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Our notes are a valuable asset to your PG Residency Surgery preparation. We have added images, diagrams, charts and tables to the well-organized, clear and concise study content, wherever required. The coloured notes give you much-needed relief during continuous reading.

The notes has been carefully reviewed by our video lecture faculty and has been curated to provide you a helping hand during your **PG Residency Surgery Preparation**

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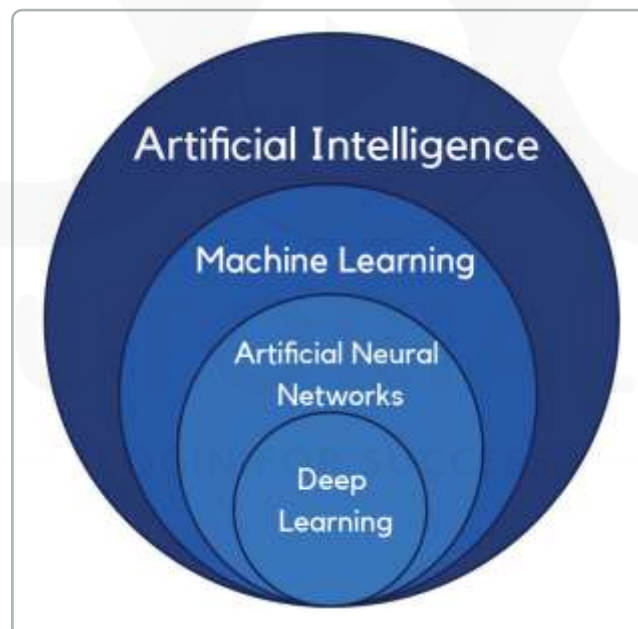
Happy Learning!



### EUROPEAN COMMISSION DEFINITION:

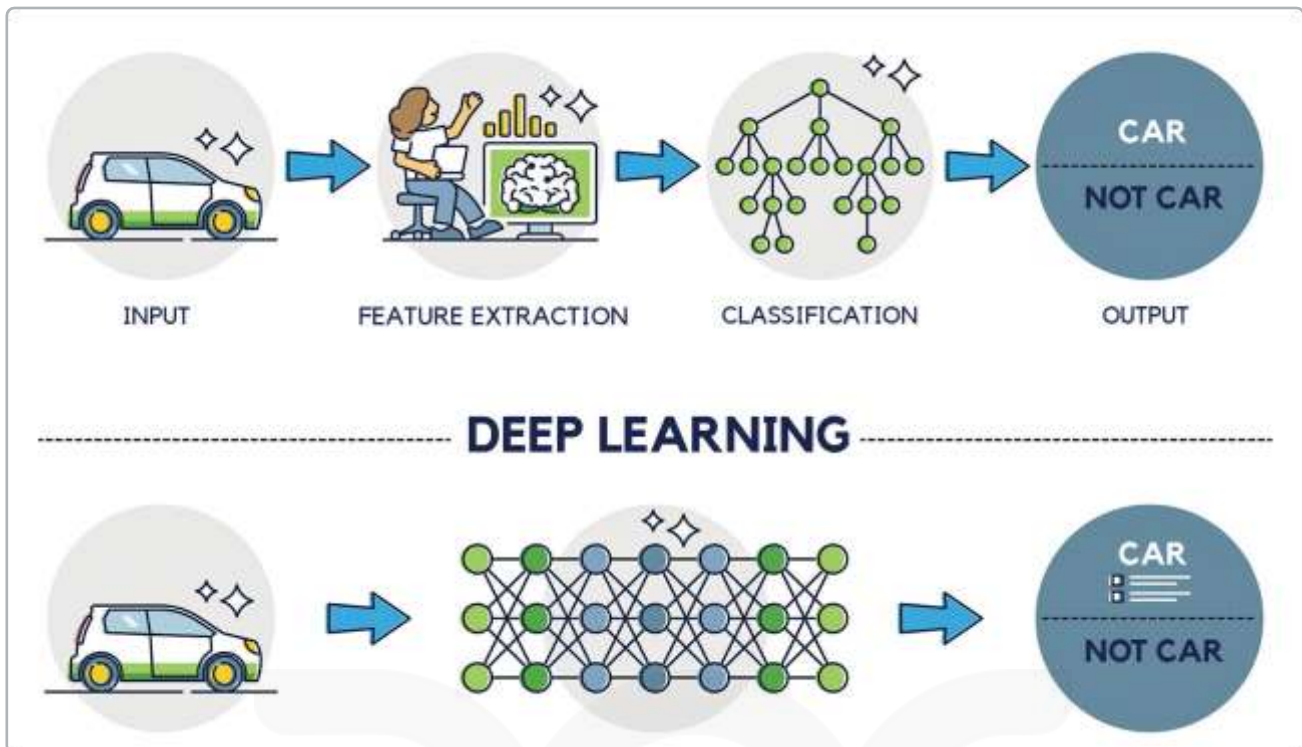
- AI refers to systems that display intelligent behaviour by analysing their environment and taking actions—with some degree of autonomy—to achieve specific goals.
- General meaning: Simulation of human intelligence in machines programmed to think and act like humans.
- Core abilities:
  - Learning
  - Problem-solving
  - Decision-making
  - Perception
  - Data analysis
  - Language understanding
  - Predictions & content creation (text, images)

### SUBFIELDS OF AI



1. Machine Learning (ML)
  - a. Key aspect of AI.
  - b. Enables systems to learn from data without explicit programming.
  - c. Example: Feature extraction → classification → output.
2. Deep Learning (DL) time stamp of 07:10 needs to be attached under the heading
  - a. Subset of ML using neural networks with multiple layers.
  - b. Performs feature extraction + classification automatically.
  - c. Example: Car vs. Not Car detection.
3. Natural Language Processing (NLP)
  - a. Enables computers to understand, interpret, and generate human language.
  - b. Applications: chatbots, translation, sentiment analysis, predictive text.

## SUBfIELDS Of AI



## APPLICATIONS Of AI

- General:
  - Language translation
  - Smart assistants (Alexa, Siri)
  - Document analysis
  - Online searches
  - Predictive text
  - Chatbots
  - Sentiment analysis
  - Social media monitoring
  - Automatic summarization

## HISTORY Of AI

### Exploring the Historical Journey of Artificial Intelligence





## AI IN SURGERY – APPLICATIONs

### 1. Pre-operative Phase

- Diagnosis a& Planning:
  - AI-assisted radiology (detect cancers, staging).
  - 3D reconstructions from CT/MRI (virtual anatomy).

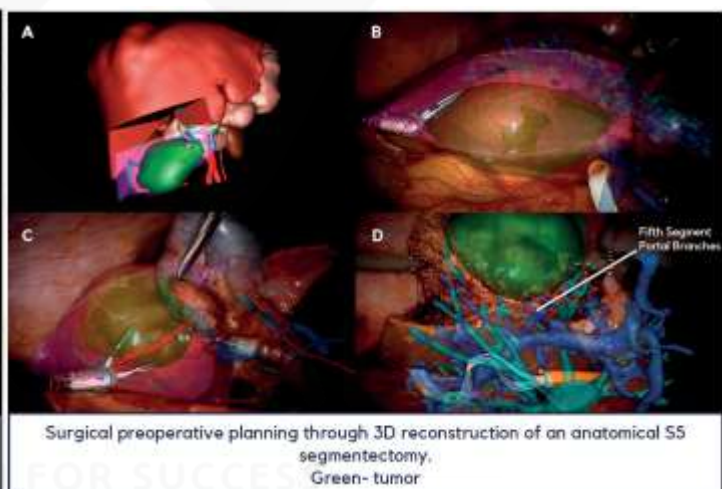
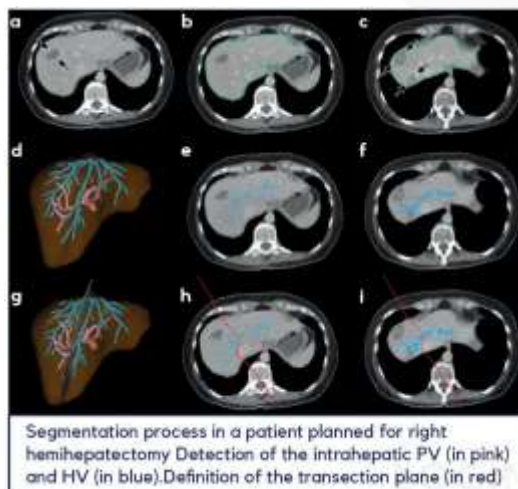


ANATOMAGE



AI BASED LAP/ROBOTIC SIMULATION

- Risk Prediction Models:
  - Tools: IBM Watson, Google DeepMind.
  - Predict complications, mortality, length of hospital stay.



### 2. Intra-operative Phase

- Robotic Surgery + AI:
  - Smart robotic systems using computer vision & data.
  - Gesture recognition for safety.
- Surgical Navigation Systems:
  - AI for laparoscopic navigation & time-structure identification.
  - Examples: Touch Surgery™, Proximie™, Verb Surgical.
- AI-powered Laparoscopy:
  - Real-time blood vessel detection (AR overlays).
  - Video analysis for skill assessment (SurgNet, DeepSurg).

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