Identifying Patients with MCI from Healthy Controls

Patients with MCI and HC from Sweden

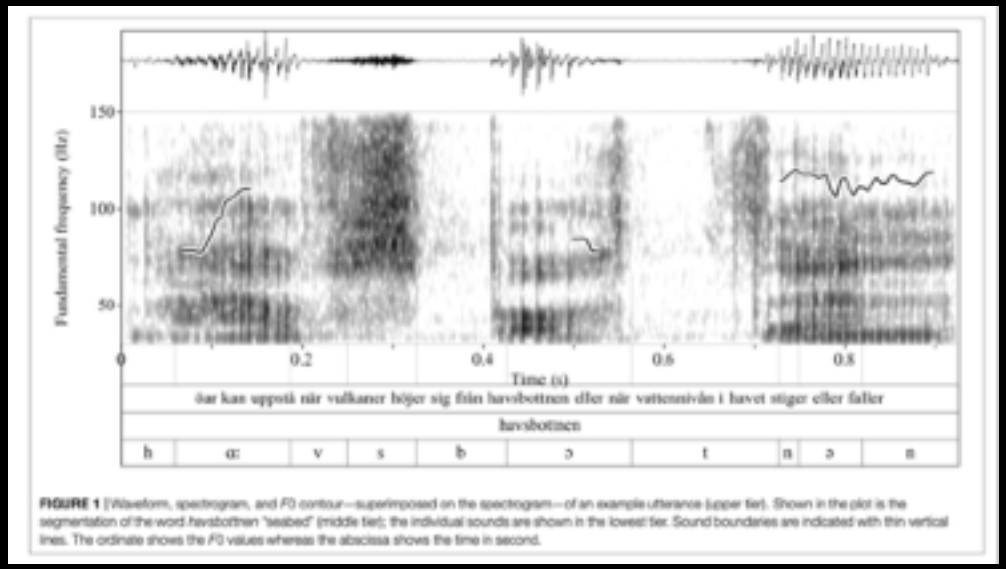

FIGURE 1 | Waveform, spectrogram, and *F*0 contour—superimposed on the spectrogram—of an example utterance (upper tier). Shown in the plot is the segmentation of the word *havsbottnen* "seabed" (middle tier); the individual sounds are shown in the lowest tier. Sound boundaries are indicated with thin vertical lines. The ordinate shows the *F*0 values whereas the abscissa shows the time in second.

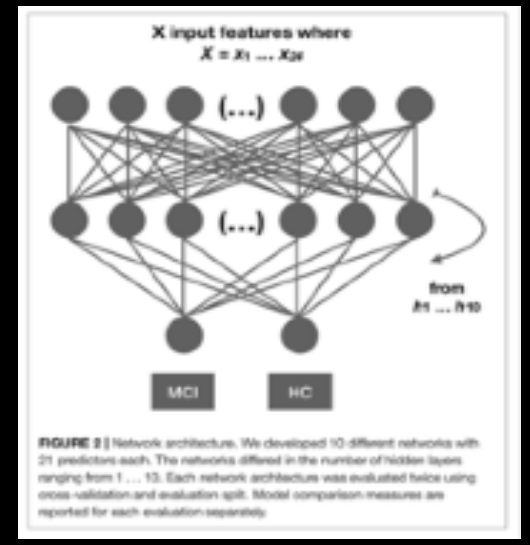

FIGURE 2 | Network architecture. We developed 10 different networks with 21 predictors each. The networks differed in the number of hidden layers ranging from 1 ... 10. Each network architecture was evaluated twice using cross-validation and evaluation split. Model comparison measures are reported for each evaluation separately.

Automatic Segmentation and Transcription

1. Vowel Formants (i.e., *F*1, *F*2, *F*3, *F*4, *F*5) at the 15%, 50%, and 75% of the vowels' total duration: i.e., *F*1 15%,*F*1 50%, *F*1 75%...*F*5 15%,*F*5 50%, and *F*5 75%.

2. Fundamental frequency (*F*0): *mean F*0, *min F*0, and *max F*0.

3. Vowel duration

4. Gender.

5. Age

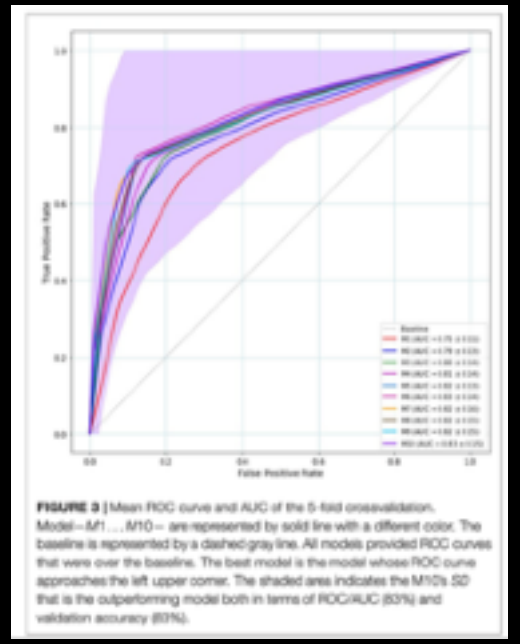

FIGURE 3 | Mean ROC curve and AUC of the 5-fold crossvalidation. Model—M1 ..., M10— are represented by solid line with a different color. The baseline is represented by a dashed gray line. All models provided ROC curves that were over the baseline. The best model is the model whose ROC curve approaches the left upper corner. The shaded area indicates the M10's SD that is the outperforming model both in terms of ROC/AUC (83%) and validation accuracy (80%).

Themistocleous Charalambos, Eckerström Marie, and Dimitrios Kokkinakis (2018). Identification of Mild Cognitive Impairment from Speech in Swedish using Deep Sequential Neural Networks. *Frontiers in Neurology*. doi: 10.3389/fneur.2018.00975.

Subtyping patients with Primary Progressive Aphasia (PPA)