PREDIS

Resource Guide

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Browse by

Services

Page 3

Organizations

Page 10

Use-Cases

Page 13

Services

AI Services 4

Computer-Based Training 4

Data Management 5

Data Storage 6

High-performance Computing 6

Open Data Repository 7

Software 7

Source Code Control 8

Statistical Services 8

Survey Platform 9

Web Hosting Services 9

AI Services

PREDIS

AI Services may include partnership on research projects, contract technical services, training for students and research staff, and other related technical advice.

https://www.predis.ca/contactez-nous

Consulting | AI Programming | Student Training | Specialized Computer Training

Institut intelligence et données (IID)

L'IID can offer advice to Quebec-based labs, researchers, and companies about the use and development of AI tools and processes.

https://iid.ulaval.ca/services/#Opportunites-pour-entreprises

Consulting | AI Programming | Specialized Computer Training | Grant Applications | General Project Involving AI

Computer-Based Training

PREDIS

PREDIS offers partnering and mentorship for graduate students to pursue AI-based projects, with design, programming, and hosting AI tools and approaches.

https://www.predis.ca/contactez-nous

Training | AI Programming | Student Training | Specialized Computer Training

Brio (Continuing Education)

Training includes specialized computer training, including programming at all levels, specialized topics, and computer environments specialized for specific workflows.

https://www.brioeducation.ca/en

Training | Student Training | Specialized Computer Training

Calcul Quebec (In french-language)

Calcul Quebec curates a list of classes and courses offered at Canadian Universities in french-language.

https://www.calculquebec.ca/services-aux-chercheurs/formation/

Training | AI Programming | Student Training | Specialized Computer Training

Digital Research Alliance of Canada (DRAC)

Digital Research Alliance of Canada curates a list of classes and courses offered at Canadian Universities.

https://explora.alliancecan.ca/

Training | AI Programming | Student Training | Specialized Computer Training

Computer-Based Training (continued)

IVADO

IVADO offers training and student support in AI and machine-learning topics.

https://ivado.ca/formation/

Training | AI Programming | Student Training | Specialized Computer Training

Institut intelligence et données (IID)

L'IID offers training in AI and machine-learning topics

https://iid.ulaval.ca/services/#liste

Training | AI Programming | Student Training | Specialized Computer Training

ULaval Library AI Training

AI Tools to help with Literature Review

https://www.bibl.ulaval.ca/services/soutien-a-lapprentissage/outils-dintelligence-artificielle-ia-en-recherche-documentaire

AI Training | AI Tools

Data Management

PREDIS

PREDIS offers advice about Data Management, including how to evaluate your needs, identifying partners or appropriate partners, and setting up custom workflows and automation for your specific needs.

https://www.predis.ca/contactez-nous

Data Management Planning | Training | Consulting | Student Training | Data Storage | Open Science Data Repositories

DMP Assistant

This is a web-based tool for describing a Data Management Plan. This is the tool the Tri-Agency Funders are promoting for DMP presentation.

https://dmp-pgd.ca/

Tools

OSF (Open Science Framework)

Tools for collaboration, data coordination, and publication of preprints

https://osf.io/

Data Management Planning | Training | Consulting | Data Storage

Data Management (continued)

ULaval Library Open Data Repository Advice

Université Laval has expert advice on choosing an Open Data Repository, including advantages and disadvantages of the major Canadian and international offerings.

https://www.bibl.ulaval.ca/services/soutien-a-ledition-savante-et-a-la-recherche/gestion-des-donnees-de-recherche

Data Management Planning | Training | Student Training | Specilaized Library Services | Data Storage | Open Science Data Repositories

Data Storage

Digital Research Alliance of Canada (DRAC)

Data storage services include bulk storage of research data, and advice about how to store research data reliably.

https://www.alliancecan.ca/fr/services

Data Storage

Calcul Quebec

Calcul Quebec curates a collection of specialized research software

https://www.calculquebec.ca//en/academic-research-services/infrastructures-services

Data Storage

ULaval Bureau du numérique en recherche

The BNR offers storage for research data for members of the Université Laval, at both free and paid tiers

https://valeria.science/accueil

Data Storage

High-Performance Computing

Digital Research Alliance of Canada (DRAC)

High-performance computing are computer environments which permit highly intensive or parallelizable computer processing beyond the scale of infrastructure that can be purchased or managed by an individual lab.

https://www.alliancecan.ca/en/services

AI Programming

High-Performance Computing (continued)

Calcul Quebec

High-performance computing are computer environments which permit highly intensive or parallelizable computer processing beyond the scale of infrastructure that can be purchased or managed by an individual lab, hosted by universities in Quebec

https://www.calculquebec.ca/services-aux-chercheurs/infrastructures-et-services/

AI Programming

Open Data Repository

Borealis (Dataverse)

Open data repositories are collections of scientific data which adhere to the FAIR principles of Findability, Accessibility, Interoperability, and Reusability.

https://borealisdata.ca/dataverse/laval

Consulting | Specilaized Library Services | Data Storage | Open Science Data Repositories

FRDR / DFDR

FRDR is a Canadian Open Data Repository

https://www.frdr-dfdr.ca/repo/?locale=en

Data Storage | Open Science Data Repositories

Lunaris

Lunaris is a Canadian index of Canadian Open Data Repositories

https://www.lunaris.ca/en

Data Storage | Open Science Data Repositories

Software

DRAC Research Software

These are curated and sometimes hosted software packages for specific research purposes

https://www.alliancecan.ca/en/services/research -software

Tools | Research Software

Software (continued)

Calcul Quebec Research Software

Calcul Quebec curates a collection of specialized research software.

https://docs.alliancecan.ca/wiki/Available_software

Tools | Research Software

Paradim

Paradim develops and supports tools for medical image synthesis and analysis.

https://paradim.science/

Tools | Research Software

Source Code Control

Gitlab

Source code control is a way to tracking changes over time of text files, often computer code and documentation.

https://git.valeria.science/

Data Storage | Open Science Data Repositories | Source Code Control

Statistical Services

CERVO Biostatistics

Statistical services include project-based consulting with trained statisticians, and training of students and research staff.

chantal.merette@psa.ulaval.ca

Consulting | Statistical Services

ULaval Library Statistics

Université Laval's Library offers statistical support and advice to students and faculty.

https://www.bibl.ulaval.ca/services/soutien-a-lapprentissage/soutien-a-lutilisation-doutils-numeriques-et-statistiques

Consulting | Statistical Services

Statistical Services (continued)

ULaval Statistics Service

Université Laval's Statistics program offers statistical support and advice to students and faculty.

https://scs.fsg.ulaval.ca/

Consulting | Statistical Services

Survey Platform

REDCap

REDCap is a survey platform hosted at ULaval for data collection. It is often used in clinical research.

https://redcap.valeria.science/

Data Storage | Research Software

Web Hosting Services

PREDIS

PREDIS can offer advice about web technologies and hosting options

https://www.predis.ca/contactez-nous

Consulting

ULaval Web Hosting

This is advice or capacity for hosting material on websites.

https://www.ulaval.ca/la-recherche/vice-rectorat-a-la-recherche-a-la-creation-et-a-linnovation/bureau-du-numerique-en-recherche

Data Storage | Web Hosting

Organizations

In alphabetical order

B
Bibliothèque de l'Université Laval 11
Biostatistics (CERVO) 11
Bureau du numérique en recherche (BNR) 11

C
Calcul Quebec 11
Canada Bioimaging 11
Canadian Institute for Health Information (CIHI) 11
Centre de recherche en données massives 11
Citadel 11

D
Digital Research Alliance of Canada (DRAC) 11

G
Genovalia 12

I
Institut intelligence et données (IID) 12
IVADO 12

M
Mila 12

P
Paradim 12
PREDIS 12

S
Scienta 12
Statistics (Université Laval) 12

B

Bibliothèque de l'Université Laval

https://www.bibl.ulaval.ca/

- University Laval Library

Université Laval

Biostatistics (CERVO)

chantal.merette@psa.ulaval.ca

- Clinical biostatistics services, affiliated with the CIUSSSCN.

Université Laval

Bureau du numérique en recherche (BNR)

https://www.ulaval.ca/la-recherche/vice-rectorat-a-la-recherche-a-la-creation-et-a-linnovation/bureau-du-numerique-en-recherche

- Université Laval Digital Research Support. This is the organization responsible for computer and computer-related support of research activity at the Université Laval.

Université Laval

Bureau du numérique en recherche (BNR)

https://valeria.science

- Université Laval scientific computing platform, offering a survey tool (REDCap), hosted version control (Gitlab), and high-performance computing.

Université Laval

C

Calcul Quebec

www.calculquebec.ca/en/

- The Quebec centres within the Digital Research Alliance of Canada

Quebec

Canada Bioimaging

https://www.canadabioimaging.org/

- National bioimaging collections and expertise

Canada

Canadian Institute for Health Information (CIHI)

https://www.cihi.ca/

- National organization for hospital health data

Canada

Centre de recherche en données massives

https://crdm.ulaval.ca/

- ULaval organization promoting big data, including training and software

Université Laval

Citadel

https://citadel-chum.com/

- Hospital data lake for the Centre hospitalier de l'Université de Montréal

Centre hospitalier de l'Université de Montréal (CHUM)

D

Digital Research Alliance of Canada (DRAC)

www.alliancecan.ca/en

- A national supercomputing platform available to all Canadian researchers. The "Alliance" is a coordinating body offering access to university-affiliated supercomputing datacentres across Canada, with a wide range of high-performance hardware, software, and expertise available for free.

Canada

G

Genovalia

https://genovalia.ulaval.ca/en/

- Centre de valorisation des données en génomique non-humaine offers expertise in data collection and analysis for genomic, proteomic, and other approaches to understanding organisms and their interactions. They have commercial, as well as academic research activities.

Université Laval

I

Institut intelligence et données (IID)

https://web.iid.ulaval.ca/en

- Université Laval-based data and AI/ML/DL expertise and training. They have commercial, as well as academic research activities.

Université Laval

IVADO

https://ivado.ca/

- Granting, training, and research on AI topics, based in Montréal.

Canada

M

Mila

https://mila.quebec/en

- Artificial Intelligence Research Centre in Montreal

Quebec

P

Paradim

https://paradim.science/

- Medical image annotation, reuse, and analysis platform based at the IUCPQ.

L'Institut universitaire de cardiologie et de pneumologie de Québec – Université Laval (IUCPQ)

PREDIS

https://www.predis.ca/

- PREDIS is a way to obtain expertise in Artificial Intelligence and data management through a consultation model, focused on services for academic researchers and their teams. PREDIS can deliver custom software, training, and consulting services on a grant-supported, non-profit model.

Université Laval

S

Scienta

https://www.scienta.ca/

- Hospital data lake for the Centre hospitalier de l'Université Laval

CHU de Québec-Université Laval

Statistics (Université Laval)

https://scs.fsg.ulaval.ca/

- Biostatistics services associated with the Université Laval.

Université Laval

Use-Cases

I need to store my data 14

I need to back up my data 15

I would like to publish my open data 16

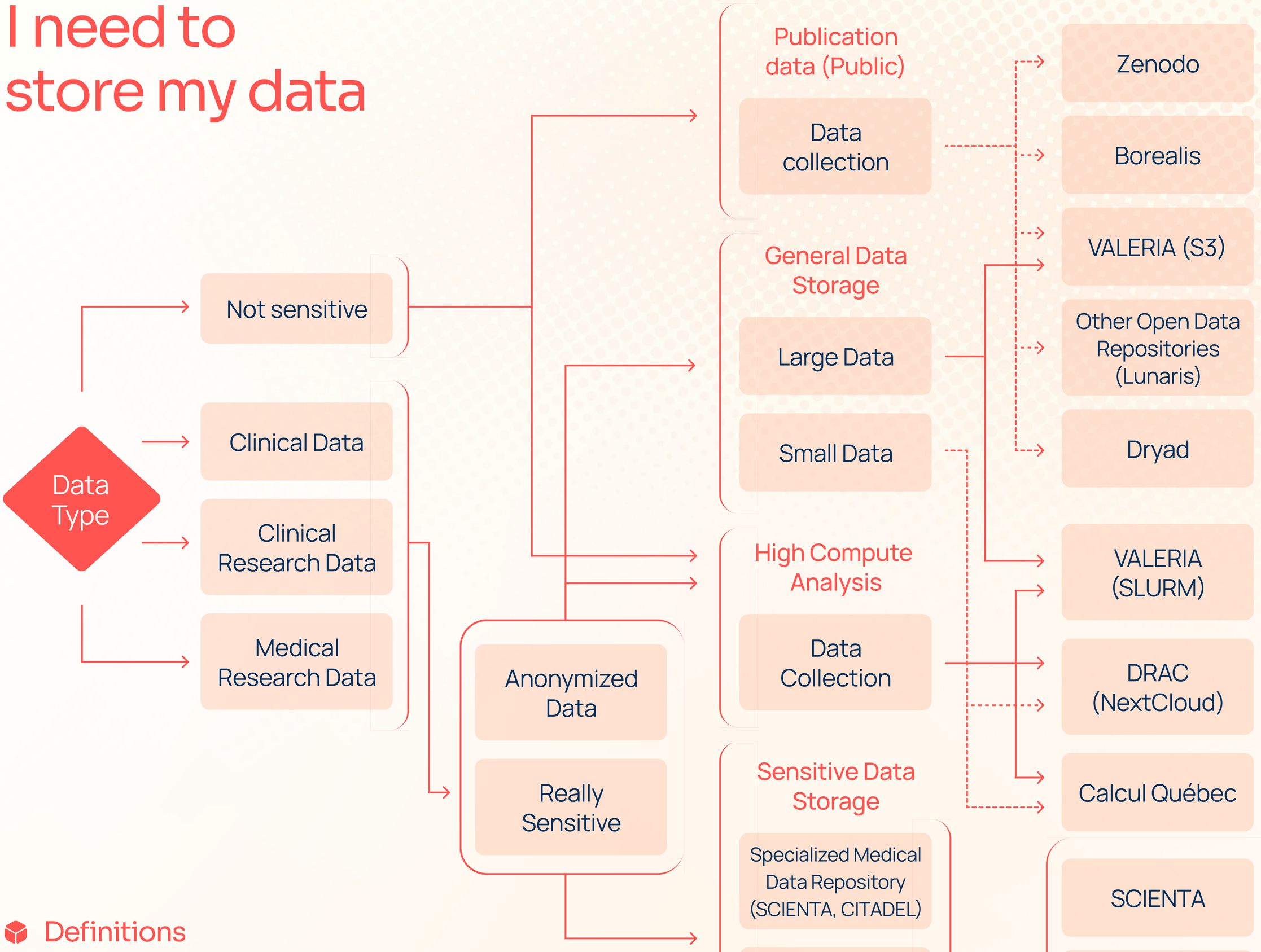
I need to transfer data between collaborators 17

Data Analysis with ML/DL 18

Getting Started with AI 20

Using CPU/GPU resources 22

I need to store my data



Definitions

Clinical data: data collected in the course of clinical care by medical professionals

Medical records: patient records of interactions with the healthcare system

Medical research data: data collected from patients in the course of medical research, which may or may not be identifiable and sensitive

Clinical research data: personal medical data collected in a clinical context for research purposes

High compute analysis: data that requires specialized computing resources for analysis

Anonymized data: data that has had individual identifiers removed, but could be subject to re-identification (remains sensitive)

Small data: data whose total volume is less than a few dozen gigabytes

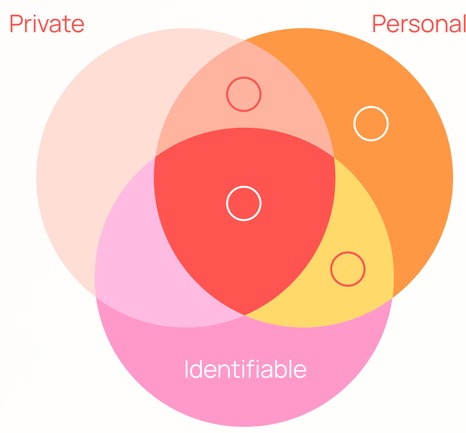
Large data: data whose volume is much larger, including multi-terabyte datasets or larger

Publication data: data for publication as Open Data, either as a supplement to a publication, or as a published dataset on its own

Specialized medical data repository: a repository of highly sensitive medical data, often a combination of clinical, research, and administrative data from the healthcare context

Data collection: Structured or semi-structured data ready to be analysed

Data Sensitivity



- **Personal only:** Favorite cheese
- **Personal and Private:** Anonymized Head CT
- **Personal and Identifiable:** Personal Name
- **Personal, Private, Identifiable:** Medical Chart

I need to back up my data

Ask yourself the following questions

- How much data do you have? (number of files, total size on disk)
- What is the rate of growth of your data?
- How sensitive is the data?
- How many people need access?
- How fast do you need to access a backup?

Follow the 3 - 2 - 1 Rule

- 3 Copies of data
- 2 Different media
- 1 Copy off-site

Be mindful of

- Some setup required
- Possible ongoing costs
- Requires monitoring
- Requires testing

Approaches

Local Only

Working Computer(s)
+
Bulk Storage (3)
(NAS, Hard Drives)
+
DVDs/Tape Offsite (3)

Online Only

Working Computer(s)
+
Cloud/Academic (1) (2)
+
Second Service/Tape

Local-Online Hybrid

Working Computer(s)
+
Bulk Storage (3)
(NAS, Hard Drives)
+
Cloud/Academic (1) (2)

Storage Types

1. **Cloud:** Microsoft (OneDrive), Google (Drive), Dropbox/Sync/etc, Amazon (S3)
2. **Academic Offers:** DRAC, Open Data Repos: Borealis, FRDR, Zenodo
3. **Local:** DVDs, Tape, Hard Drive (HDD/SSD), Network Attached Storage (NAS)

We offer consulting and training on these subjects. Contact us today: info@predis.ca

I would like to publish my open data

Ask yourself the following questions

How long do you have?

- Some repositories accept data automatically, and some are human-curated by volunteers

How big is the dataset?

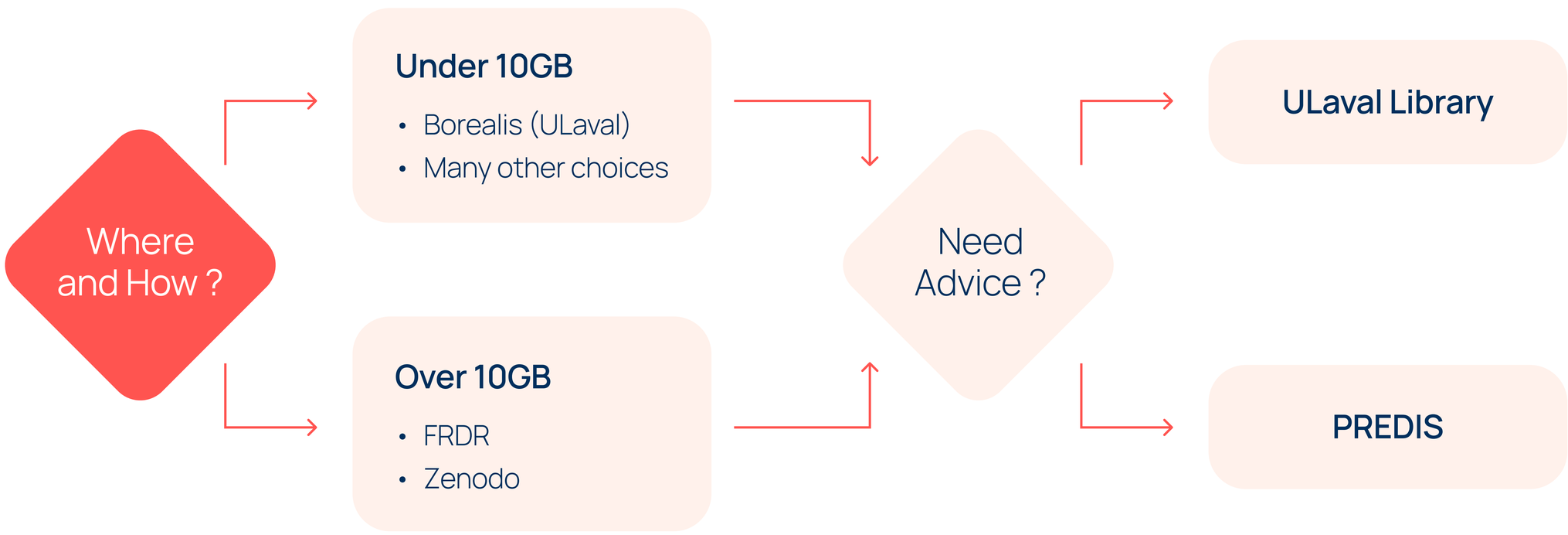
- There are size and number-of-files limits on most repositories
- Do you expect to add to the dataset over time?

Is the dataset sensitive?

- If there is personally-identifying information (PII), or personal health information (PHI), it restricts how you publish the data

Do you need an embargo?

Approach



We offer consulting and training on these subjects. Contact us today: info@predis.ca

I need to transfer data between collaborators

Ask yourself the following questions

- How much data do you have to transfer? (number of files, total size on disk)
- How sensitive is the data?
- How far away is the collaborator?

Approaches

Publish

- Create an Open Dataset
- Describe and Publish the data on an Open Data Repository (Borealis, FRDR, etc)

Send

- Ship physical media
- Email
- Globus
- Other file transfer (scp)

Shared Space

- Cloud storage
- Academic cloud (DRAC)
- Remote access

Large Data

- Partition data
- Resilient file transfer
  - Globus
  - rsync

We offer consulting and training on these subjects. Contact us today: info@predis.ca

Data Analysis with ML/DL

Situation

You have data such as images, signals, texts, or documents and want to use machine learning or deep learning to extract meaningful trends or develop a predictive model, but you don't know where to start or which resources to use at each step of the process.

Here are guidelines to properly define, prepare, and execute your machine learning project.

→ Define your research question within the ML/DL paradigm.

Translate your scientific question into a learning task: **classification, regression, segmentation, clustering, or generation**. Identify your outcome variable (what you are trying to model/predict), the type of label or its absence (the label is the expected value), and specify whether your task is supervised, self-supervised, or unsupervised. Also evaluate what has been done in the literature for your specific case.

Need help ?

- **IID:** https://iid.ulaval.ca/
- **PREDIS:** https://www.predis.ca/
- **Université Laval:** https://www.ulaval.ca/

→ Collect, organize, and store your data.

Organize your raw data (images, signals, texts, documents) into a reproducible folder structure. Apply appropriate anonymization measures and obtain necessary ethical approvals before storage. Choose a platform that meets your needs for storage volume, access, and regulatory requirements (HIPAA/GDPR, if applicable).

Need help ?

- **DRAC:** https://www.alliancecan.ca/en
- **Calcul Québec:** https://www.calculquebec.ca/en/
- **BNR:** https://www.ulaval.ca/en/research/office-of-the-vice-rector-research-and-innovation/the-office-of-digital-services-in-research

Next

Data Analysis with ML/DL (continued)

→ Prepare and process your dataset.

Clean, normalize, and transform your data into a format suitable for learning according to the task and data type. Split the data into training, validation, and test sets from the start and before any model-related decisions to avoid data leakage.

→ Select and design your model architecture.

Choose an architecture suited to your data type: convolutional neural networks (CNN) or Vision Transformers for images, recurrent neural networks (RNN) or Transformers for sequential signals, large language models (LLM) or BERT-like encoders for text. Prefer pre-trained models and fine-tuning when labeled data is scarce. Document all architectural choices and hyperparameters to ensure reproducibility. Beware of common pitfalls: overfitting, class imbalance, data leakage.

Need help ?

- **IID:** https://iid.ulaval.ca/
- **PREDIS:** https://www.predis.ca/

→ Train your model on appropriate computing infrastructure.

Transfer training to GPU-equipped infrastructure when your dataset or model becomes too large for a local machine.

See use case: Using CPU/GPU resources.

→ Evaluate, interpret, and validate your results.

Report metrics appropriate to your task (AUC-ROC, F1, Dice, MAE, etc.) only on the held-out test set. Use explainability tools (Grad-CAM, SHAP, attention maps) to verify the consistency of what the model has learned. Validate results against clinical or scientific ground truth.

Contact us today: **info@predis.ca**

Getting Started with AI

Situation

You have data, you have a question, or you're simply curious about what AI could bring to your research. This use case guides you through key steps — from defining your goals to finding the right collaborators and funding — so you can start with AI in a structured and productive way.

Learn more about AI — at your own pace

If you want to gain basic knowledge before starting a project, you can turn to resources such as online courses, workshops, and reading groups. Check with IID, PREDIS, or ULaval about upcoming training sessions for health researchers:

- https://iid.ulaval.ca/
- https://www.predis.ca/
- https://www.ulaval.ca/

Here are some guidelines:

→ Clearly define your starting point

Identify what you currently have: a dataset, a research question, a hypothesis, or simply an area of interest. You don't need everything to start. Even a general interest in AI ("I want to understand what AI could bring to my research") is a valid starting point.

Ask yourself the following questions:

- What problem am I trying to solve?
- What result would be useful to me?
- Do I need to automate a task to make my work easier?

→ Assess the feasibility of your idea

Before writing a grant application or committing resources, check if your project is ready to be implemented. A feasibility study covers four essential aspects:

1. Data availability and quality: Do you have sufficient and well-structured data? Are there access or consent issues?

2. Technical and IT requirements: Does your project require specialized infrastructure, storage, or computing resources (e.g., HPC, GPU)?

3. Ethical and regulatory considerations: Do you need to consider ethics committee approvals, data governance rules, or privacy regulations (e.g., Law 25)?

Next

Getting Started with AI (continued)

4. Team skills and capabilities: Does your team have the necessary expertise, or are there gaps to fill through collaboration or training?

IID and PREDIS can help you conduct this evaluation. Identifying obstacles early saves significant time and strengthens the foundation of any future funding request.

→ Explore collaboration opportunities

Many AI projects in health research benefit from forming interdisciplinary teams. Consider collaborating with ULaval professors who have complementary AI skills. A collaborator can enhance both the scientific rigor of your project and the credibility of a funding application.

→ Apply for a grant

If your project takes shape and you want to seek external funding, PREDIS can assist you in writing your grant application, whether by identifying relevant calls for proposals or strengthening the AI aspects of your proposal.

Contact us today: **info@predis.ca**

Using CPU/GPU resources

EXPERT

Situation

Someone has advanced computing resource needs because their workstation or laptop resources are insufficient. The Digital Research Alliance of Canada (DRAC), or the Alliance, offers a very generous resource for its members.

The Alliance

The Digital Research Alliance of Canada (formerly Compute Canada) provides Canadian researchers (and their students) with free access to high-performance computing infrastructure. All job submissions go through SLURM, a scheduler that determines when and where your job will run.

→ Access

- If you are a researcher, you need to become a member
  - https://docs.alliancecan.ca/wiki/Apply_for_a_CCDB_account/en
- If you work with a researcher, you need to become a member and be approved by that researcher (the sponsor).

→ Types of resources

The first step is to determine your needs:

- **CPU:** Your code is sequential or slightly parallel, uses data processing tools (pandas, R, etc.), runs bioinformatics tools, or lacks GPU-optimized libraries.
- **GPU:** You train deep learning models (PyTorch, TensorFlow, JAX), run CUDA-accelerated simulations, or perform large-scale matrix operations.

→ Launch the computing job

- The Alliance documentation is the best place to help you: https://docs.alliancecan.ca/wiki/Running_jobs/en
- Refer directly to the SLURM documentation if needed: https://slurm.schedmd.com/documentation.html

Next

Using CPU/GPU resources (continued)

→ Specifics

- You must request exactly the resources you need. Requesting too many lowers your priority (the chance of getting resources in the future).
- Never use the login node (front-end node) to run your jobs. Also, do not use VS Code on the front-end node. Use a compute node instead.
- Some compute nodes do not have internet access.

Summary

Identify a lack of computational resources

↓

Register with the Alliance

↓

Identify the necessary resources

↓

Launch the computation

If you have any questions during this process, please feel free to contact us at: info@predis.ca

PREDIS

About PREDIS

PREDIS - **P**lateforme de **RE**cherche, **D**onnées, **I**ntelligence et **S**anté is a platform of the Integrated University Health and Social Services Center (CIUSSS) of the Capitale-Nationale, affiliated with Laval University and recognized by Fonds de recherche du Québec.

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