Inserm

Roadmap

Understanding Artificial Intelligence

Pôle IA & Numérique

Roadmap

Understanding Artificial Intelligence

What is a learning roadmap?

A learning roadmap is a structured guide that outlines, step by step, the key stages to progressively understand a topic.

It helps answer three essential questions:
- What should I learn?
- In which order?
- What is the objective at each stage?

Each section provides a selection of resources in different formats and difficulty levels to support learning and understanding.

How to use this roadmap ?

This roadmap has been designed as a progressive learning path. It is recommended to follow the steps in order, in order to build solid foundations before moving to more advanced topics.

Who is it for ?

This roadmap is intended for anyone who wishes to better understand artificial intelligence, regardless of their initial level of knowledge.

It provides beginners with a clear and logical learning structure, while allowing more advanced readers to refresh or consolidate their understanding.

Comment ont été choisis les supports ?

The resources were selected to provide content that is reliable, accessible, and suitable for a wide range of profiles. Three formats were prioritised: online courses, video content, reference materials, including French and European institutional publications, as well as scientific articles (especially literature reviews and state-of-the-art papers).

The goal is to offer a flexible learning pathway adapted to different levels of knowledge, available time and learning preferences.

Each resource is labelled with a colour indicator:
- 🟢 Discovery / Accessible
- 🟠 Further exploration
- 🔴 For further reading

Roadmap
Understanding Artificial Intelligence

1. **Understanding what AI is**

- Clarify key concepts: distinguish AI from statistics, models from algorithms, and machine learning from deep learning
- Understand the main types of learning (supervised, unsupervised, reinforcement learning)

2. **Types of models**

- Understand the main categories of AI/ML models and their typical applications, especially in health and biomedical research

3. **Data**

- Understand why data quality is critical in AI projects and how health data can be prepared, structured and made usable for machine learning

4. **Building an AI project**

- Gain an overall understanding of the main steps involved in developing an AI model, from defining the problem to evaluation and deployment considerations

5. **Critical appraisal**

- Learn how to assess the quality of a dataset and the relevance of evaluation metrics
- Understand the gap between theoretical performance and real-world performance

6. **Key challenges and impacts**

- Understand the main scientific, clinical, ethical, and societal issues related to AI in health research

7. **Regulation**

- Become familiar with the main European regulatory frameworks related to AI and health data (GDPR, AI Act and the European Health Data Space)

Roadmap
Understanding Artificial Intelligence

1. **Understanding what AI is**

- Clarify key concepts: distinguish AI from statistics, models from algorithms, and machine learning from deep learning
- Understand the main types of learning (supervised, unsupervised, reinforcement learning)

🎓 Online courses

- Objectif IA : Initiez-vous à l'intelligence artificielle - Direction interministérielle du numérique - mentor.gouv.fr
- Initiez-vous au Machine Learning - OpenClassrooms
- Initiez-vous au Deep Learning - Groupe INSA - OpenClassrooms
- Introduction à l'intelligence artificielle (IA) - IBM - Coursera

▶ Videos

- C'est quoi l'intelligence artificielle ? Découvrir #1 - Inria - Médiation Scientifique
- Du machine learning et des données - Découvrir #2 - Inria - Médiation Scientifique
- TOUT COMPRENDRE À L'IA - Dossier #33 - L'Esprit Sorcier

📝 Documentation scientifique

- Cho H, She J, De Marchi D, El-Zaatari H, Barnes E, Kahkoska A, Kosorok M, Virkud A
  Machine Learning and Health Science Research: Tutorial
  J Med Internet Res 2024;26:e50890
  URL: https://www.jmir.org/2024/1/e50890
  DOI: 10.2196/50890

- Liebovitz D, Wu A, Reamer C, Vadasz B.
  Artificial Intelligence and Machine Learning in Health Care: Current Capabilities, Emerging Potential, and Future Directions
  URL: https://pubmed.ncbi.nlm.nih.gov/41622017/
  DOI: 10.1016/j.mcna.2025.07.011

Roadmap
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2.

Types of models

- Understand the main categories of AI/ML models and their typical applications, especially in health and biomedical research

Online courses
- Initiez-vous au Machine Learning - OpenClassrooms
- Initiez-vous au Deep Learning - Groupe INSA - OpenClassrooms
- Microsoft AI & ML Engineering Certificat Professionnel - Coursera
- AI Integration in Healthcare Patient Data - Illinois Tech - Coursera
- Cours du MYRIAD

Videos
- Tous les algorithmes de Machine Learning expliqués en 17 min - Infinite Codes

Documentation

- Tekkeşin Aİ. **Artificial Intelligence in Healthcare: Past, Present and Future.** Anatol J Cardiol. 2019;22(Suppl 2):8-9. doi:10.14744/AnatolJCardiol.2019.28661

- Mohammad Shehab, Laith Abualigah, Qusai Shambour, Muhannad A. Abu-Hashem, Mohd Khaled Yousef Shambour, Ahmed Izzat Alsalibi, Amir H. Gandomi, **Machine learning in medical applications: A review of state-of-the-art methods**, Computers in Biology and Medicine, https://doi.org/10.1016/j.compbiomed.2022.105458.

- Wang F, Preininger A. **AI in Health: State of the Art, Challenges, and Future Directions**. Yearb Med Inform. 2019;28(1):16-26. doi:10.1055/s-0039-1677908

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3. | **Data**

- Understand why data quality is critical in AI projects and how health data can be prepared, structured and made usable for machine learning

🎓 Online courses

- Initiez-vous au Machine Learning - OpenClassrooms
- Gouverner vos données pour réussir vos projets IA : méthodes et outils pour les PME - France Num

▶ Videos

- Comment les données sont-elles préparées pour l'apprentissage automatique ? - AltexSoft

📝 Documentation

- Stratégie intelligence artificielle et données de santé - Ministère de la Santé
- Guide sur la qualité des Bases de Données à visée de recherche en santé - F-CRIN
- Bernardi F, Alves D, Crepaldi N, Yamada D, Lima V, Rijo R, **Data Quality in Health Research: Integrative Literature Review,** J Med Internet Res 2023;25:e41446, URL: https://www.jmir.org/2023/1/e41446, DOI: 10.2196/41446

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4.   **Building an AI project**

- Gain an overall understanding of the main steps involved in developing an AI model, from defining the problem to evaluation and deployment considerations

Online courses

- Objectif IA : Initiez-vous à l'intelligence artificielle - mentor.gouv.fr
- Initiez-vous au Machine Learning - OpenClassrooms
- Conduire un projet IA dans votre entreprise : étapes clés et bonnes pratiques - France Num

Videos

- Objectif IA : Abordez les étapes d'un projet d'intelligence artificielle - institutmontaigne

Documentation

- Intelligence artificielle en santé : un guide pour une innovation responsable - Agence du numérique en Santé

Roadmap
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5.	**Critical appraisal**

- Learn how to assess the quality of a dataset and the relevance of evaluation metrics
- Understand the gap between theoretical performance and real-world performance

Online courses

- Optimisez votre apprentissage avec l'Intelligence Artificielle - OpenClassrooms
- Initiez-vous au Machine Learning - OpenClassrooms

Videos

- Validation croisée pour évaluer l'efficacité d'un modèle en machine learning | Cycle avancé IA #11 - EpiMed Open Course

Documentation

- Roosan, D. (2024). **Comprehensive guide and checklist for clinicians to evaluate artificial intelligence and machine learning methodological research.** Journal Of Medical Artificial Intelligence, 7. doi:10.21037/jmai-24-65

- Schwabe, D., Becker, K., Seyferth, M. et al. **The METRIC-framework for assessing data quality for trustworthy AI in medicine: a systematic review**. npj Digit. Med. 7, 203 (2024). https://doi.org/10.1038/s41746-024-01196-4

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6. | **Key challenges and impacts**

- Understand the main scientific, clinical, ethical, and societal issues related to AI in health research

🎓 Online courses

- Optimisez votre apprentissage avec l'Intelligence Artificielle - OpenClassrooms
- Introduction à l'intelligence artificielle (IA) – IBM - Coursera
- AI Integration in Healthcare Patient Data - Illinois Tech - Coursera

▶ Videos

- L'IA détruit-elle notre intelligence et notre liberté ? - En Société 14 décembre 2025
- Qui a peur de l'IA ? Se questionner #1 - Inria - Médiation Scientifique
- Les humains sont-ils bons pour la casse ? Se questionner #3 - Inria - Médiation Scientifique
- IA : data centers vs climat ? | Décryptage | ARTE
- Perdons-nous le contrôle sur l'IA ? | 42 - La réponse à presque tout | ARTE
- Madagascar : les petites mains de l'IA | ARTE Reportage
- L'intelligence artificielle, une course mondiale | Géopolitis

📝 Documentation

- Stratégie intelligence artificielle et données de santé - Ministère de la Santé
- Guide éthique pour l'IA en santé - Agence du numérique en Santé
- Recommandations de bonnes pratiques suite à l'analyse des questions éthiques soulevées par l'utilisation de l'Intelligence Artificielle dans la recherche à l'Inserm

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7.	Regulation

- Become familiar with the main European regulatory frameworks related to AI and health data (GDPR, AI Act and the European Health Data Space)

Online courses

- Réglementation IA : quelles mesures à implémenter pour un usage conforme et éthique des IA ? – France Num

Videos

- WEBINAIRE « AI ACT : 1h pour tout comprendre et pour agir ! » – IEEPI
- IA : quelles obligations RGPD et AI Act ? – Data Comply One

Documentation

- AI Act
- RGPD
- Le RGPD appliqué au secteur de la santé – CNIL
- IA et RGPD : la CNIL publie ses nouvelles recommandations pour accompagner une innovation responsable – CNIL
- Les fiches pratiques IA – CNIL
- European Health Data Space (EHDS) – Commission européenne
- EHDS in action – Commission européenne