived from living and deceased individuals.

If yes to either of the two questions above, the proposal must be approved by the participating academic institution’s Research Ethics Board\*, and a valid Ethics approval is required for the duration of the research project. Access to funding may be denied for projects that do not have Ethics approval.

Please note: Mitacs may request a copy of the report to ensure compliance.

**3.3 Does the proposed research involve animal subjects?**

**N**o

If yes, the proposal must be approved by the participating institution’s Animal Care Committee\*, and a valid approval from the committee is required for the duration of the research project.

Please note: Mitacs may request a copy of the report to ensure compliance.

**3.4 Does the proposed research involve the use of biohazards?**

No

If yes, the necessary review/report must be conducted in accordance with your academic institution’s policies\*, and a valid biohazards approval is required for the duration of the research project.

Please note: Mitacs may request a copy of the report to ensure compliance.

**3.5 Have any academic supervisors declared a Conflict of Interest (COI)\* as part of this application?**

No

If yes, please attach the appropriate documentation outlined in section 4.1.1

**3.6 Have any interns declared a Conflict of Interest (COI)\* as part of this application?**

No

If yes, please attach the signed conflict resolution letter.

*\* If you have any questions about the requirement for Research Ethics/Animal Care/Biohazards review or Conflict of Interest Policies at your institution, please contact your corresponding institution's research office.*

### 4. Participants

### If you are participating in Accelerate International, and your academic supervisor and/or partner organization is overseas, please complete Appendix B

**4.1. Lead academic supervisor in Canada:**

|  |  |
| --- | --- |
| Name: | Thang Le Dinh |
| Academic institution: | Université du Québec |
| Department: | Département [Marketing et systèmes](http://www.uqtr.ca/ecoledegestion) d'information |
| Address (at academic institution): | 351, boulevard des Forges, |
| City, province, postal code: | Trois-Rivières (Québec), G8Z 4M3 |
| Phone: | +1 819 376 5011, poste 3158 |
| Permanent email: | [thang.ledinh@uqtr.ca](mailto:thang.ledinh@uqtr.ca) |
| Alternative email: |  |
| Administrative or Departmental Assistant contact information  (if applicable): |  |

**4.1.1. Is the academic supervisor:**

1. An owner or a co-owner (including owning shares) of the partner organization: No
2. A relative of an owner or co-owner (including owning shares) or a relative of a participant in the day-to-day management of the partner organization: No
3. A current or former employee of and/or a participant in the day-to-day management of the partner organization: No
4. A relative of the intern and/or partner supervisors of the proposed project: No

**If yes** to any of the above, please provide a copy of your approved academic institution’s Conflict of Interest declaration, or other appropriate documentation such as a letter or email from your Dean, with your application. The documents must describe the nature of the conflict and the measures in place to manage the conflict. Generally, Mitacs will accept the mitigation measures put in place by your academic institution. However, when the conflict is considered significant, Mitacs may require that the academic institution appoint an independent administrator to hold the award and to be responsible for ensuring the best interests of the intern. In such cases, the independent administrator must be included as an applicant, and must submit a declaration that they will act in the best interests of the intern(s).

**For any additional academic co-supervisors in Canada, copy and paste Section 4.1. and 4.1.1 below:**

**4.2. Partner organization in Canada:**

|  |  |  |  |
| --- | --- | --- | --- |
| Legal name (REQUIRED): | Fédérations des caisses Desjardins du Québec | | |
| Operating name (if different): |  | | |
| Contact name: | Nathalie Neriec | | |
| position: | Leader de pratique – partenariats et rayonnement | | |
| Department: | Innovation, Partenariats et Développement de la pratique d’analytique avancée | | |
| Address: | 1101 rue Sainte Catherine O | | |
| City, Province, postal code: | Montréal, QC H3B 1H8 | | |
| Phone: | 514-817-000 | | |
| Email: | Nathalie.neriec@desjardins.com | | |
| Website: | www.desjardins.com | | |
| Partner size (number of employees): | 1000+ |  | |
| Legal status: | For Profit Canadian Private Corporation |  | |
| If Not-for-profit Canadian Corporation | Select NFP Type |  | |
| **NAICS Code** (First three digits)\*: | 522 | | |
| \* [Click here for a list of North American Industry Classification System codes.](https://www23.statcan.gc.ca/imdb/p3VD.pl?Function=getVD&TVD=1181553) | | | |
| Is this the **first time** the partner has collaborated with the academic institution? : | | Yes |  |

**For any additional partner organization in Canada copy and paste Section 4.2. below:**

Please note that the financial contribution of organizations with permanent establishments in Canada may be subject to any applicable Goods and Services Tax (GST), Harmonized Sales Tax (HST) and/or Quebec Sales Tax (QST) (collectively VAT).

**4.2.1 Invoicing Partner Contact**

Partner contributions must be received by Mitacs BEFORE any funds are awarded to the academic institution. **Costs can only be incurred after research approval of the proposal** and the **receipt** of the partner funds at Mitacs**.**

Please describe any applicable **invoicing requirements** (vendor setup, PO, etc.):

|  |  |
| --- | --- |
| Primary customer **billing** contact name: | Laurence Beaulieu |
| Primary customer **billing** phone number: | 514-386-8257 |
| Primary customer **billing** email address: | Laurence.beaulieu.3@umontreal.ca |
| Customer **accounts payable** email address: | christelle.molez@ivado.ca |
| Partner organization wishes to be invoiced by term, annually, or in one payment: | By term |
| Is there a PO required?: | No:X  Yes (please provide the PO number): |
| Other invoicing instructions:  (additional billing contact names, email addresses, etc.) | dany.plourde@ivado.ca |

**Invoicing Partner address**:

|  |  |
| --- | --- |
|  | Address same as filled in Section 4.2. |
|  | Address same as filled in Appendix B (Section 4.2) |
| X | If invoicing address different than Section 4.2 or Appendix B (Section 4.2), please fill out the following: |

|  |  |
| --- | --- |
| Legal name: | Université de Montréal - IVADO |
| Address: | 6666 rue Saint‐Urbain, 4e étage, suite 480 |
| City, country, postal code: | Montréal, QC, H2S 3H1 |

Have these funds been leveraged against other federal or provincial programs? No

**If yes,** please provide details:

**4.2.2 Partner funds at academic institution. *IF APPLICABLE***

To be completed only if partner funds were sent as an exception to the academic institution**. If no** please proceed to section 4.3.

1. Is there a **research agreement** in place with the academic institution that governs the use of these partner funds?

Yes\_\_ No\_\_\_

**If yes** please speak with your BD representative, fill out the *addendum to research agreement* document, and submit that document with your completed application.

**If no** pleasecomplete the following:

1. ORS/UILO or equivalent agrees to send these funds to Mitacs: Yes\_\_\_ No\_\_\_

**If yes**, please provide:

|  |  |
| --- | --- |
| Academic institution account number: |  |

1. The partner agrees by signing this application that the funds can be forwarded: Yes\_\_\_ No\_\_\_

**If yes**, please provide:

|  |  |
| --- | --- |
| Name of the consenting partner representative: |  |

1. **Invoicing academic institution contact** to receive Mitacs invoice:

|  |  |
| --- | --- |
| Name: |  |
| Department: |  |
| Email: |  |

1. Is the GST or HST, and QST (if applicable) to be included with invoice to academic institution? Yes\_\_\_ No\_\_\_

**If no**, tax(es) will be invoiced directly to the industry partner.

**4.3. Intern(s) identified:**

**4.3.1. Intern #1 information *\* MANDATORY \****

|  |  |  |  |
| --- | --- | --- | --- |
| Name: | Do Dung Vu | | |
| Full-time diploma or degree program during internship: (e.g. college, undergrad, Master’s, PhD, PDF, recent graduate) | PDF | | |
| Expected month/year of graduation: | 12 | | 2023 |
| If PDF, indicate month/year PhD received: | 01 | | 2022 |
| If recently graduated, indicate diploma/degree obtained: | PhD | | |
| If recently graduated, indicate month/year diploma or degree obtained | 01 | | 2022 |
| Academic institution during internship: | Université du Québec à Trois-Rivières | | |
| Department: | Département [Marketing et systèmes](http://www.uqtr.ca/ecoledegestion) d'information | | |
| Address at academic institution: | 351, boulevard des Forges, | | |
| City, province, postal code: | Trois-Rivières (Québec), G8Z 4M3 | | |
| Country: | Canada | | |
| Phone: | 514-813-6660 | | |
| Permanent phone or cell phone | 514-813-6660 | | |
| Permanent email: | vudodung85@gmail.com | | |
| Alternative email: | [jundsinfo@gmail.com](mailto:jundsinfo@gmail.com) | | |
| Citizenship: | **Canadian Permanent Resident** | If Foreign, please indicate citizenship: | |
| Gender: | **Male** |  | |
| *For internships with international travel only (please complete Appendix B in addition to the full application):* | | | |
| Will this intern conduct any internship units at a partner organization outside Canada? | No | | |
| OPTIONAL: If known, please indicate anticipated **travel** dates | Start Date: DD/MM/YYYY  End Date: DD/MM/YYYY | | |

**4.3.2. Conflict of interest. Is the intern:**

1. An owner or a co-owner (including owning shares) of the partner organization: No
2. A relative of an owner or co-owner (including owning shares) or a relative of a participant in the day-to-day management of the partner organization: No
3. A current or former employee of and/or a participant in the day-to-day management of the partner organization:

No

1. A relative of the academic and/or partner supervisors of the proposed project: No

**If yes** to any of the above, please [click here](https://www.mitacs.ca/sites/default/files/resources/COI_Template_Intern_2019.docx) to complete the **Conflict of Interest Declaration** and send it to [accelerate@mitacs.ca](mailto:accelerate@mitacs.ca) **BEFORE** submitting your application.

**4.3.3. Demographic information.**

The following data is collected for Mitacs to help report on key demographic information. This data is not shared with any of the participants (including academic supervisors) on the project.

**Please indicate (x):**

|  |  |  |
| --- | --- | --- |
| Do you identify as an Indigenous person based upon your cultural and/or ancestral background? | | |
| Yes ( ) | No (x ) | Prefer not to answer ( ) |
| Do you identify as belonging to a visible minority group (other than an Indigenous one)? | | |
| Yes ( ) | No (x ) | Prefer not to answer ( ) |
| Do you identify as a person with a disability? | | |
| Yes ( ) | No ( x ) | Prefer not to answer ( ) |
| Do you identify as francophone? | | |
| Yes ( ) | No ( x ) | Prefer not to answer ( ) |
| Are you the first in your family to attend college or university? | | |
| Yes ( ) | No (x ) | Prefer not to answer ( ) |

**For any additional interns copy and paste Section 4.3. below:**

**4.4. Intern(s) to be determined (TBD):**

**4.4.1. Intern #1 information *\* MANDATORY \****

|  |  |  |  |
| --- | --- | --- | --- |
| Name: | Hang My Thi Vu | | |
| Full-time diploma or degree program during internship:  (e.g. college, undergrad, Master’s, PhD, PDF, recent graduate) | PDF | | |
| Expected month/year of graduation: | 08 | | 2023 |
|  |  | |  |
| If recently graduated, indicate diploma/degree obtained: | PhD | | |
| If recently graduated, indicate month/year diploma or degree obtained | 12 | | 2021 |
| Academic institution during internship: | Université du Québec à Trois-Rivières | | |
| Department: | Département [Marketing et systèmes](http://www.uqtr.ca/ecoledegestion) d'information | | |
| Address at academic institution: | 351, boulevard des Forges, | | |
| City, province, postal code: | Trois-Rivières (Québec), G8Z 4M3 | | |
| Country: | Canada | | |
| Phone: |  | | |
| Permanent phone or cell phone | (+84) 98683680 | | |
| Permanent email: | vtmhang@fit.hcmus.edu.vn | | |
| Alternative email: |  | | |
| Citizenship: | **Foreign** | If Foreign, please indicate citizenship: Vietnam | |
| Gender: | **Female** |  | |
| *For internships with international travel only (please complete Appendix B in addition to the full application):* | | | |
| Will this intern conduct any internship units at a partner organization outside Canada? | No | | |
| OPTIONAL: If known, please indicate anticipated **travel** dates | Start Date: DD/MM/YYYY  End Date: DD/MM/YYYY | | |

**4.4.2. Conflict of interest. Is the intern:**

1. An owner or a co-owner (including owning shares) of the partner organization: No
2. A relative of an owner or co-owner (including owning shares) or a relative of a participant in the day-to-day management of the partner organization: No
3. A current or former employee of and/or a participant in the day-to-day management of the partner organization: No
4. A relative of the academic and/or partner supervisors of the proposed project: No

**If yes** to any of the above, please [click here](https://www.mitacs.ca/sites/default/files/resources/COI_Template_Intern_2019.docx) to complete the **Conflict of Interest Declaration** and send it to [accelerate@mitacs.ca](mailto:accelerate@mitacs.ca) **BEFORE** submitting your application.

**4.4.3. Demographic information.**

The following data is collected for Mitacs to help report on key demographic information. This data is not shared with any of the participants (including academic supervisors) on the project.

**Please indicate (x):**

|  |  |  |
| --- | --- | --- |
| Do you identify as an Indigenous person based upon your cultural and/or ancestral background? | | |
| Yes ( ) | No (x ) | Prefer not to answer ( ) |
| Do you identify as belonging to a visible minority group (other than an Indigenous one)? | | |
| Yes ( ) | No (x ) | Prefer not to answer ( ) |
| Do you identify as a person with a disability? | | |
| Yes ( ) | No ( x ) | Prefer not to answer ( ) |
| Do you identify as francophone? | | |
| Yes ( ) | No ( x ) | Prefer not to answer ( ) |
| Are you the first in your family to attend college or university? | | |
| Yes ( ) | No (x ) | Prefer not to answer ( ) |

### 5. Budget and Invoicing

All Accelerate projects are required to include a complete Accelerate Budget and the invoicing schedule on the Excel Budget spreadsheet template must be confirmed. Please refer to the [**Accelerate Guide: Writing your proposal**](https://www.mitacs.ca/sites/default/files/uploads/page/guide_to_writing_your_proposal_2019.pdf) for assistance.

### 6. Suggested Reviewers

* 1. **Reviewer’s comments.** Please select ONE of the following:

\_\_ We consent to receive reviewer’s comments in either official language (French or English).

\_\_ We request to only receive reviewer’s comments in the language in which this proposal is submitted.

* 1. Please provide the names and contact information of at least **SIX (6)** **arms-length** reviewers.

An arms-length reviewer must:

* Be a recognized expert in the research topics and technical aspects covered by the proposal;
* NOT be from the same academic institution as the intern(s) or the academic supervisor(s); and
* NOT have had any collaboration with the intern(s) or the academic supervisor(s) or the partner(s) during the past five (5) years or planned for the near future.

Please note that suggested reviewers who qualify as arms-length are required for the review of your application.

**Reviewer 1:**

|  |  |
| --- | --- |
| Name: | Nizar Bouguila |
| Academic institution: | Concordia University, Canada |
| Department: | Concordia Institute for Information Systems Engineering |
| Email: | nizar.bouguila@concordia.ca |

**Reviewer 2:**

|  |  |
| --- | --- |
| Name: | Stéphane Gagnon |
| Academic institution: | Université du Québec en Outaouais, Canada |
| Department: | Département des sciences administratives |
| Email: | stephane.gagnon@uqo.ca |

**Reviewer 3:**

|  |  |
| --- | --- |
| Name: | Hamid Nach |
| Academic institution: | Université du Québec à Rimouski, Canada |
| Department: | Secteur disciplinaire des sciences de la gestion |
| Email: | hamid\_nach@uqar.ca |

**Reviewer 4:**

|  |  |
| --- | --- |
| Name: | Elaine Mosconi |
| Academic institution: | Université de Sherbrooke, Canada |
| Department: | École de gestion |
| Email: | Elaine.Mosconi@USherbrooke.ca |

**Reviewer 5:**

|  |  |
| --- | --- |
| Name: | Luc Duong |
| Academic institution: | L'École de technologie supérieure, Canada |
| Department: | Software and IT engineering |
| Email: | [luc.duong@etsmtl.ca](mailto:luc.duong@etsmtl.ca) |

**Reviewer 6:**

|  |  |
| --- | --- |
| Name: | Won-Yong Shin |
| Academic institution: | Dankook University, Korea |
| Department: | Computer Science and Engineering |
| Email: | wyshin@dankook.ac.kr |

**Potential conflict of interest. *\*OPTIONAL\****

Please list reviewers you would prefer Mitacs not to contact.

|  |  |
| --- | --- |
| Name: |  |
| Academic institution / Research Group: |  |

|  |  |
| --- | --- |
| Name: |  |
| Academic institution / Research Group: |  |

### 7. Mitacs Accelerate Memorandum

The participants listed below confirm that the information presented accurately reflects their intention to apply to the Mitacs Accelerate program. The participants have also agreed to set in place an internship based upon the attached proposal. The participants acknowledge that they have read, understood and agreed to abide by and uphold the Project Responsibilities applicable to each of them, available for reference at <http://www.mitacs.ca/en/programs/accelerate/project-responsibilities> which include and are not limited to the following: It is understood that the partner organization contribution shall be provided to Mitacs Inc. in Canadian dollars prior to commencement of the internship; in the event that the sponsor organization funds are at the academic institution, the academic institution shall forward these funds to Mitacs. Upon research approval and the receipt of the partner funds at Mitacs, Mitacs shall forward the funds to the Canadian academic institution as a research grant to the Canadian supervising professor, and the internship stipend/salary will be paid to the student by the academic institution from the grant. Costs associated with this proposal as outlined in the budget can only be incurred after research approval of the proposal and the receipt of the partner funds at Mitacs.

Mitacs is unable to assume liability for any losses including—but not limited to—accidents, illness, travel, or other losses that may occur during the internship period. All undersigned parties agree that they are responsible for ensuring that they have appropriate insurance and meet any institutional policies regarding health, safety, and travel preparation requirements. All parties also agree that the intern will provide Mitacs with a final report and that all participants will complete an exit survey within one month of project completion.

*For projects involving international travel:* In acknowledging that international exposure can greatly enhance an intern’s learning and experience, Mitacs will approve international travel provided that participation does not impact the safety and security of the intern and meets the policies outlined by the home academic institution. By signing this memorandum, you are acknowledging that the home academic institution agrees to assist the intern in meeting all academic institution requirements pertaining to research abroad and that the intern understands that he/she is responsible for obtaining insurance appropriate for the travel destination. Participants in projects involving international travel acknowledge that additional project responsibilities apply to each of them, available for reference at [https://www.mitacs.ca/en/programs/accelerate/mitacs-accelerate-international](https://www.mitacs.ca/en/programs/accelerate/mitacs-accelerate-international" \t "_blank). Participants in projects involving international travel also acknowledge that the internship cannot begin and funds cannot be released until Mitacs receives the signed International Pre-Departure Form and Code of Conduct and Ethics forms.

All parties involved with Mitacs Accelerate are bound by the standard intellectual property (IP) terms of the academic institution where the intern is enrolled; except where intellectual property is covered by separate agreements to which the academic institution(s) and the sponsor organization are parties and that are active during the dates of the internship. By signing this memorandum, if you have separate agreements covering IP between you and the academic institution, you are acknowledging that you are bound by their specific terms and conditions. Otherwise, if you don’t have separate agreements, you are bound by the standard intellectual property terms of the academic institution, and by signing this memorandum you agree to the terms of the academic institution where the intern is enrolled. Institution-specific IP policies regarding Accelerate internships can be found at https://www.mitacs.ca/en/programs/accelerate/faq.

The participants also agree that Mitacs will post the title of the project, the public project overview, the name of the partner(s) organization(s), the name of the intern(s), the name of supervisor(s) and the involved academic institution on [www.mitacs.ca/en/projects](http://www.mitacs.ca/en/projects) and may be used by Mitacs to publicize Mitacs Accelerate. Mitacs Privacy Policy can be found at [www.mitacs.ca/en/privacy-policy.](https://www.mitacs.ca/node/20705)

Internship participants (intern, supervising professor, and partner) further agree to the following addendum(s):

Mitacs does not require, inspect, or enforce any additional terms as outlined by participants in the above addendum.

**7.1. Title of the Project:**

**Dialogue Systems as a Smart Banking Conversational Service**

**7.2. Public Project Overview:**

Using simplified language understandable to a layperson, provide a general, one-paragraph description of the proposed research project to be undertaken by the intern(s) as well as the expected benefit to the partner organization. **(100-150 words)**

Nowadays, the banking sector has undergone a massive transformation of its services from e-banking to smart banking that implements modern technologies to provide a more innovative experience for customers. This project addresses the challenge of providing dialogue systems as a smart banking conversational service in order to improve customer experience and satisfaction. The purpose of this research is to propose a novel framework by which a dialogue system can adapt and learn to choose an optimal and personalized dialogue strategy based on customer knowledge and interactive experience with human users. The proposed service receives the user’s questions, analyzes the requirements using machine learning algorithms and artificial intelligence techniques, and make a personalized appropriate response that may include the answer, hint, process, or recommended product and service to satisfy user needs.

### 7.3. Participant Signatures:

### Please sign, scan, and save in PDF format. Typed signatures will not be accepted.

**7.3.1.1 Intern:**

|  |  |  |
| --- | --- | --- |
| Name: | Dung Do Vu | |
| Department: | Département [Marketing et systèmes](http://www.uqtr.ca/ecoledegestion) d'information | |
| Academic institution: | Université du Québec à Trois-Rivières | |
|  | *For interns participating in international travel:* The intern acknowledges that additional [Project Responsibilities](https://www.mitacs.ca/en/programs/accelerate/mitacs-accelerate-international) found at [www.mitacs.ca/en/programs/accelerate/mitacs-accelerate-international](http://www.mitacs.ca/en/programs/accelerate/mitacs-accelerate-international) apply to Accelerate International travel (as outlined in the Memorandum above) and agrees to abide by these additional program rules. The intern also acknowledges that they are aware of and agree to any IP agreements related to this project. | |
|  | *For interns participating in the Indigenous Pathways program:*  [] The intern self-identifies as an Indigenous person. | |
| Signature: |  | Date: |

**7.3.1.2 Intern:**

|  |  |  |
| --- | --- | --- |
| Name: | Hang My Thi Vu | |
| Department: | Département [Marketing et systèmes](http://www.uqtr.ca/ecoledegestion) d'information | |
| Academic institution: | Université du Québec à Trois-Rivières | |
|  | *For interns participating in international travel:* The intern acknowledges that additional [Project Responsibilities](https://www.mitacs.ca/en/programs/accelerate/mitacs-accelerate-international) found at [www.mitacs.ca/en/programs/accelerate/mitacs-accelerate-international](http://www.mitacs.ca/en/programs/accelerate/mitacs-accelerate-international) apply to Accelerate International travel (as outlined in the Memorandum above) and agrees to abide by these additional program rules. The intern also acknowledges that they are aware of and agree to any IP agreements related to this project. | |
|  | *For interns participating in the Indigenous Pathways program:*  [] The intern self-identifies as an Indigenous person. | |
| Signature: |  | Date: |

**7.3.2. Academic supervisor in Canada:**

|  |  |  |
| --- | --- | --- |
| Name: | Thang Le Dinh | |
| Department: | Département [Marketing et systèmes](http://www.uqtr.ca/ecoledegestion) d'information | |
| Academic institution: | Université du Québec à Trois-Rivières | |
| Signature: |  | Date: |

**7.3.3. Academic supervisor abroad (if applicable):**

|  |  |  |
| --- | --- | --- |
| Name: |  | |
| Department: |  | |
| Academic institution: |  | |
| Signature: |  | Date: |

**7.3.4. Partner organization in Canada (if applicable):**

|  |  |  |
| --- | --- | --- |
| Name: | Wissem Maazoun | |
| Department: | Innovation, Partenariats et Développement de la pratique d’analytique avancée | |
| Title/position: | Directeur | |
| Organization: | Fédérations des caisses Desjardins du Québec | |
| Total financial commitment: | 90000$ | |
|  | The partner organization commits to the funding contribution specified directly above and the payment schedules outlined in the attached *Accelerate Budget and Invoicing* schedule. These are key conditions of the application and by signing this proposal below, the partner organization agrees to these conditions. Please note that the financial contribution of organizations with permanent establishments in Canada may be subject to any applicable Goods and Services Tax (GST), Harmonized Sales Tax (HST) and/or Quebec Sales Tax (QST) (collectively VAT). | |
|  | *For partner organizations participating in the Indigenous Pathways program, check any that apply:*  [] The partner organization is a for-profit organization with self-identifying Indigenous persons who hold 50% or greater ownership shares  [] The partner organization is a not-for-profit organization with board membership consisting of 50% or greater self-identifying Indigenous persons  [] The partner organization is a not-for-profit organization whose core mandate includes Indigenous community impact or serving indigenous communities | |
| Signature: |  | Date: |

**7.3.5. Partner organization abroad (if applicable):**

|  |  |  |
| --- | --- | --- |
| Name: |  | |
| Department: |  | |
| Title/position: |  | |
| Organization: |  | |
| Financial commitment: | $ | |
|  | The partner organization commits to the funding contribution specified directly above and the payment schedules outlined in the attached *Accelerate Budget and Invoicing* schedule. These are key conditions of the application and by signing this proposal below, the partner organization agrees to these conditions. Please note that the financial contribution of organizations may be subject to applicable taxes. | |
| Signature: |  | Date: |

**7.3.6. Office of Research Services Representative or equivalent:**

|  |  |  |
| --- | --- | --- |
| Name: |  | |
| Title/position: |  | |
| Academic institution: |  | |
| Signature: |  | Date: |

**For any additional participants include corresponding details and signature line below:**

### Appendix A – Accelerate Intern Consent Form

**USE AND DISCLOSURE OF PERSONAL INFORMATION PROVIDED TO MITACS**

1. All personal information collected is subject to privacy legislation and Mitacs Privacy Policy for Program Participants. For a description of Mitacs’s commitment to protecting the personal information provided by program applicants, please see <http://www.mitacs.ca/en/privacy-policy>.
2. All the information supplied in this application will be made available to Mitacs staff responsible for managing the application, for activities including identifying appropriate peer reviewers, administering, and monitoring awards, compiling statistics, and evaluating the program.
3. Information supplied in this application will be made available to internal and/or external reviewers, being composed of experts recruited from the academic, public, and private sectors. All reviewers are required to commit to keep the application information confidential.
4. Contact information in this application may be used by Mitacs staff to contact you in future for:
   1. Invitations to be profiled in stories or news items, to speak at or attend events, to provide a spotlight story and/or blog post;
   2. Communications about opportunities for Mitacs alumni; and
   3. Research surveys for Mitacs alumni.

You will have the opportunity to unsubscribe from emails sent to you, once all commitments regarding the internship that is the subject of this application are complete.

1. Your name, academic institution and department, and the title of your project may be provided to the federal, provincial, and academic institution funders of the Accelerate program, to:
   1. Enable Mitacs to report on funding contract commitments; and
   2. Allow the funders to evaluate the program.

Additional information, such as passport numbers and dates of birth, may be provided to the international funders of the program (if applicable), for adjudication and reporting purposes.

1. Your name, contact information, and other personal information as required may be provided to the academic institution(s) participating in the internship to enable the academic institution(s) to manage the award, to sign off on the pre-departure form (if applicable), and for reporting purposes.

I, the undersigned, do hereby give CONSENT to the use and disclosure of the information contained in my application for the purposes described above.

Dung Do Vu

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Intern name Signature Date

**USE AND DISCLOSURE OF PERSONAL INFORMATION PROVIDED TO MITACS**

1. All personal information collected is subject to privacy legislation and Mitacs Privacy Policy for Program Participants. For a description of Mitacs’s commitment to protecting the personal information provided by program applicants, please see <http://www.mitacs.ca/en/privacy-policy>.
2. All the information supplied in this application will be made available to Mitacs staff responsible for managing the application, for activities including identifying appropriate peer reviewers, administering, and monitoring awards, compiling statistics, and evaluating the program.
3. Information supplied in this application will be made available to internal and/or external reviewers, being composed of experts recruited from the academic, public, and private sectors. All reviewers are required to commit to keep the application information confidential.
4. Contact information in this application may be used by Mitacs staff to contact you in future for:
   1. Invitations to be profiled in stories or news items, to speak at or attend events, to provide a spotlight story and/or blog post;
   2. Communications about opportunities for Mitacs alumni; and
   3. Research surveys for Mitacs alumni.

You will have the opportunity to unsubscribe from emails sent to you, once all commitments regarding the internship that is the subject of this application are complete.

1. Your name, academic institution and department, and the title of your project may be provided to the federal, provincial, and academic institution funders of the Accelerate program, to:
   1. Enable Mitacs to report on funding contract commitments; and
   2. Allow the funders to evaluate the program.

Additional information, such as passport numbers and dates of birth, may be provided to the international funders of the program (if applicable), for adjudication and reporting purposes.

1. Your name, contact information, and other personal information as required may be provided to the academic institution(s) participating in the internship to enable the academic institution(s) to manage the award, to sign off on the pre-departure form (if applicable), and for reporting purposes.

I, the undersigned, do hereby give CONSENT to the use and disclosure of the information contained in my application for the purposes described above.

Hang Vu Thi My

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Intern name Signature Date

### Appendix B – Accelerate International

***If internship involves international travel, please complete the following:***

**B 1. Partner interaction (continued from section 2.5g)**

|  |  |
| --- | --- |
| Interaction % on-site at partner location in Canada | \_\_75\_\_ % |
| Interaction % on-site at partner location abroad | \_\_\_\_\_ % |
| Interaction % at academic institution in Canada | \_\_25\_\_ % |
| Interaction % at academic institution abroad | \_\_\_\_\_ % |
| TOTAL (must equal 100%) | 100% |

% of partner interaction: 75 % **+** % of academic interaction: 25 % = 100%

**B 1.1 Do any interns expect to spend more than twelve (12) consecutive months outside of their home country?** No

If yes, Mitacs may request additional information.

**B 2. Does this project create new international collaborations?** N/A

If no, please briefly describe nature of the existing international collaboration. Include a summary of the collaboration, duration of the collaboration, and any past exchange of personnel, etc.

**B.3. IP ownership**

Any intellectual property (IP) generated from an Accelerate International project is bound by the policies of the academic institution where the student/PDF is registered, whether in Canada or abroad, unless a separate intellectual property agreement has previously been successfully negotiated between the academic institution, the industry partner, and (if applicable) the student/PDF. Mitacs makes no claim to intellectual property.

**Do the academic institution(s), partner organization(s) and/or intern (if applicable) have a separate IP agreement(s) that will be active during the dates of the internship?**

**Yes\_\_\_ No\_x\_\_ In development \_\_\_\_**

Provide an outline of the terms of any existing or planned IP agreement(s) below. A copy of the signed IP agreement must also be provided to Mitacs before a funding decision will be made about the project. Also ensure that the benefit from the project for Canada is clearly described in Section 2.6.

**B 4. Additional participant information:**

**B 4.1 Academic supervisor abroad (if applicable):**

|  |  |
| --- | --- |
| Name: |  |
| Academic institution: |  |
| Department: |  |
| Address (at academic institution): |  |
| City, country: |  |
| Postal code: |  |
| Phone: |  |
| Permanent email: |  |
| Alternative email: |  |

**B 4.1.1 Is the academic supervisor:**

1. An owner or a co-owner (including owning shares) of the partner organization: Yes\_\_\_ No\_X\_\_
2. A relative of an owner or co-owner (including owning shares) or a relative of a participant in the day-to-day management of the partner organization: Yes\_\_\_ No\_X\_\_
3. An employee of and/or a participant in the day-to-day management of the partner organization: Yes\_\_\_ No\_X\_\_
4. A relative of the intern and/or partner supervisors of the proposed project: Yes\_\_\_ No\_X\_\_

**If yes** to any of the above, please provide a copy of your approved academic institution’s Conflict of Interest declaration, or other appropriate documentation such as a letter or email from your Dean, with your application. The documents must describe the nature of the conflict and the measures in place to manage the conflict. Generally, Mitacs will accept the mitigation measures put in place by your academic institution. However, when the conflict is considered significant, Mitacs may require that the academic institution appoint an independent administrator to hold the award and to be responsible for ensuring the best interests of the intern. In such cases, the independent administrator must be included as an applicant, and must submit a declaration that they will act in the best interests of the intern(s).

**B 4.2 Partner organization abroad (if applicable):**

|  |  |  |  |
| --- | --- | --- | --- |
| Legal name: |  | | |
| Operating name (if different): |  | | |
| Contact name: |  | | |
| Position: |  | | |
| Department: |  | | |
| Address: |  | | |
| City, postal code: |  | | |
| Country: |  | | |
| Does the organization have a permanent establishment in Canada? | Select yes/no | | |
| Phone: |  | | |
| Email: |  | | |
| Website: |  | | |
| Partner size (number of employees): | Select No. employees |  | |
| Legal status: | Select Legal Status |  | |
| **NAICS Code** (First three digits)\*: |  | | |
| \* [Click here for a list of North American Industry Classification System codes.](https://www23.statcan.gc.ca/imdb/p3VD.pl?Function=getVD&TVD=1181553) | | | |
| Is this the **first time** the partner has collaborated with the academic institution? : | | Select yes/no |  |