Unraveling the “black-box” of artificial intelligence-based pathological analysis of liver cancer

1. Current advances of AI-based approaches for clinical management of liver cancer.
2. AI-based prognostication of liver cancer
3. Molecular profiling of liver cancer via AI
4. Exploring predictive indicators for therapy response
5. Current challenges limiting AI-based approaches in the management of liver cancer

(One paragraph highlighting the urgent need to explain the “black box” of deep learning)

1. Strategies for unraveling the “black-box” of AI-based
2. **Model-based explanation**
3. Support vector machine or random forests vs. deep learning
4. Supervised learning vs. weakly supervised learning vs. unsupervised learning
5. Textual explanation
6. Image captioning
7. Image captioning with visual explanation
8. Example-based explanation

a. Triplet network

b. Prototypes

1. **Post hoc explanation**
2. Visual explanation (saliency mapping, pathologist-in-the-loop)
3. Backpropagation-based approaches

Including class activation mapping (CAM) and gradient-weighted class activation mapping (Grad-CAM)

1. Perturbation-based approaches

Including Occlusion sensitivity map (OSM), local interpretable model-agnostic explannations (LIME)

1. Multiple instance learning-based approaches
2. Textual explanation

Testing with concept activation vectors (TCAV)

1. Example-based explanation
2. Influence functions

4. Conclusion and future applications.