

Human-in-the-loop (HITL):

how Psychology can
contribute to Machine
Learning

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What's HITL?

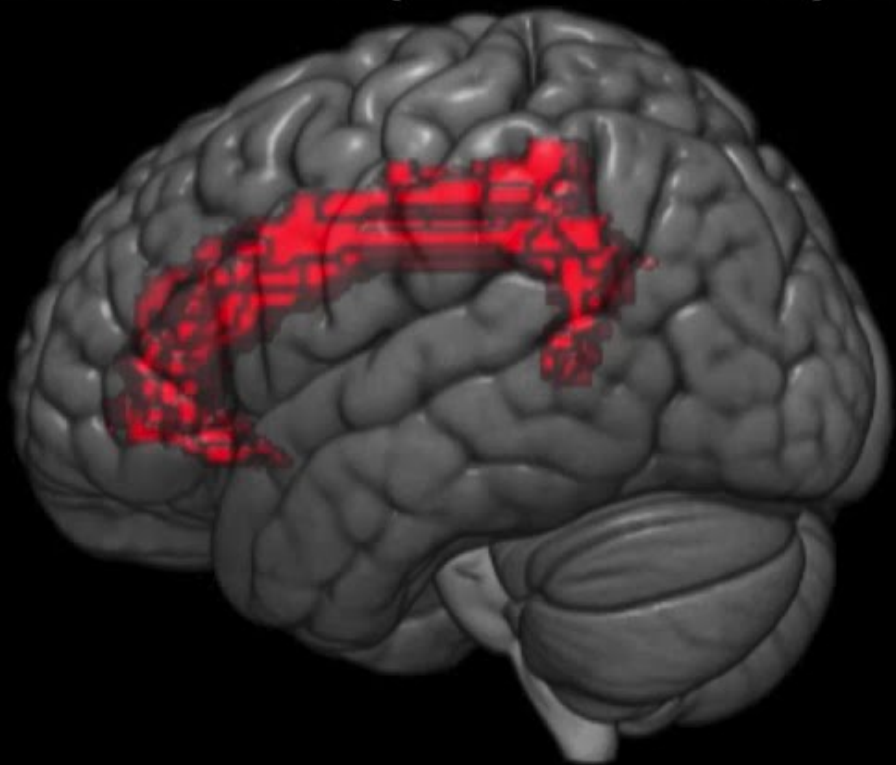
- Human-in-the-Loop (HITL):
 - an approach to leverage both HUMAN and MACHINE INTELLIGENCE to create machine learning models
 - usually steps in by three actions

Humans label data

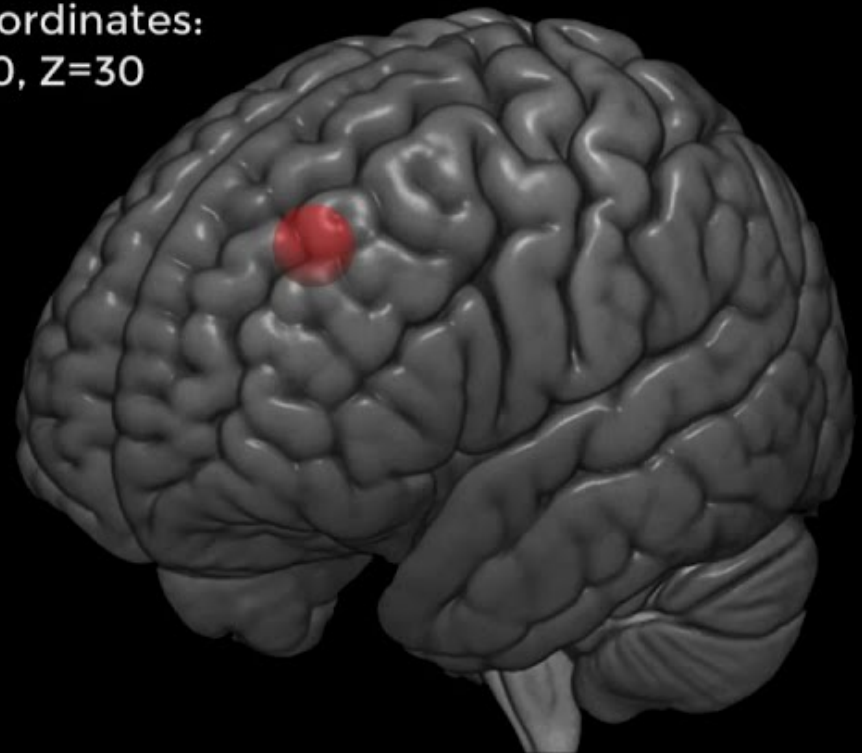
- The model can learn to make decisions upon the high-quality training data by humans

ROI Analysis

Atlas-based (or anatomical) ROI

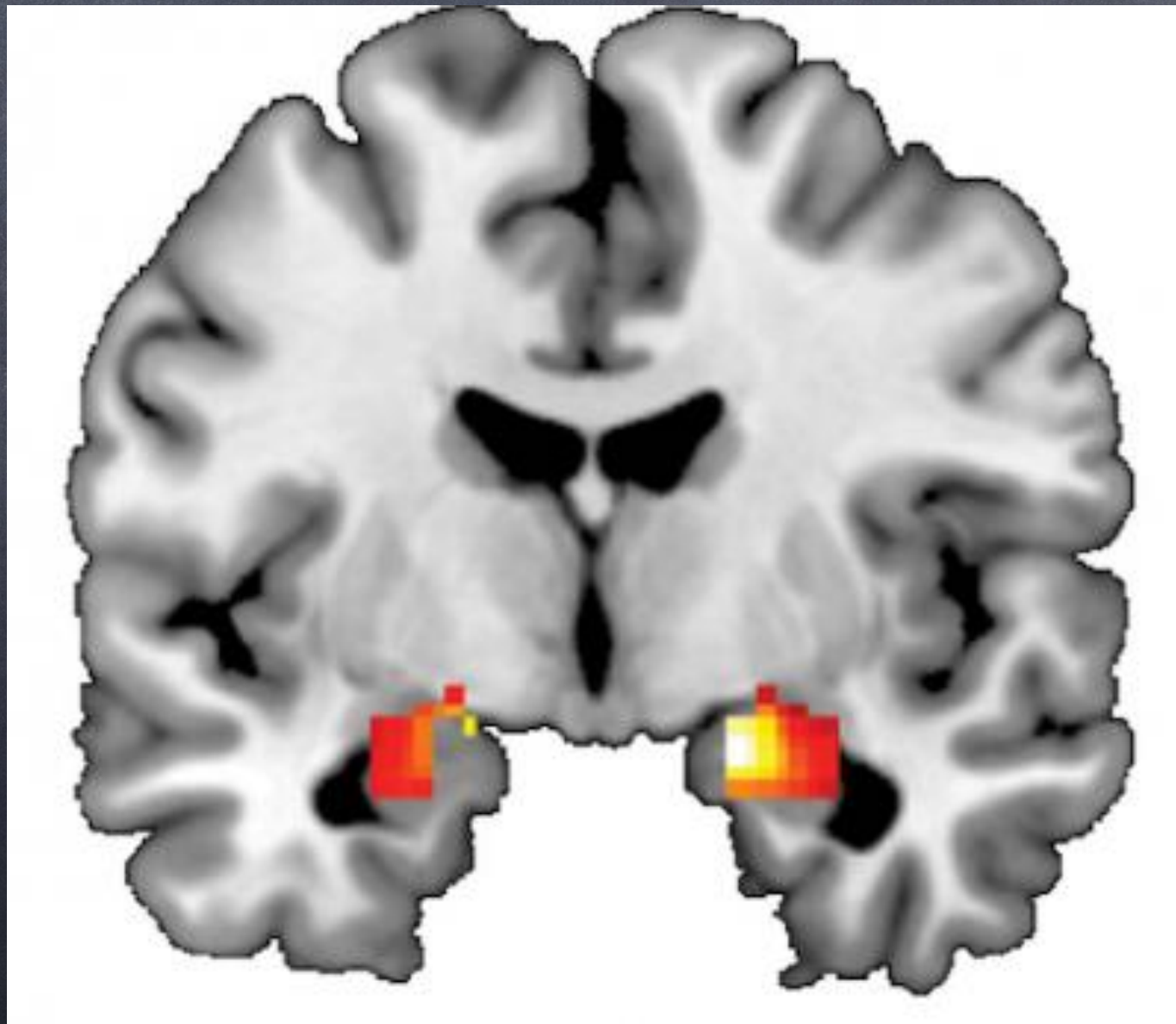


e.g., MNI coordinates:
X=0, Y=30, Z=30



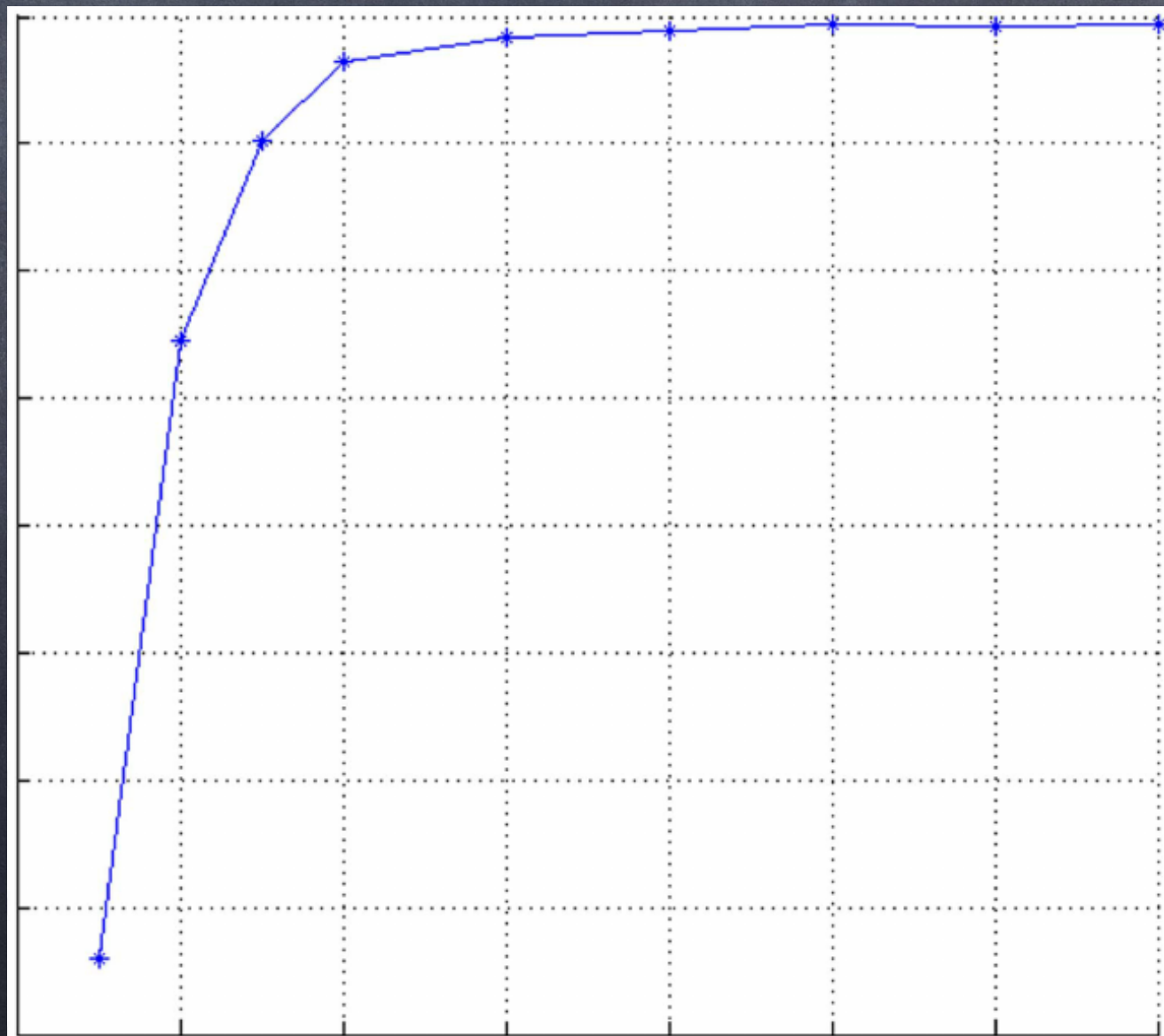
Humans tune the model

- Humans can correct the overfitting and teach the edge cases in the model or further to add on new categories



Humans test and validate a model

- By scoring outputs of a model, humans can spot the unconfident judgement or incorrect decision made by an algorithm



Testing & Validation

- Behavioral experiment: Listening test to test the performance of denoising algorithm on normal-hearing group

VideoAudioTest

Speech Evaluation Toolkit

Name: amount / method: Total 6 s

Enhancement Test:

Speech Browser: List Browser: Film Browser:

noisy01
noisy04
noisy05

Run DEL

Result

noisy01-NoViedo	0	1	1
noisy01- Viedo	0	0	0
noisy04-NoViedo	0	1	1
noisy04- Viedo	0	0	0
noisy05-NoViedo	0	0	0
noisy05- Viedo	0	0	0

Last one
noisy04-NoVedio

0
1
1

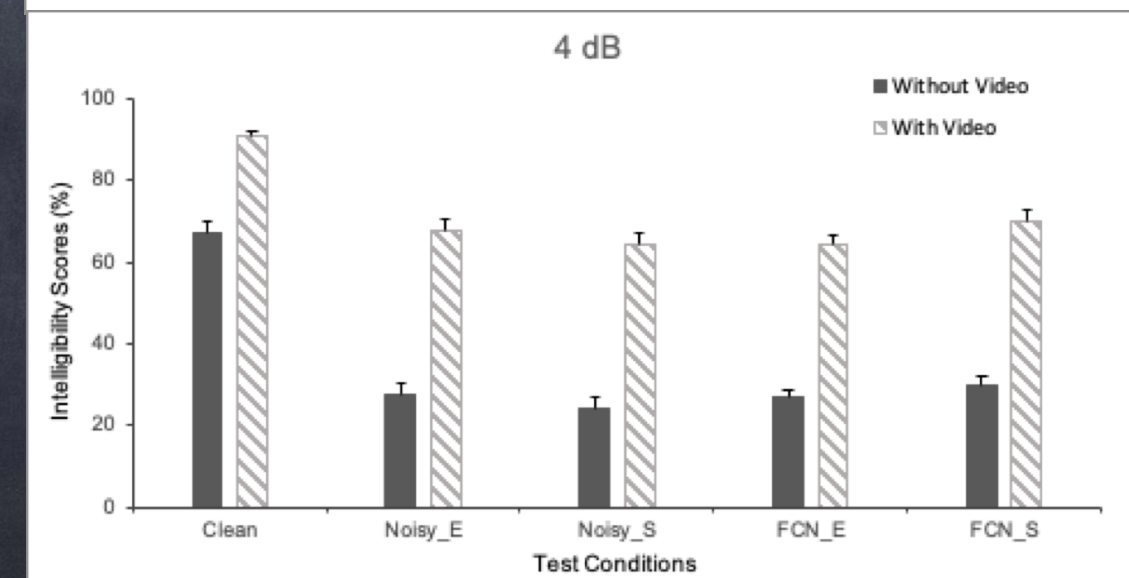
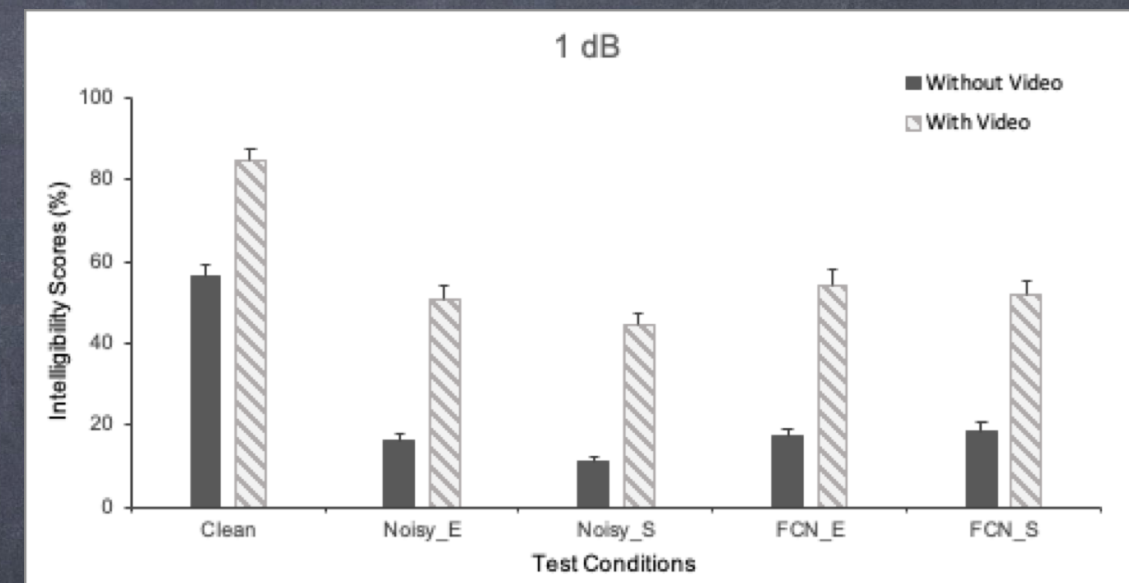
per 10 word 0

Like 1

Fatigue 1

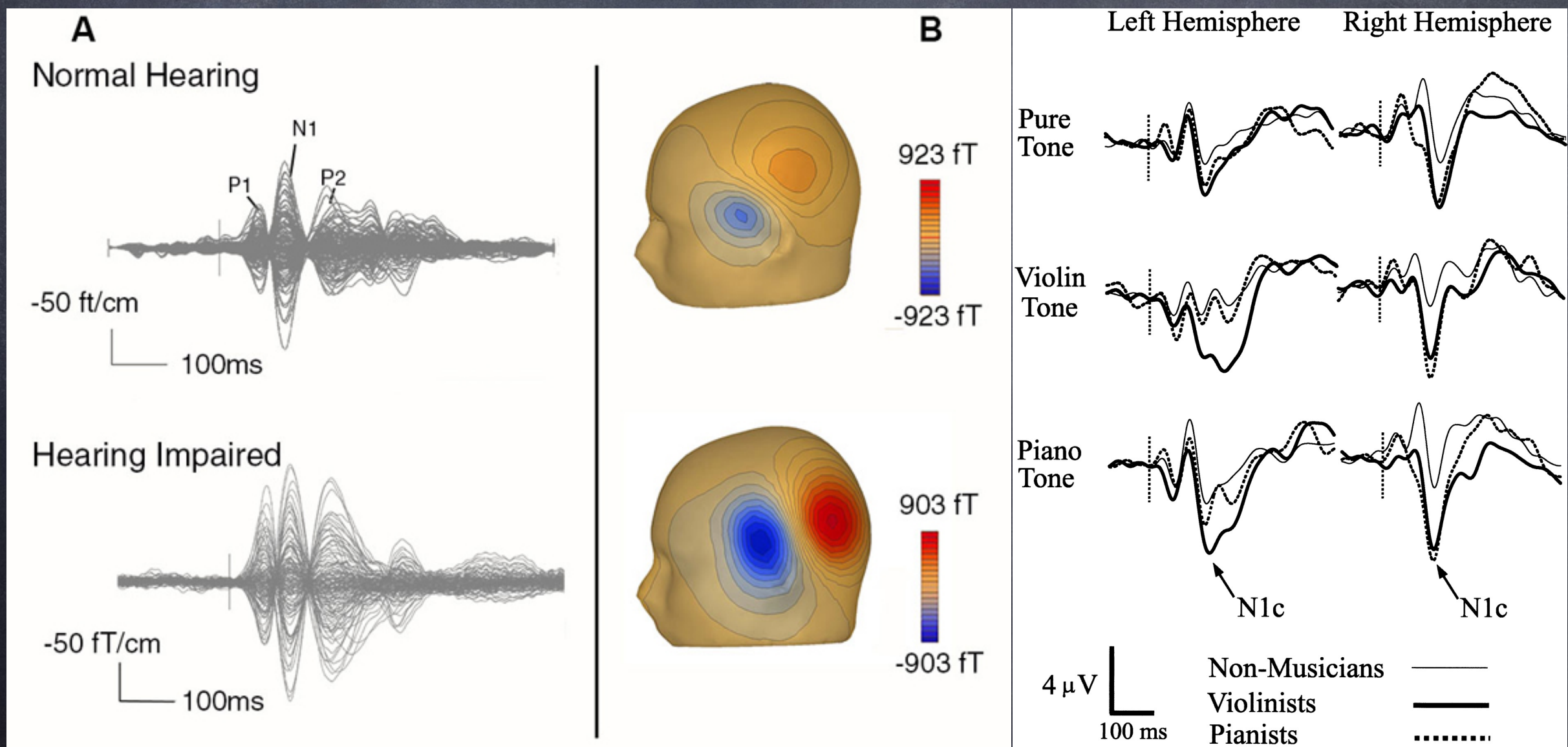
Replay

1



Testing & Validation (cont'd)

- Neuroscience approach: MEG (Magnetoencephalography) to validate the biological reaction for the denoising algorithm



Why HITL?

- SMARTER: HITL provides a continuous feedback in each of actions
- MORE ACCURATE: HITL serves as a better training and tuning regressor to learn between the next-known and unknown
- MORE EFFECTIVE: HITL helps model to select what it needs in the active learning

Thank you for your
attention!