NeuroML

(Machine Learning in Neuroscience)

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NeuroML- Machine Learning in Neuroscience

Machine Learning

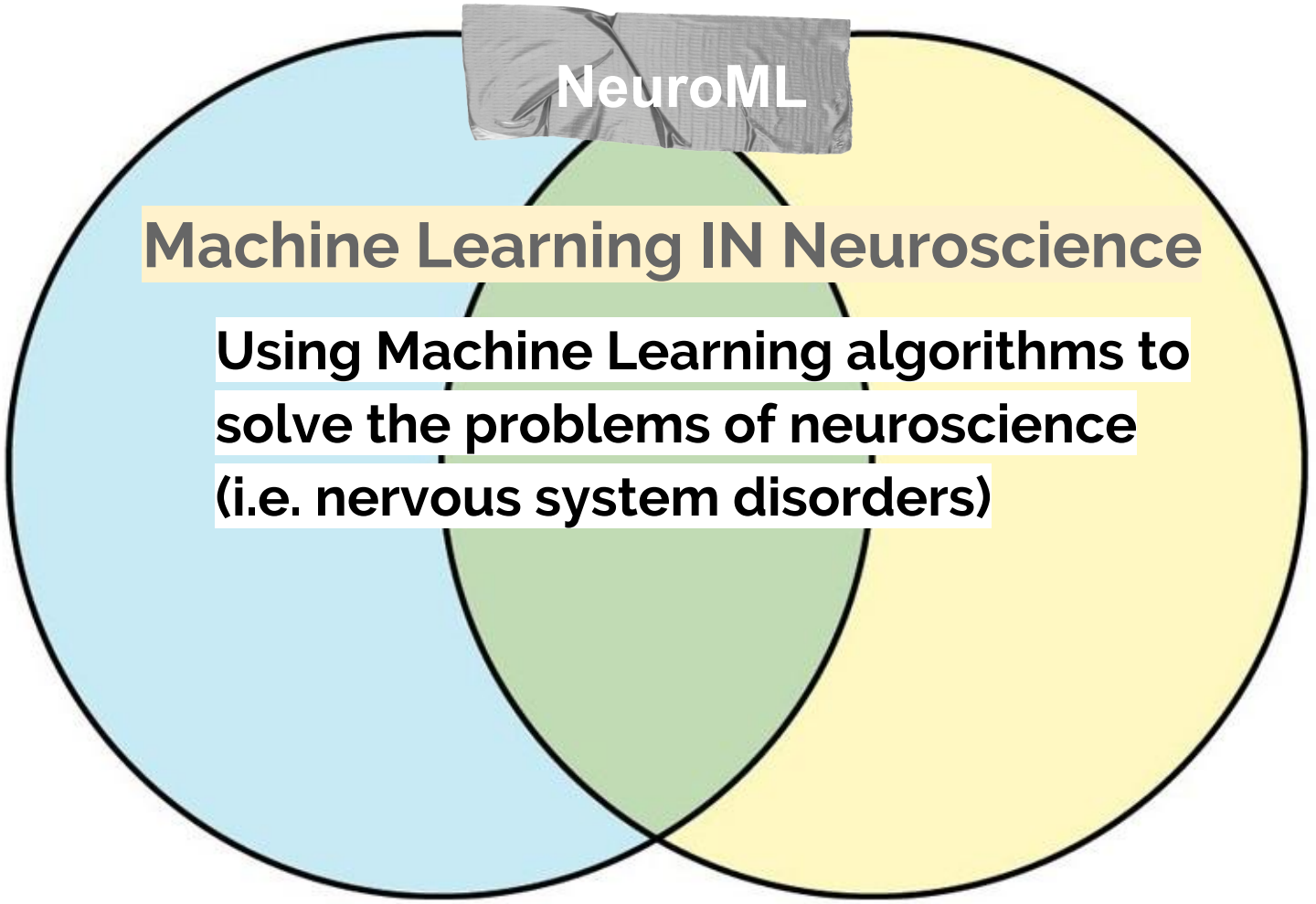
When a machine learns

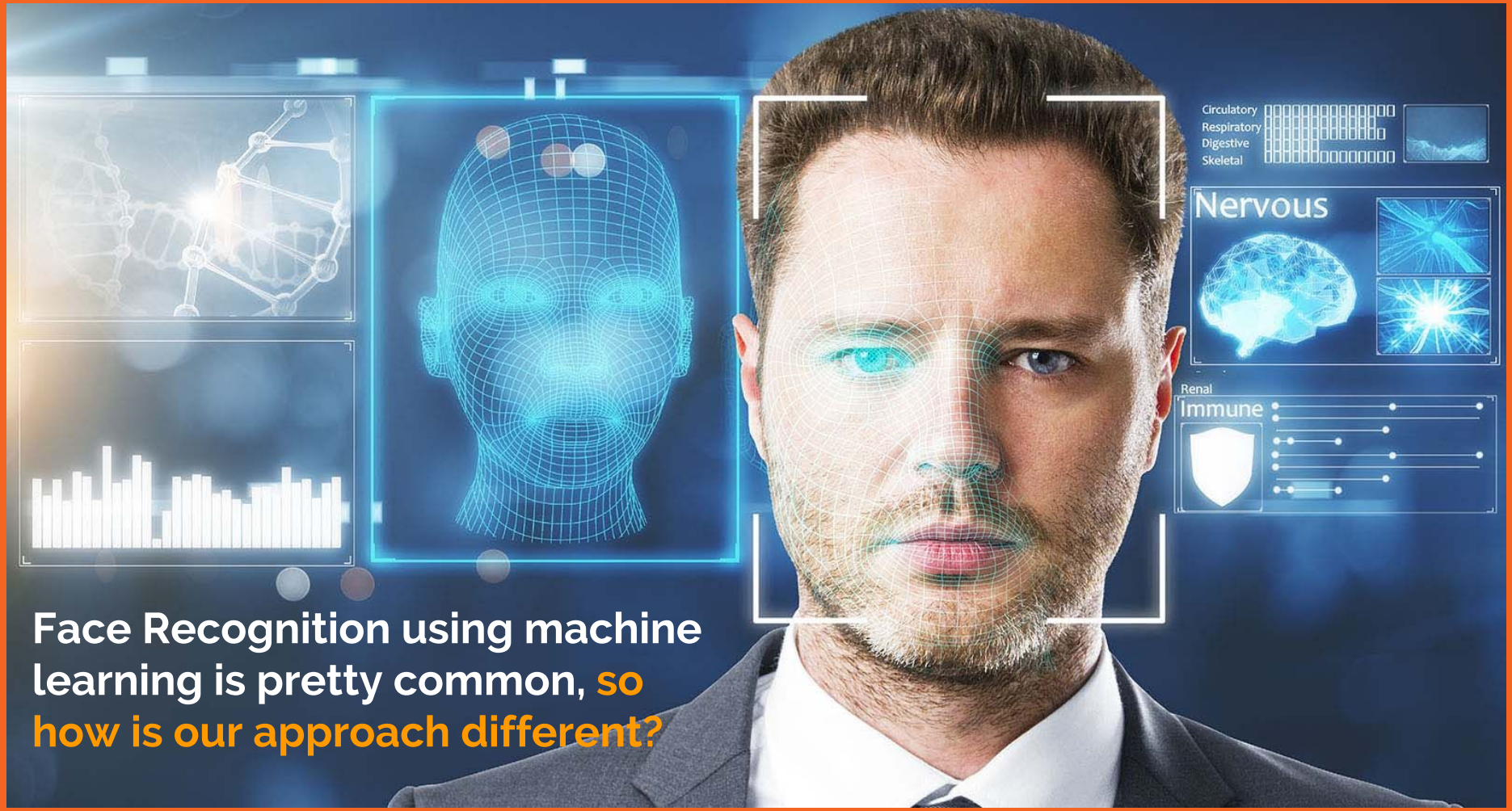
- **LEARNING** from past experiences
- **ADAPTING** in the present scenario
- **IMPROVING** for future predictions

Neuroscience

Science of neurology

- **Neurology**: Branch of medicine that deals with disorders related to nervous system and brain.
- “Scientific study of the nervous system”


NeuroML
Machine Learning IN Neuroscience
Using Machine Learning algorithms to solve the problems of neuroscience (i.e. nervous system disorders)


Circulatory
Respiratory
Digestive
Skeletal
Nervous
Renal
Immune
Face Recognition using machine learning is pretty common, so how is our approach different?

Stimuli (if any)

- auditory
- visual
- somatosensory
- olfactory
- ...

Task

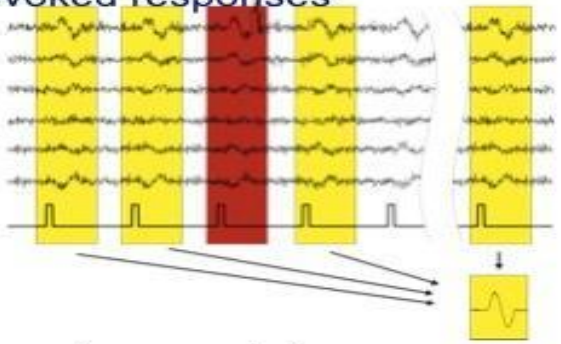
- attend/ignore
- detect + react
- detect + count
- imagine
- observe/imitate
- ...

Behavioral responses

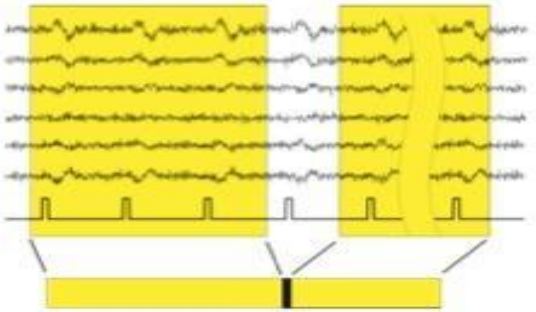
- limb/finger movement
- speech
- ...

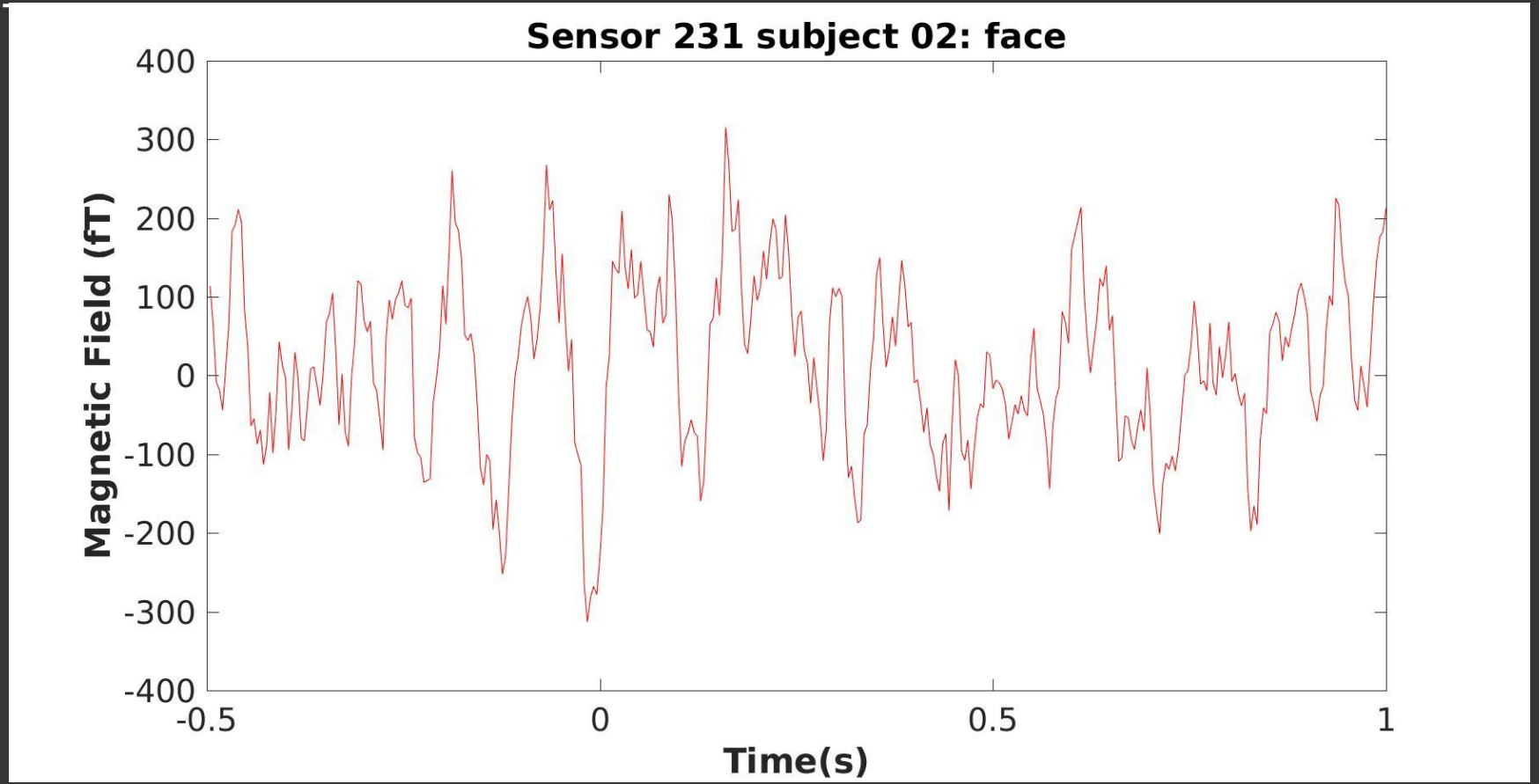
MEG/EEG

- evoked responses

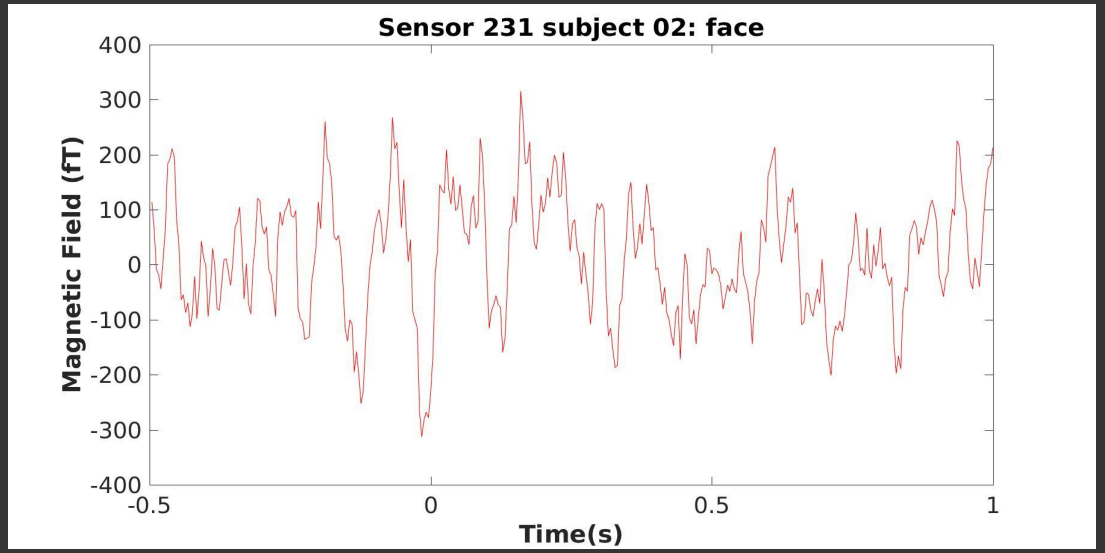


- spontaneous data




Sensor 231 subject 02: face
Magnetic Field (fT)
400
300
200
100
0
-100
-200
-300
-400
-0.5
0
0.5
1
Time(s)

Problem 1: Not all signals are “correct”


Sensor 231 subject 02: face
Magnetic Field (fT)
400
300
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0
-100
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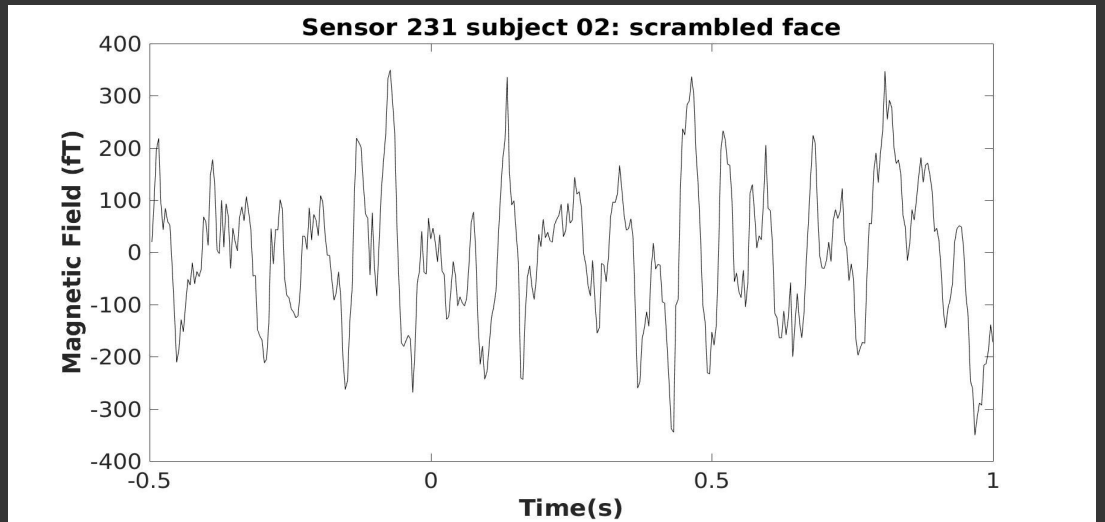
-300
-400
-0.5
0
0.5
1
Time(s)


Sensor 231 subject 02: scrambled face
Magnetic Field (fT)
400
300
200
100
0
-100
-200
-300
-400
-0.5
0
0.5
1
Time(s)

Problem 2: **No clear demarcation between the signals.**

Machine Learning did what humans could not: find the patterns between signals classified as face and scrambled face.

ENTERS MACHINE LEARNING

How I went about it

Future Extension

Use eye tracking to identify the features captured by the sensors during the timestamps found.

Additional Section

How to take up a new field and “learn” it

Step 1: Don’t take an online course.

Step 2: Take up a project. (self-undertaken or under a professor who is generous enough, preferably with a friend if you are a beginner)

Step 3: Search “how to do xyz”.

Thank me later.

Tip

- **Be patient,** it will not happen overnight.
- It needs **persistence and devoted time** to your desk and laptop, and maybe some isolation.
- Remember, **Google is your best friend**.
- Follow **Tunnel Approach**

SubSteps: How to go about a self-undertaken project

Step 3.1: Find existing code; copy it in your notebook/notepad and run it.

Step 3.2: Understand it and play with it.

Step 3.3: Tweak with it and analyse the results.

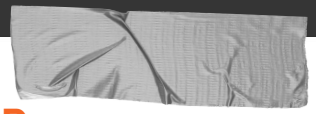
Hello future pro.

Tip

- **Be patient,** it will not happen overnight**.**
- It needs **persistence and devoted time** to your desk and laptop.
- Remember, **Google is your best friend**.
- Follow **Tunnel Approach**
- **Talk to people** about it
- Ask their opinions and different approaches for 3.3

How to develop new ideas?

- Read and observe
- Approach a professor
- Search ‘simple problem statements for machine learning’, ‘kaggle datasets for NLP’.



TIP

- Read articles on Medium, Kaggle
- Follow bloggers like machinelearningmastery, KDnuggets
- Be part of communities like FDG, GDG, WWC, PyDelhi, WiMLDS
- Discuss ideas with people

Good luck!

Machine Learning is not difficult, but needs a careful application and understanding.

I hope you'll use these tips to go out and make great contributions to this field and society!

Reach out to me:
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For more such future events, follow us at

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Delhi Women in Machine Learning and Data Science