Project title: Shaman

Names of group members:

Dataset(s) (either existing or self-collected)

1. Check for specific words like Help: Dataset: We will also collect some data and extend speech_commands datasets.
   - Panic detection – We don't have the exact dataset where a patient is in a panic state trying to call for help. For this project we will start with some available datasets:
2. The Ryerson Audio-Visual Database of Emotional Speech and Song (RAVDESS) | Zenodo - 2 Female actors [2], Toronto emotional speech set (TESS) Collection - 24 professional actors (12 female, 12
   - male) [3], Speech Emotion Recognition (en) | Kaggle [4].

Problem(s) to work on

Create a help/panic detector for Hospital rooms / Assisted living setups. While panic buttons are useful in certain settings a user may not be able to press it in time, wasting crucial time. There can be two parts, one where the user is able to either explicitly call for help using predefined keywords and second where the device auto detects panic in the user's voice and calls for help.

Potential ways to solve problem(s)

1. TrainaTinyMLmodeltodetectkeywordslike"Help","Good","Emergency".Wecanusethe speech_commands and extend it with these keywords.
2. Train a TinyML model to detect panic or fear from the user's voice. For this model we suspect that the Arduino TinyML board may not be able to run this model. We may have to switch to a Raspberry pi board for this model.
3. Our idea is to process the input voice signal and then discard it, we won't be recording or saving any voice thus our project will not be a concern related to privacy.

Future extensions (Out of Scope)

1. Incorporation of language; detection of language to determine distress.
2. We can also use heart rate [6] and SpO2 (Oxygen Saturation), EDA (Electrodermal activity) [5] sensor to be sure about the panic detection our model did.
3. After the detection we can raise an alarm, or call someone for help.

References

1. Kaggle, A Data Science Community: https://www.kaggle.com/
2. https://zenodo.org/record/1188976#.ZFa4QRPML8Y
3. https://tspace.library.utoronto.ca/handle/1807/24487
4. https://www.kaggle.com/datasets/dmitrybabko/speech-emotion-recognition-en
5. https://www.pluxbiosignals.com/products/electrodermal-activity-eda-sensor-1
6. https://www.sparkfun.com/products/16474?gclid=Cj0KCQjw9deiBhC1ARIsAHLjR2AflE4bLdapsZSel4D4dZvLR_fs1PIzF8YKdmTFPJdmKpqWUCIVE7MaAh2MEALw_wcB