

# V Jornadas FC

Conselho do Colégio de Especialidade  
de Farmácia Comunitária da Ordem dos  
Farmacêuticos

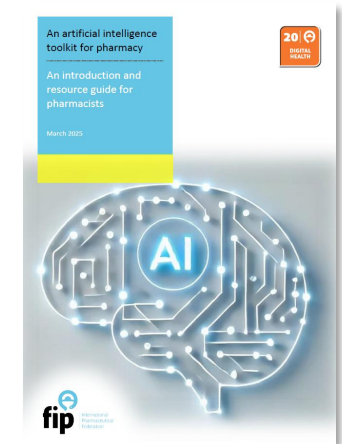
**31 de maio de 2025**

*Ordem dos Farmacêuticos, Lisboa*

# V JORNADAS FARMÁCIA COMUNITÁRIA

EXCELÊNCIA, INOVAÇÃO E LONGEVIDADE

1. Fundamentos de IA (O que é?)
2. Oportunidades (Em que pode ser útil?)
3. Checklist de implementação (Como usufruir dessa utilidade?)
4. Competências recomendadas (Como usufruir dessa utilidade?)



# How It Works

## The AI revolution

# Reaching the optimal solution

Gradient Descent  
(Minimizing the error)



Augustin-  
Louis Cauchy

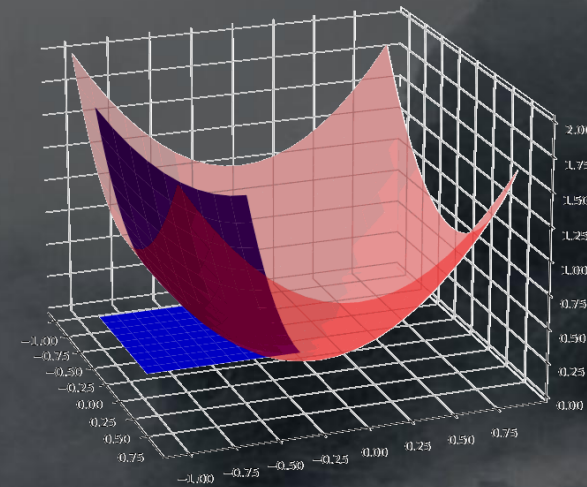


Jacques  
Hadamard



Haskell  
Curry

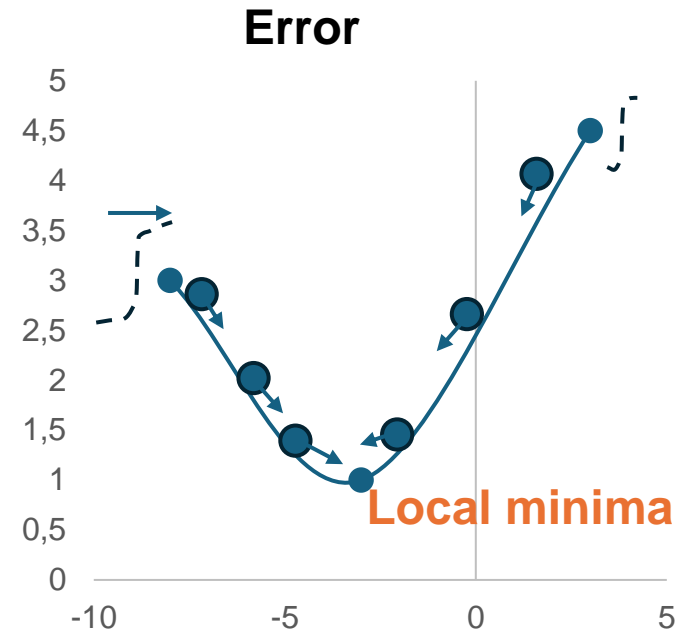
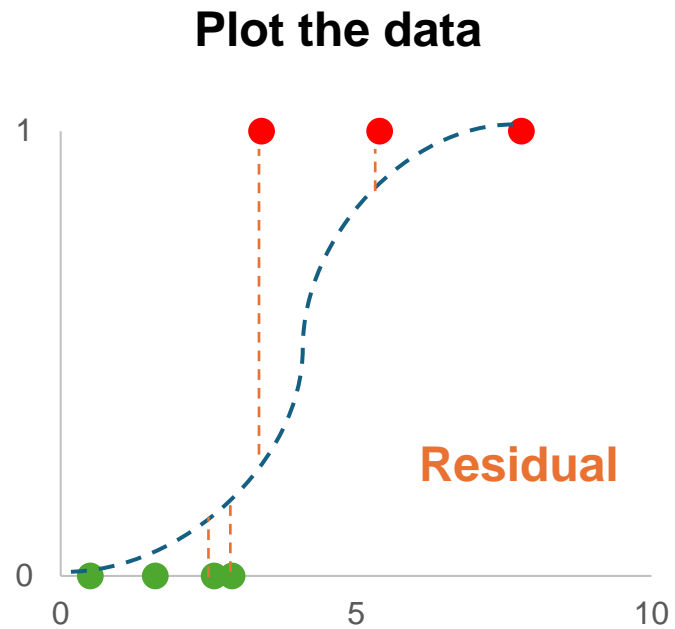
Gradient Descent  
(Augustin-Louis Cauchy)  
1847 - 1944



Adjusts the weights to find the values that minimize the loss function.

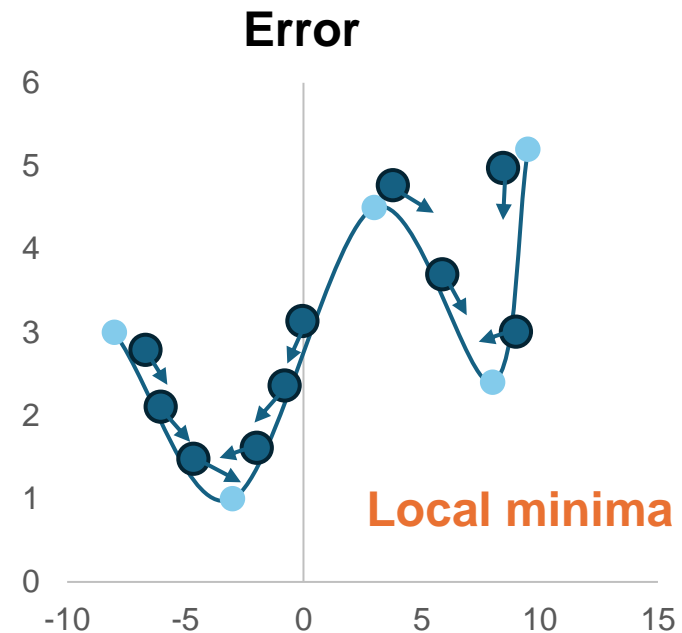
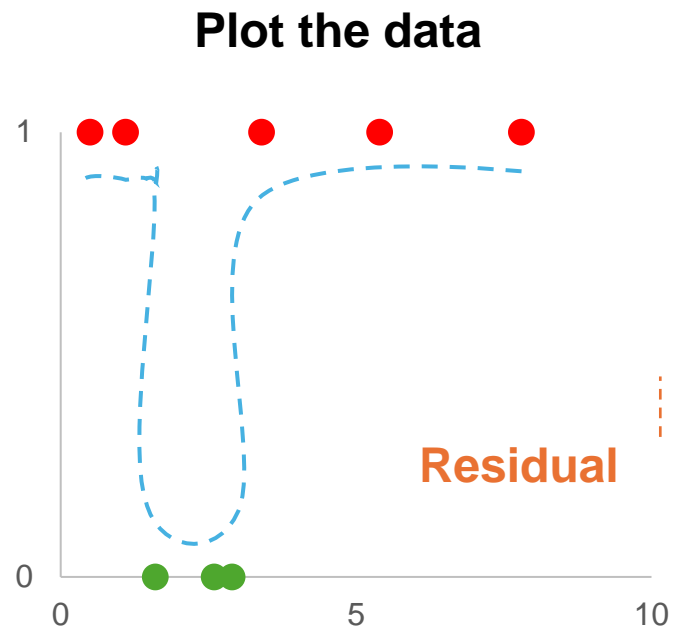
# Gradient Descent

| Value Protein X | Label Cancer |
|-----------------|--------------|
| 0,5             | 0            |
| 1,6             | 0            |
| 7,8             | 1            |
| 5,4             | 1            |
| 2,6             | 0            |
| 3,4             | 1            |
| 2,9             | 0            |

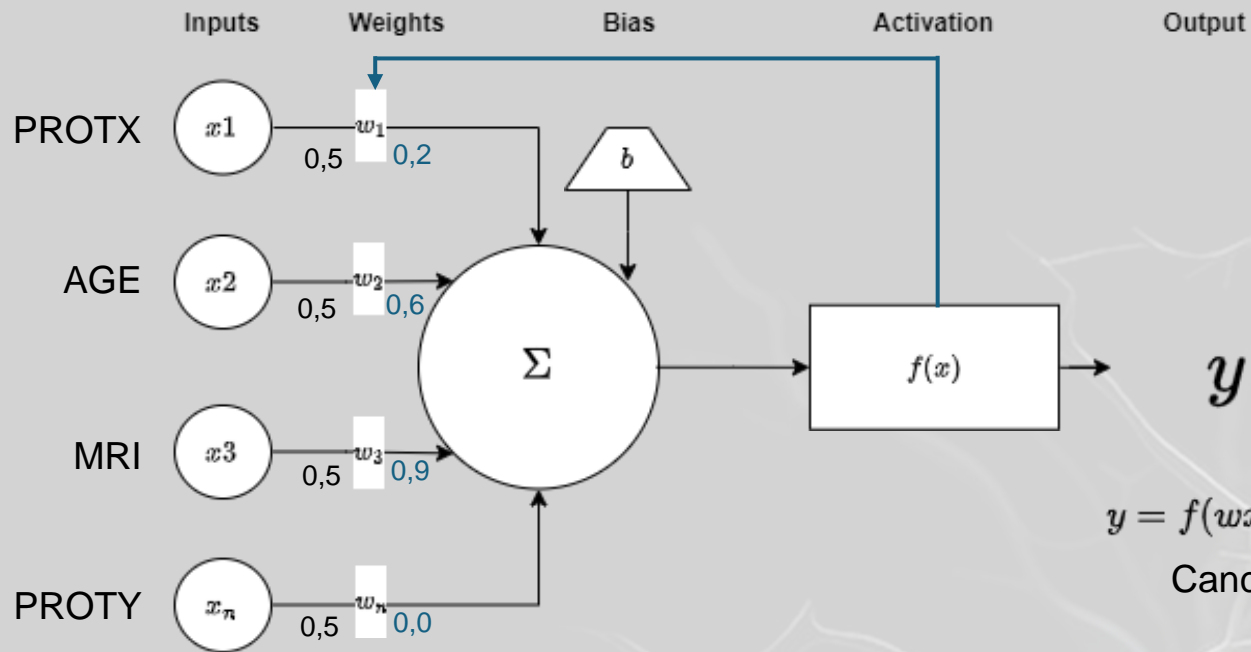


# Gradient Descent

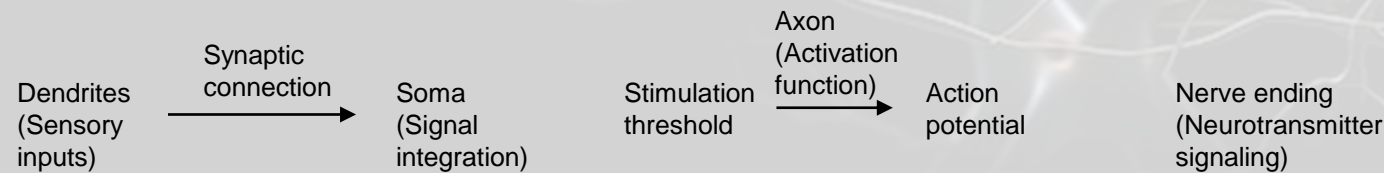
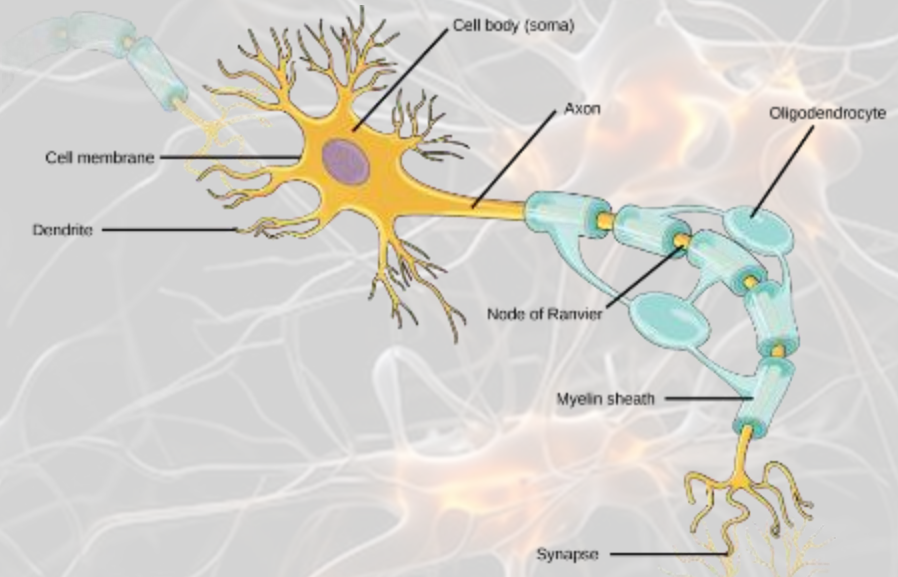
| Value Protein X | Label Cancer |
|-----------------|--------------|
| 0,5             | 1            |
| 1,6             | 0            |
| 7,8             | 1            |
| 5,4             | 1            |
| 2,6             | 0            |
| 3,4             | 1            |
| 2,9             | 0            |
| 1,1             | 1            |



# Artificial Neuron



$y = f(wx + b)$   
Cancer



# Artificial Neuron (Perceptron)

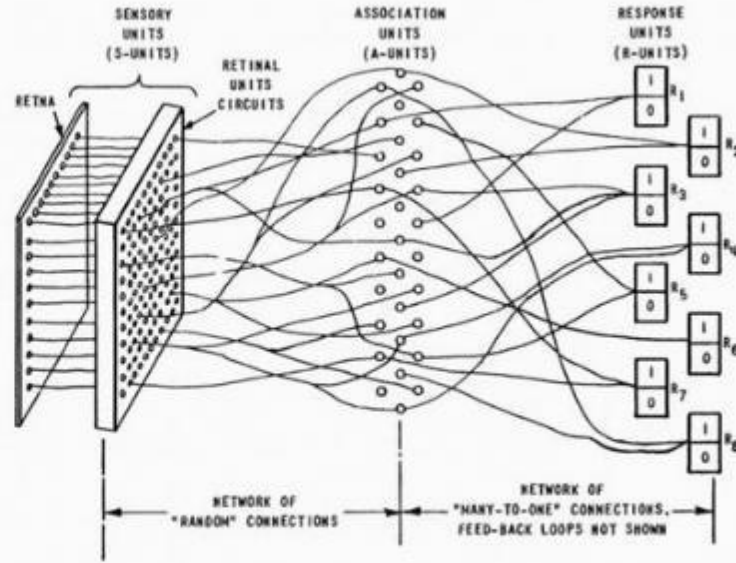
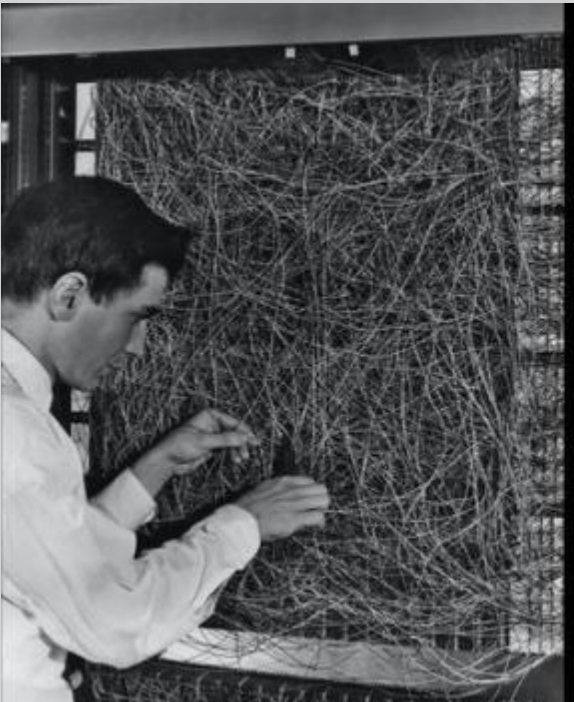
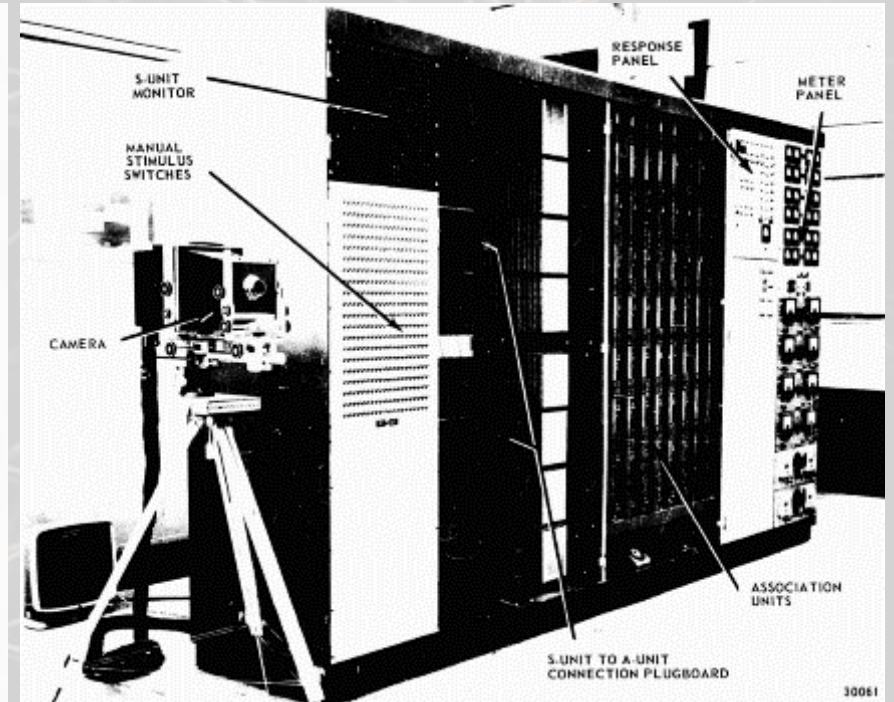
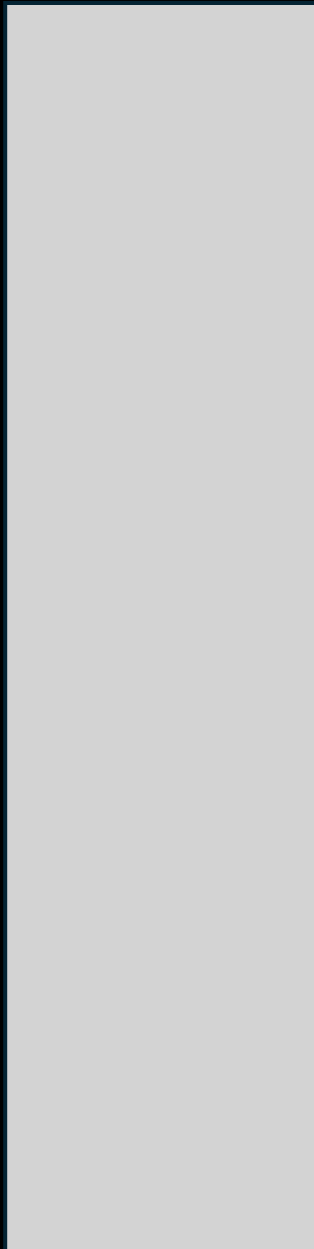


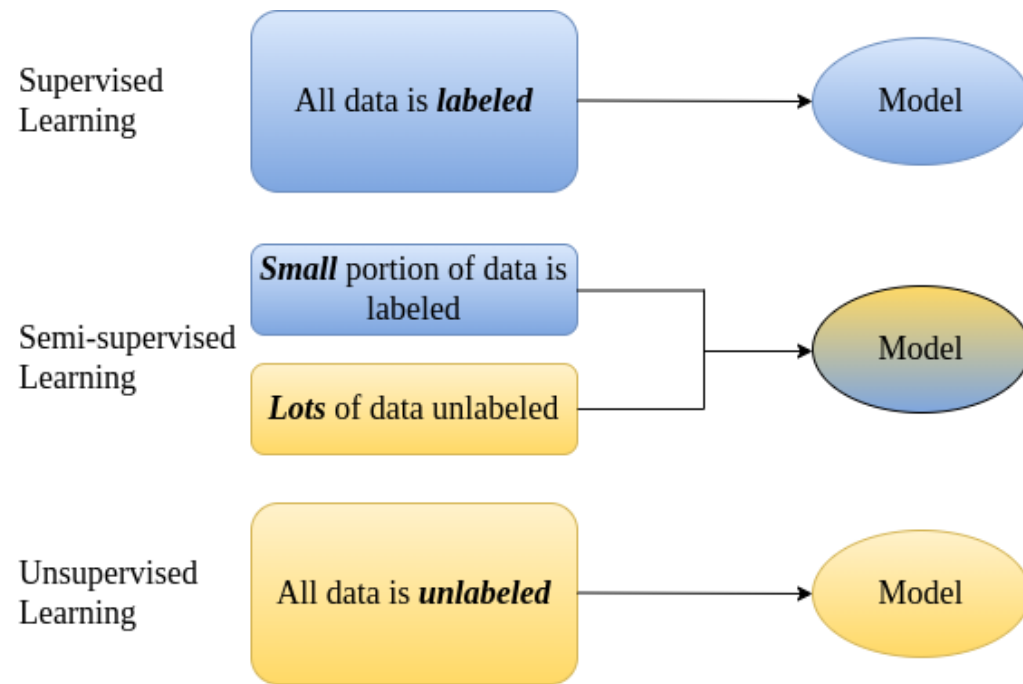
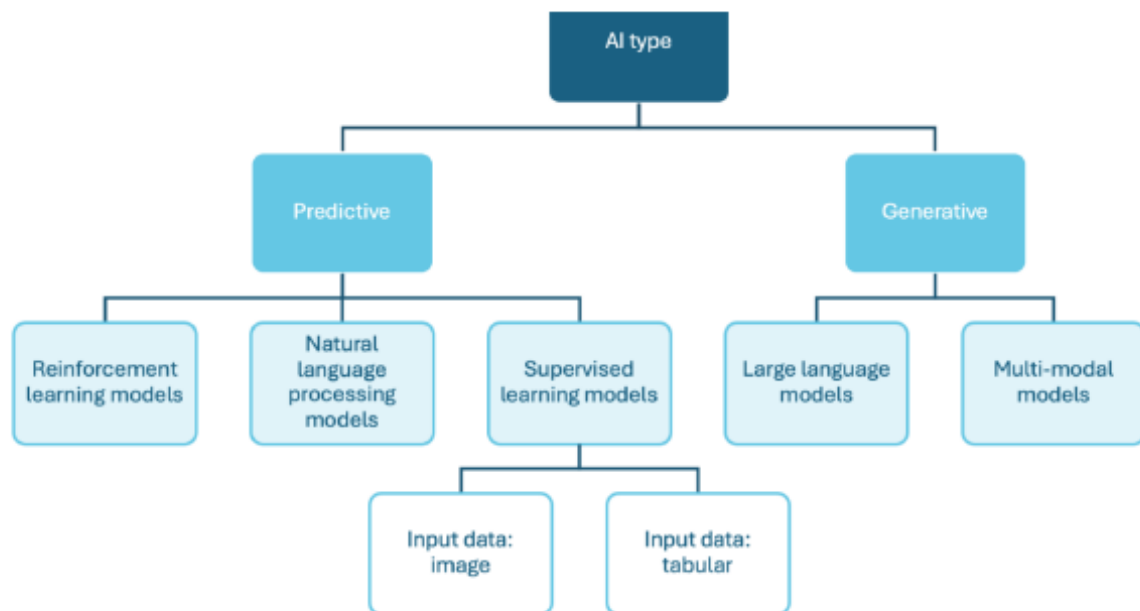
Figure 1 ORGANIZATION OF THE MARK I PERCEPTRON





## Fundamentos de IA (O que é?)

Figure 2: Deep learning models



## Saúde preventiva

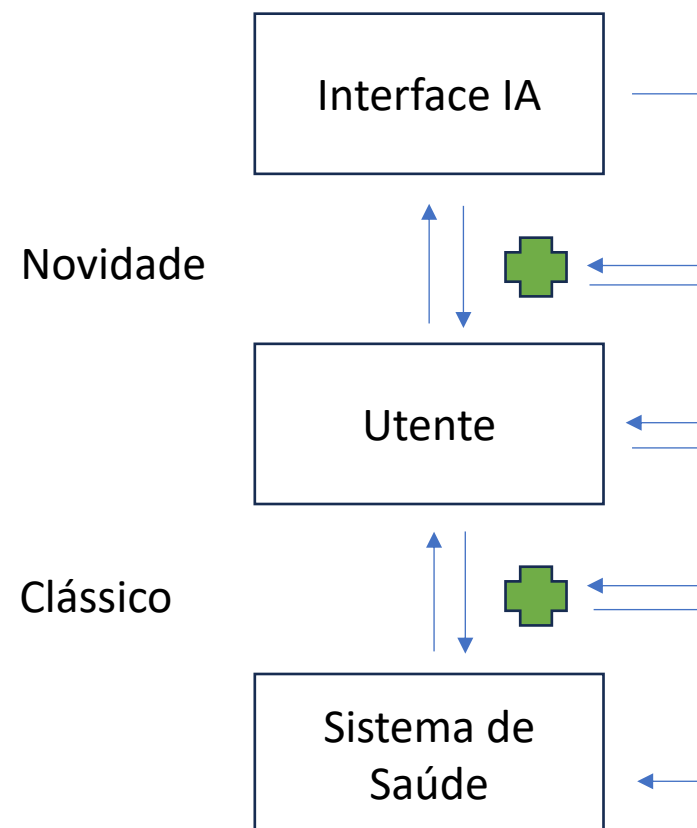
**Triagem digital de sintomas** para orientar auto-cuidados ou referência rápida.

**Modelos preditivos de risco** sinalizam não-adesão, polimedicação ou eventos adversos antes de acontecerem.

**Monitorização remota & wearables** alertas automáticos de PA, glicemia, queda, etc..

**Revisão terapêutica assistida por IA** prioriza utentes de alto risco para intervenção ou ajuste posológico.

**Chatbots 24/7** reforçam literacia em saúde e lembram a toma correta do medicamento ou ensinam uso de dispositivos.



### Comunicação e satisfação

**Mensagens bidirecionais inteligentes** lembretes de renovação, follow-ups pós-dispensa e inquéritos de satisfação.

**Assistentes vocais & chatbots** no site/app agendam vacinas, respondem a dúvidas e reduzem filas de espera.

**Conteúdos personalizados gerados por IA** folhetos em linguagem simples e adaptada, tradução instantânea multilingue.

**Segmentação de campanhas** IA analisa histórico de compras, cria e atualiza profiling para ofertas preventivas (ex.: suplemento na gripe).

**Relatórios clínicos automáticos** notas para o médico de família disponíveis em segundos após a intervenção.

Google DeepMind



## Automatização de tarefas

**Robôs de tarefas** com visão computacional – contagem, verificação, entrada de encomendas, limpeza, pagamento, assistência e redução de erros.

**Previsão de inventário em tempo real** – modelos de IA que evitam ruturas e minimizam desperdício por validade.

**Sistemas de apoio à decisão em bancada** – alertas instantâneos de interações, dose e alergias antes (ou depois) da entrega.

**Assistentes telefónicos baseados em IA** – filtram chamadas, validam identidade e marcam serviços.

**Automação de processos administrativos** – reconciliação de faturação, pedidos ao grossista e relatórios.

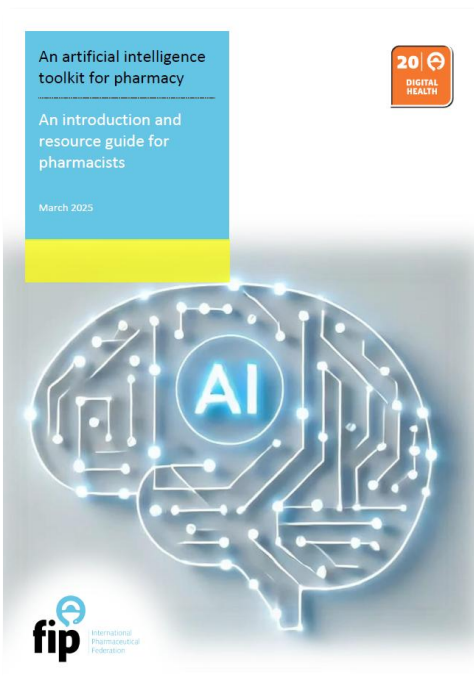
BostonDynamics



TESLA



## Checklist de implementação (Como usufruir dessa utilidade?)



1. Executive Summary – visão geral do impacto da IA na farmácia.
2. Prefácio – objectivos do toolkit e alinhamento com os FIP Development Goals.
3. Background – fundamentos de IA e avaliação de desempenho.
4. Ethical Considerations – princípios para uma IA confiável e responsável.
5. ISO Regulations & Compliance – privacidade, segurança e normas técnicas.
6. Common Barriers to Implementation – bias, drift, integração de sistemas.
7. Implementation Checklist – passos práticos para adoção segura.
8. Training & Competence Development – literacia digital para farmacêuticos.
9. Referências & Glossário – fontes e termos-chave.

### 7 Implementation checklist

As a summary to the information in the AI toolkit, the following checklist serves as a list of questions to help guide discussions when pursuing implementation of an AI tool or solution. It is not meant to serve as a comprehensive guide, but rather it should be used as a starting point. Each work environment or setting will have unique requirements that must be taken into consideration.

| Checklist                |   |
|--------------------------|---|
| Defining the use case    |   |
| <input type="checkbox"/> | What problem is the AI tool meant to solve?   |
| <input type="checkbox"/> | Can the problem be solved with a non-AI-enabled solution or tool?   |
| <input type="checkbox"/> | Have all the appropriate stakeholders been engaged, including both decision-makers and end users?   |
| <input type="checkbox"/> | How will this tool fit into the existing workflow or how will the workflow be adjusted based on the tool?   |
| Model selection          |   |
| <input type="checkbox"/> | Will the AI model be developed in-house or will a third-party vendor be used?   |
| <input type="checkbox"/> | If building the model in-house, does sufficient training data exist?  |
| <input type="checkbox"/> | If using a third-party foundation model, will it require fine-tuning (additional training) with local or domain-specific data?  |
| <input type="checkbox"/> | If using a third-party AI-powered product or software, does it need to be evaluated and approved as safe and effective by a regulatory body (e.g., FDA cleared software as a medical device)? If so, has it been?   |
| <input type="checkbox"/> | If using an existing model, how well does the model perform (see Table 3)? How does it compare with other models or existing benchmarks?  |
| Compliance               |   |
| <input type="checkbox"/> | Will the model have access to or utilise protected health information?  |
| <input type="checkbox"/> | Will using the model require data to be shared outside of the organisation? For example, does the model require using an Application Programming Interface (API) or is the data shared with a cloud server external to the organisation? If so, what limitations does this pose on what data can be included in the input of the model? |
| <input type="checkbox"/> | What compliance regulations must be followed (see section on Compliance and ISO regulation)?  |
| <input type="checkbox"/> | Can the model be deployed locally?  |
| Vendor selection         |   |
| <input type="checkbox"/> | If using a third-party vendor, do they provide a model card (as described in Table 2) or details about their training data and model performance (see metrics in Table 3)?  |
| <input type="checkbox"/> | How often does the vendor audit model performance or retrain their model?   |
| <input type="checkbox"/> | Does the vendor provide updated performance metrics after any model updates are deployed?   |
| Safety                   |   |
| <input type="checkbox"/> | Have the potential failure modes of the model been outlined? What will the mitigation strategies be?  |
| <input type="checkbox"/> | How will the model be audited on a continual basis?   |
| <input type="checkbox"/> | How often does the model need to be re-validated based on potential drift?  |
| <input type="checkbox"/> | Based on the model's training data, is the model less accurate for specific subpopulations? How will this be mitigated?   |

### Defining the use case

- What problem is the AI tool meant to solve?
- Can the problem be solved with a non-AI-enabled solution or tool?
- Have all the appropriate stakeholders been engaged, including both decision-makers and end users?
- How will this tool fit into the existing workflow or how will the workflow be adjusted based on the tool?

### Model selection

- Will the AI model be developed in-house or will a third-party vendor be used?
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- What compliance regulations must be followed (see section on Compliance and ISO regulation)?
- Can the model be deployed locally?

#### Vendor selection

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**Safety**

- Have the potential failure modes of the model been outlined? What will the mitigation strategies be?
- How will the model be audited on a continual basis?
- How often does the model need to be re-validated based on potential drift?
- Based on the model's training data, is the model less accurate for specific subpopulations? How will this be mitigated?

## Competências recomendadas (Como usufruir dessa utilidade?)

### Understanding of generative AI capabilities and limitations

- Pharmacists must comprehend what generative AI tools can and cannot do, including their scope, reliability, and the contexts in which they operate optimally. This knowledge ensures appropriate reliance on AI for decision-making, avoiding over trust that could lead to errors.

### Data literacy

- The ability to interpret and evaluate data output from AI tools is crucial. Pharmacists need to understand how to read, analyse, and make informed decisions based on the data generated by AI, which is essential for accurate patient care and medication management.

### Ethical and legal considerations of AI use

- Understanding the ethical implications and legal boundaries of using AI in pharmacy practice is paramount. This includes patient privacy concerns, data security, and the ethical use of AI in decision-making processes to ensure patient safety and compliance with regulations.

### Critical thinking and decision-making

- While AI can provide recommendations, the ultimate decision-making responsibility lies with the pharmacist. The ability to critically assess AI-generated advice, considering the unique contexts and needs of each patient, is essential for effective pharmacy practice.

### Communication skills

- Pharmacists must effectively communicate AI-generated information to patients and healthcare teams. This includes translating complex AI data into understandable advice and ensuring that AI-supported decisions are transparent and justifiable.

### Continuous learning and adaptability

- The field of AI is rapidly evolving; therefore, pharmacists need to commit to ongoing education and adaptation to new technologies. This continuous learning ensures that pharmacy practice remains at the cutting edge, using the most current AI tools to improve patient care.

### Collaborative skills for interdisciplinary teams

- Working with interdisciplinary teams, including IT professionals, data scientists, and other healthcare providers, is crucial for implementing and optimising AI tools in pharmacy practice. Effective collaboration ensures that AI implementations are well-coordinated and meet the diverse needs of healthcare delivery.

### Patient-centred care

- Pharmacists must ensure that AI tools are used in a way that prioritises patient needs and outcomes. This involves using AI to personalise medication management and support, enhancing the quality of care delivered to patients.

### Innovation and creativity

- Finally, as in all ecosystems that work with AI, pharmacists should cultivate an innovative mindset, seeking creative ways to apply AI in pharmacy practice. This includes developing new

## Papel do Farmacêutico na era da IA

1. **Recomendar** ferramentas de IA fiáveis aos utentes.
2. **Interpretar e explicar** resultados/alertas de IA em linguagem acessível.
3. **Validar** recomendações dos algoritmos com uma análise clínica robusta.
4. **Sinalizar riscos e facilitar a referenciação** para cuidados médicos adequados.

