MPSSDEGB
कौशल से रोजगार, समृद्धि अपार

FITT
Foundation For Innovation And Technology Transfer

SANKALP
Ministry of Skill Development & Entrepreneurship

Basics of AI Applications

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DAY NO. 16

INSTRUCTOR NAME: V. CHANDRASEKHAR

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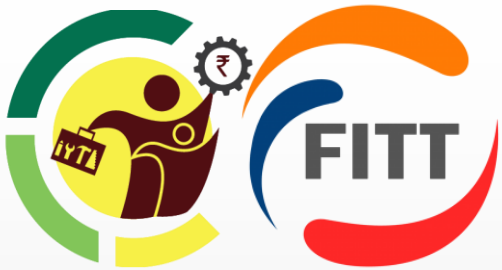
- Introduction to AI Applications
- Deep Dive: Natural Language Processing (NLP)
- Exploration of AI in Computer Vision
- Exploration of AI in Robotics and Healthcare

AI Applications:



- Natural Language Processing
- Compute Vision
- Robotics
- Healthcare

Natural Language Processing

- Natural language processing (NLP) is the discipline of building machines that can manipulate human language — or data that resembles human language — in the way that it is written, spoken, and organized

- NLP can be divided into two overlapping subfields: natural language understanding (NLU), which focuses on semantic analysis or determining the intended meaning of text, and natural language generation (NLG), which focuses on text generation by a machine

- Uses of NLP – Machine Translation, Spam Detection etc.

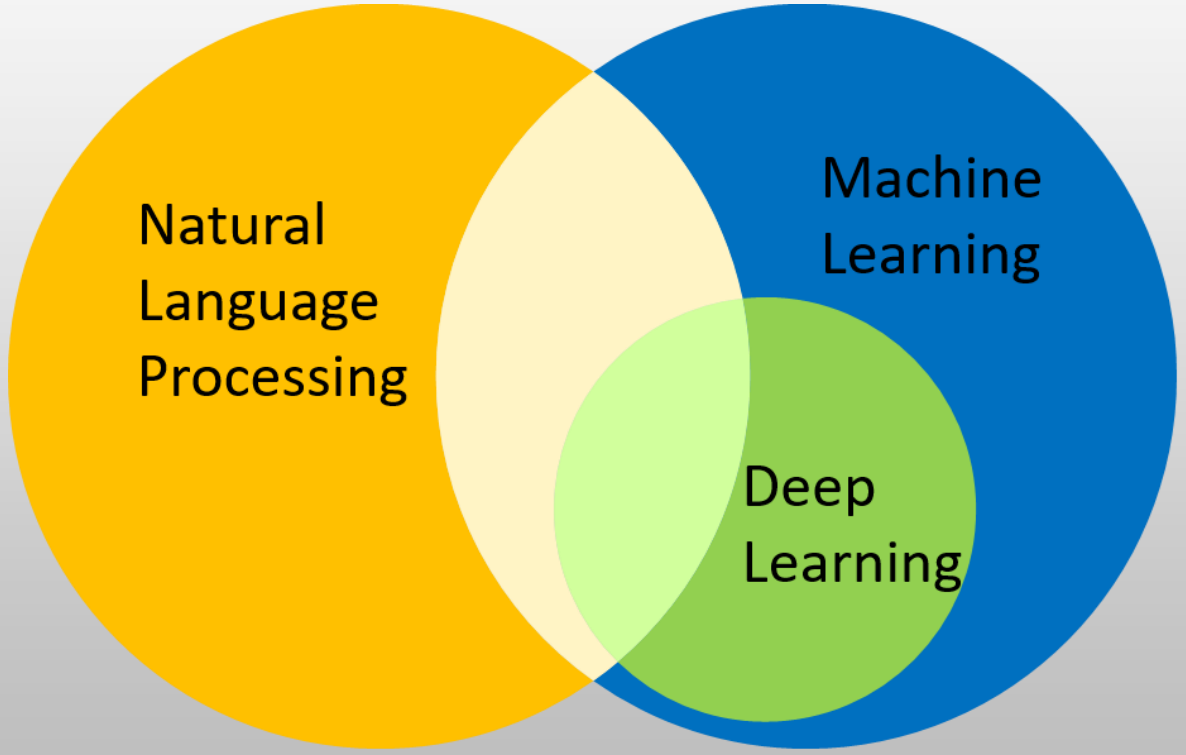
Natural Language Processing

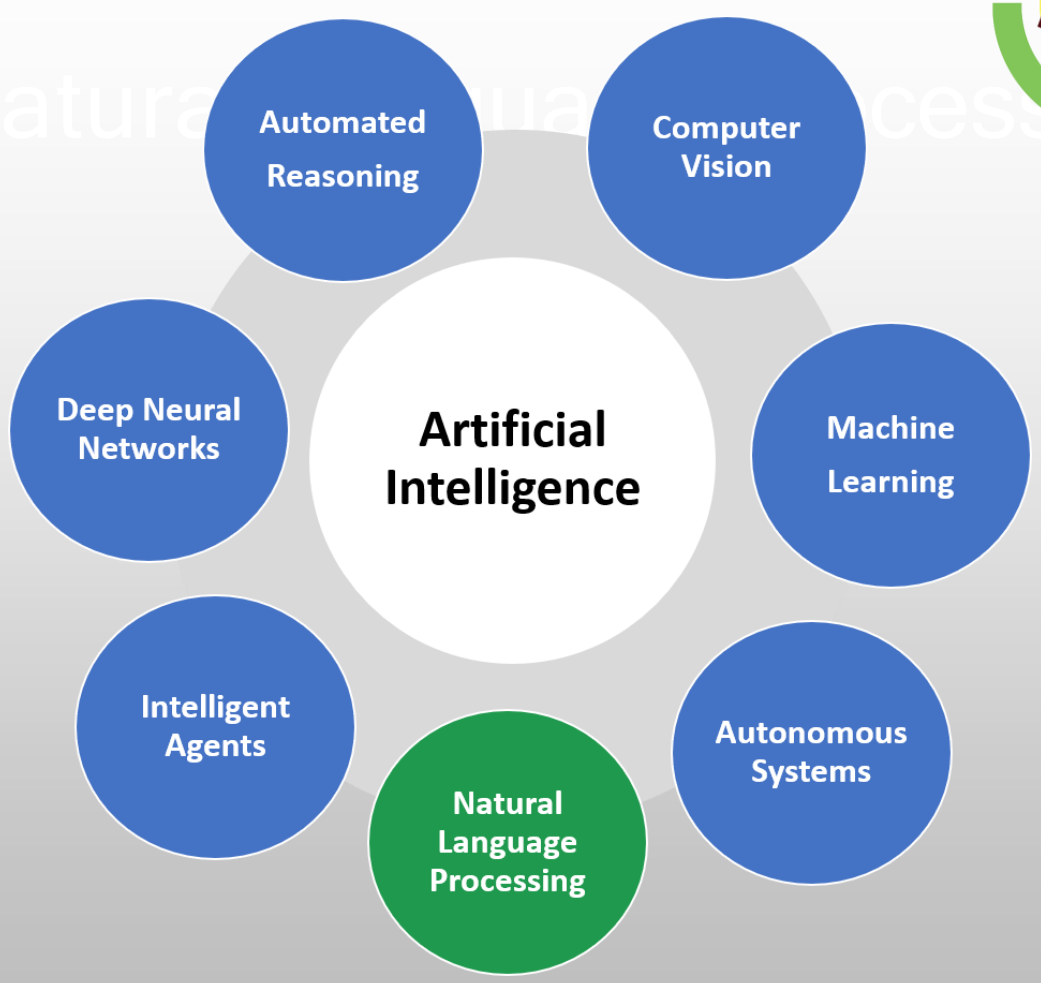
- Natural Language Processing—also known as NLP or computational linguistics—is a subfield of Artificial Intelligence (AI), Machine Learning (ML), and linguistics.
- A branch of AI, it helps computers or machines understand, manipulate, and interpret human language.
- For several decades now, humans have been communicating with machines through coding and programming languages, which in binary form, constitute of millions of zeroes and ones.
- According to Gartner, by 2025, nearly 60% of analytical queries will be generated through speech, Natural Language Processing (NLP) or voice, or would be generated automatically.

Natural Language Processi

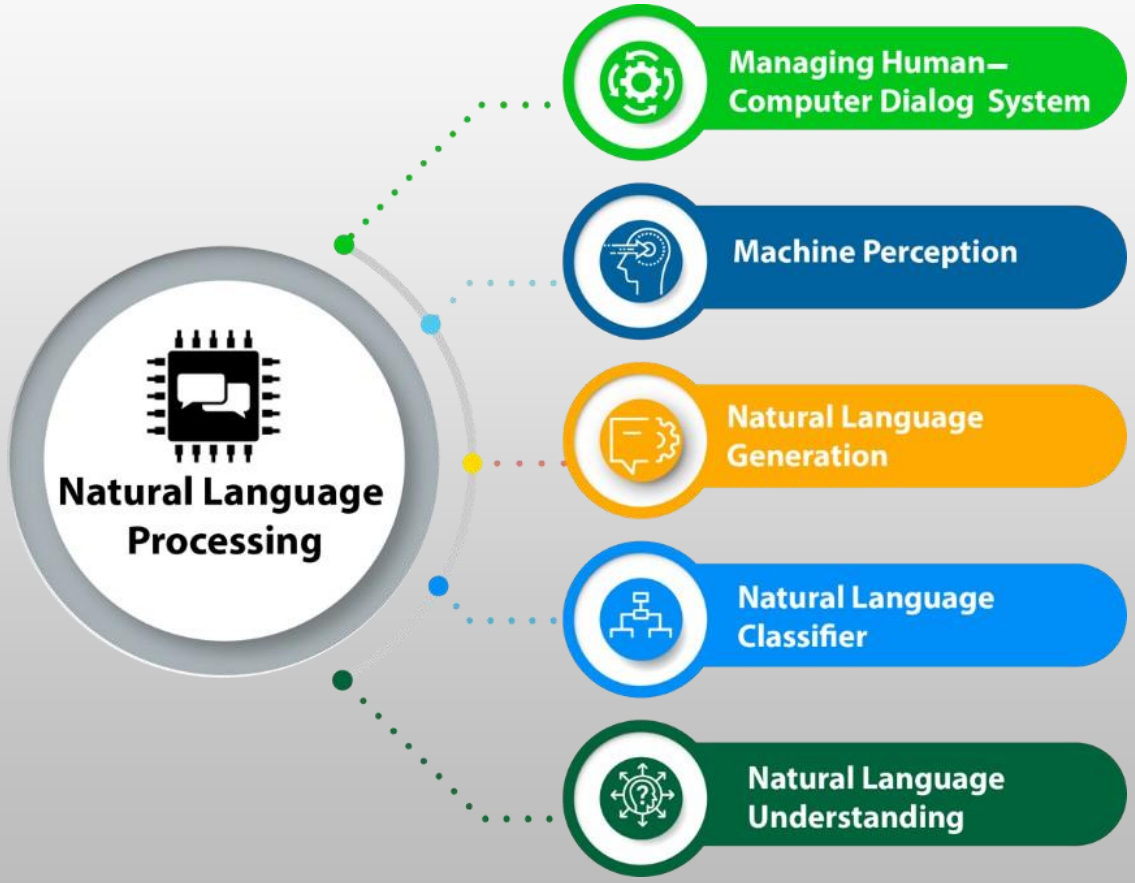
- To define it simply, Natural Language is the natural way in which humans communicate with each other. Today, we have made computers understand this natural language.
- For example, with voice commands such as “Alexa, what’s the news today” or “Ok Google, play me my favorite track,” communicating with machines has become easier.
- Similarly, when Siri, Apple’s personal voice assistant, is asked, “What is the cheapest flight to New York tomorrow?”

Natural Language Processing

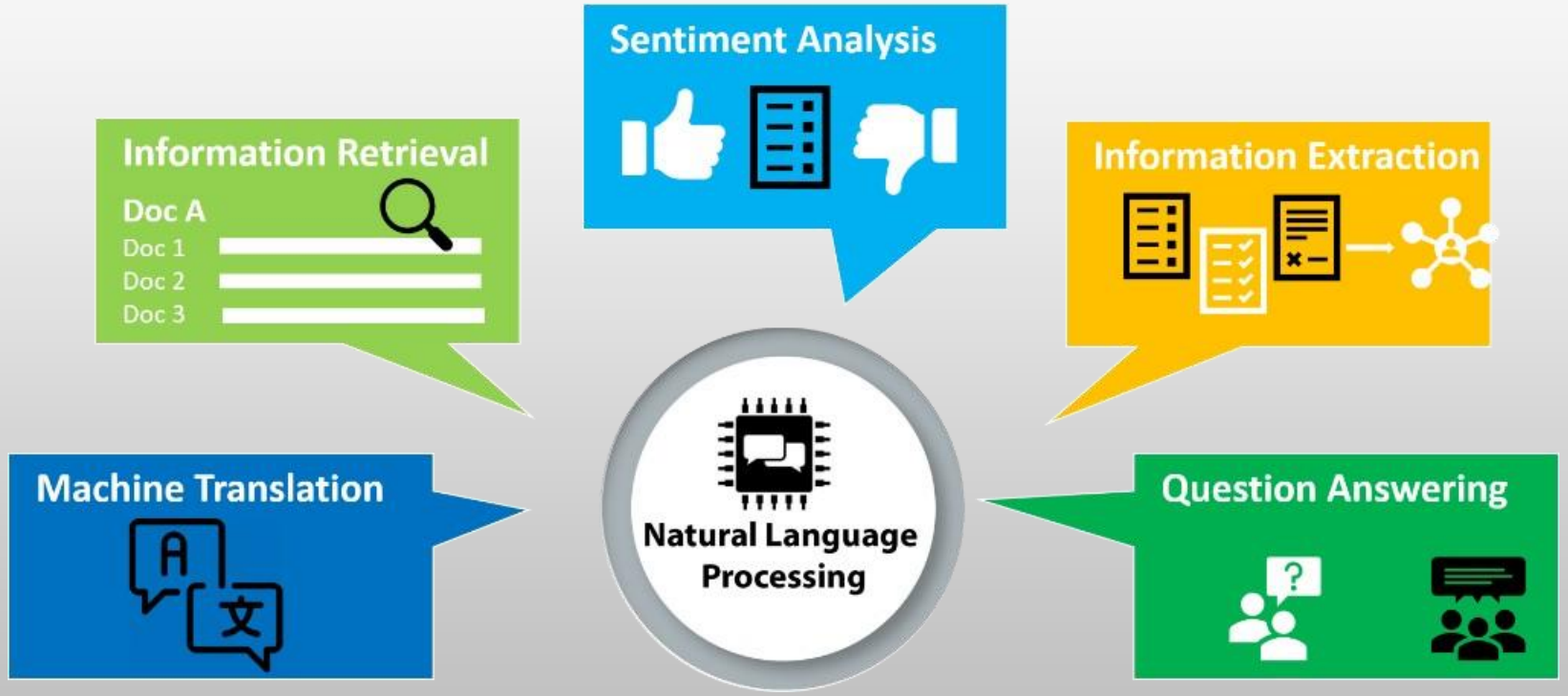



Automated Reasoning
Computer Vision
Deep Neural Networks
Artificial Intelligence
Machine Learning
Intelligent Agents
Natural Language Processing
Autonomous Systems

Natural Language Processing



Natural Language Processing



Computer Vision

- Computer vision is a technology that enables computers to recognize and identify objects visually.

- NLP can be divided into two overlapping subfields: natural language understanding (NLU), which focuses on semantic analysis or determining the intended meaning of text, and natural language generation (NLG), which focuses on text generation by a machine

- Uses of NLP – Machine Translation, Spam Detection etc.

- AI and machine learning technologies play a crucial rol[illegible]ring computer vision technology.
- AI enables computer vision to understand, recognize, and analyze all types of visual data.
- AI models, logic, and models can fast consume, absorb, and learn from the huge amount of labelled and unlabeled visual data.
- It enables computer vision-enabled computers to recognize the various diverse features, patterns, and relationships in videos, graphics, and even infographics.
- Usecases: Medical Imaging, Autonomous Vehicles, Agriculture

Exploration of AI in Robotics

- Robotics and Artificial Intelligence are the two fields that are rapidly evolving, advancing, and transforming the way businesses work. These two technologies have made it possible to create machines that can perform tasks accurately and quickly.

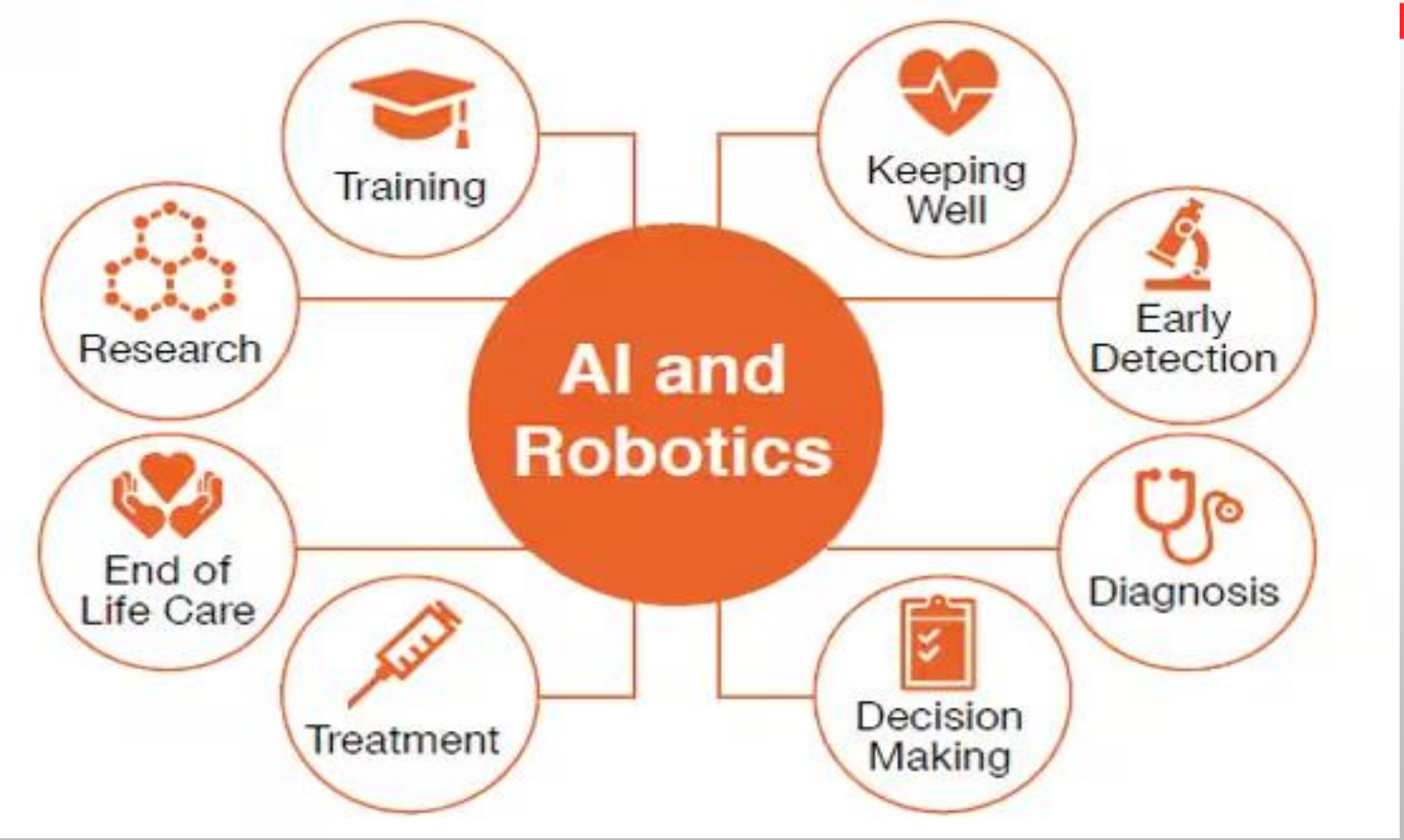
- With AI and robotics beginning to converge, a new age is up and coming in which robots with more intelligence and capability than ever are the future of humans.

- AI deals with creating intelligent machines that perform like humans, solve problems, and make decisions independently.

- It can also process large amounts of data and execute complex algorithms quickly and accurately.

- Uses: Healthcare, Manufacturing, Agriculture, Military

Exploration of AI in Robotics



Exploration of AI in Healthcare

- AI can help doctors and medical providers deliver more accurate diagnoses and treatment plans.

- AI can help make healthcare more predictive and proactive by analyzing big data to develop improved preventive care recommendations for patients.

- By automating mundane tasks, such as data entry, claims processing and appointment scheduling, using artificial intelligence in healthcare can free up time for providers and healthcare organizations to focus on patient care and revenue cycle management.

- AI algorithms can monitor patients' health data over time and provide recommendations for lifestyle changes and treatment options that can help manage their condition

Discovery and Visualization of Structural Biomarkers from MRI using Machine Learning

- That is why we screen people who exhibit no signs or symptoms yet

- But, the earlier we capture images, the smaller & smaller the visible evidences of diseases become, until they vanish before our naked eyes
  - How early can we detect diseases?

- There is a growing belief that there is an invisible side to imaging!
  - These are small changes (or *hidden patterns*) that are imperceptible to humans
  - Yet, they can be detected by AI!

Digital Health Has Become Ubiquitous

- Everyday millions of people turn to the Internet for health information and treatment advice
- In Australia, around 80% of people search the Internet for health information, and nearly 40% seek guidance online for self-treatment
- In the US, almost two-thirds of adults search the Web for health information and roughly one-third utilize it for *self-diagnosis*

Digital Health and Search Engines

- A recent study showed that half of the patients investigated their symptoms on search engines before visiting emergency departments

- Search engines (e.g., Google and Bing) are exceptional tools for educating people, but they may facilitate misdiagnosis!

- Some governments have even launched “Don’t Google It” advertising campaigns to urge their residents to avoid assessing their health using search engines

Symptom Checkers

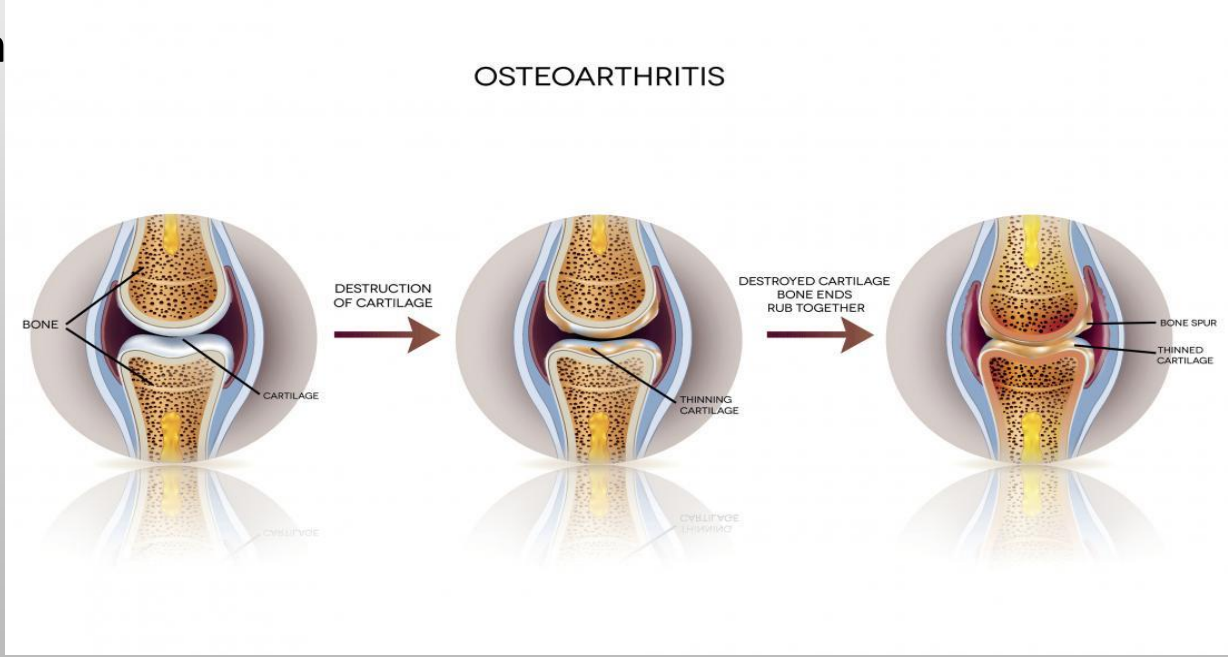
- In contrary, AI-based *symptom checkers* are tools that can assist patients in self-diagnosing themselves
  - They are constantly and instantly available!

- Studies show that more than 15 million people use symptom checkers per month that are likely to keep growing

- However, the utility and promise of symptom checkers cannot be materialized if they do not prove to be accurate in self-diagnosis

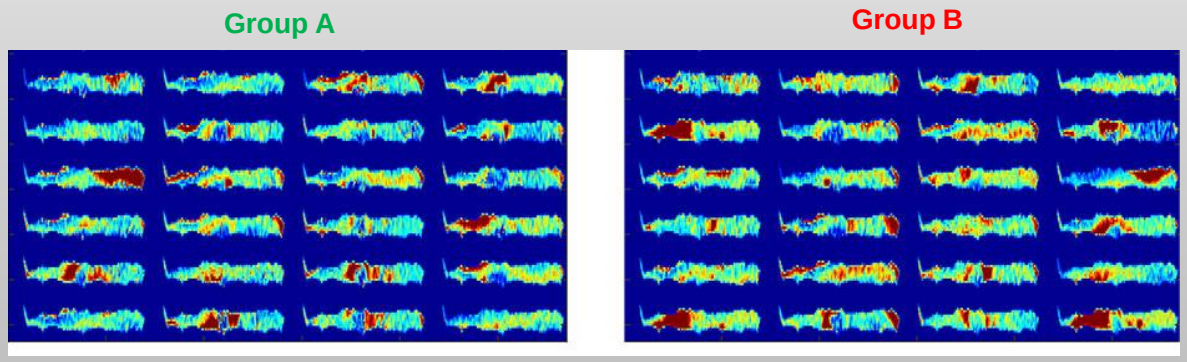
Discovery and Visualization of Structural Biomarkers from MRI using Machine Learning

- One in 10 develop knee osteoarthritis, which cannot be detected un



Discovery and Visualization of Structural Biomarkers from MRI using Machine Learning

- Here are scans that belong to different subjects, with different colors representing different ingredients that make up the cartilage

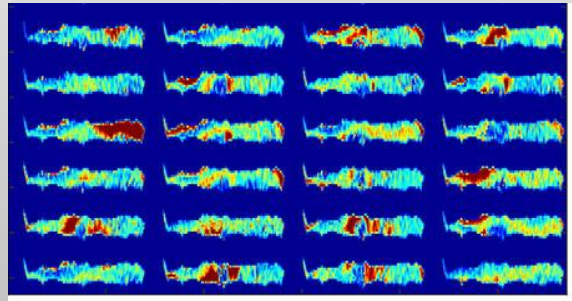


Which group has osteoartherits? Best experts cannot tell!

Discovery and Visualization of Structural Biomarkers from MRI using Machine Learning

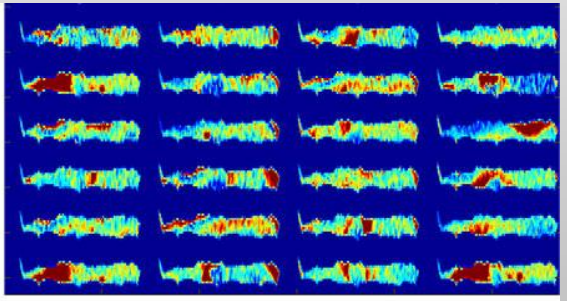
- Here are scans that belong to different subjects, with different colors representing different ingredients that make up the cartilage

Group A



NO osteoarthritis in 3 years

Group B



Osteoarthritis in 3 years

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THANKS