

Saving Face: A Gesture Recognition Application to Fight the Spread of COVID-19



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Background

COVID-19 PREVENTION



How health workers can stay healthy

DOs ✓



Wash your hands with soap and water for 40 seconds or use an alcohol-based hand rub regularly, especially before and after engaging with each patient.



Practice respiratory hygiene in health facilities by covering your nose and mouth with a tissue or flexed elbow when coughing and sneezing.



Wear protective equipment when performing a special procedure, including a long-sleeved gown, gloves, eye protection and a particulate respirator.



If you develop a dry cough, fever or difficulty breathing after you have provided care to a COVID-19 patient, **report your illness immediately**.

✗ DON'Ts



Don't touch a patient without washing your hands with soap and water for 40 seconds or using an alcohol-based hand rub.



Don't touch your eyes, nose or mouth or eat food without washing your hands.



Don't make contact with a known COVID-19 patient without wearing protective equipment, including a long-sleeved gown, gloves, eye protection and a particulate respirator.



Don't ignore symptoms if you develop them. Inform your workplace and your local health authority if you think you have COVID-19.

Stop the Spread of Germs

Help prevent the spread of respiratory diseases like COVID-19.



Stay at least 6 feet (about 2 arm lengths) from other people.



Cover your cough or sneeze with a tissue, then throw the tissue in the trash and wash your hands.



When in public, wear a mask over your nose and mouth.



Do not touch your eyes, nose, and mouth.



Clean and disinfect frequently touched objects and surfaces.



Stay home when you are sick, except to get medical care.



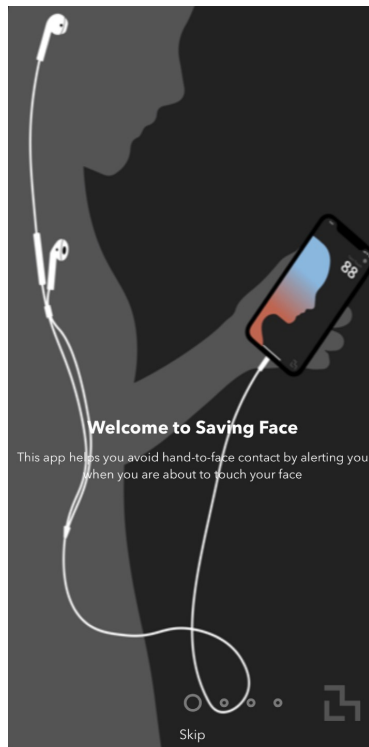
Wash your hands often with soap and water for at least 20 seconds.



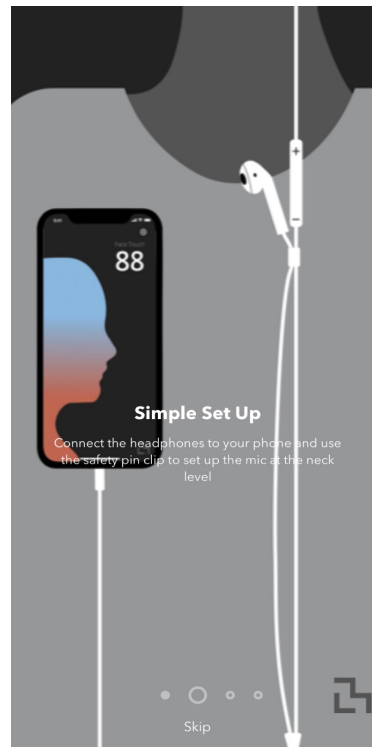
cdc.gov/coronavirus

Guidance from the WHO and CDC to reduce hand-to-face contact

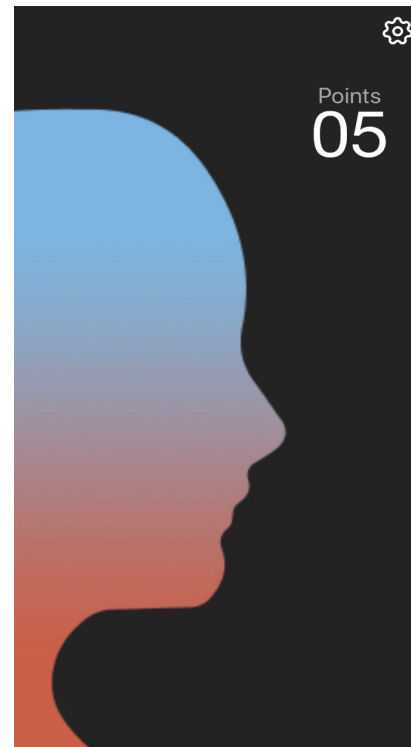
Saving Face Mobile Application



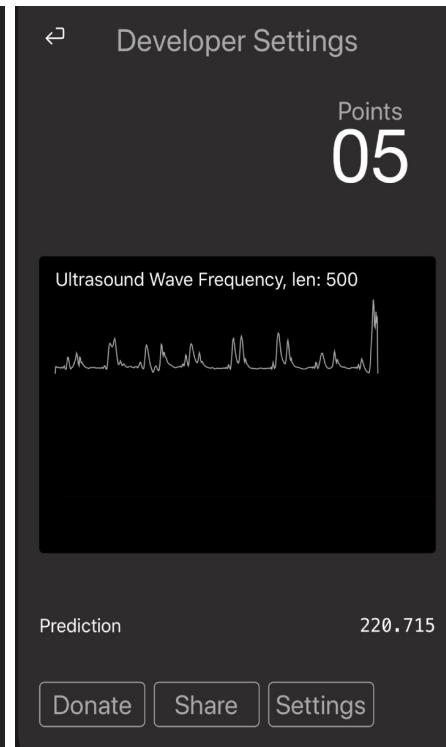
(a)



(b)



(c)



(d)

Saving Face onboarding pages and user interface

Overview

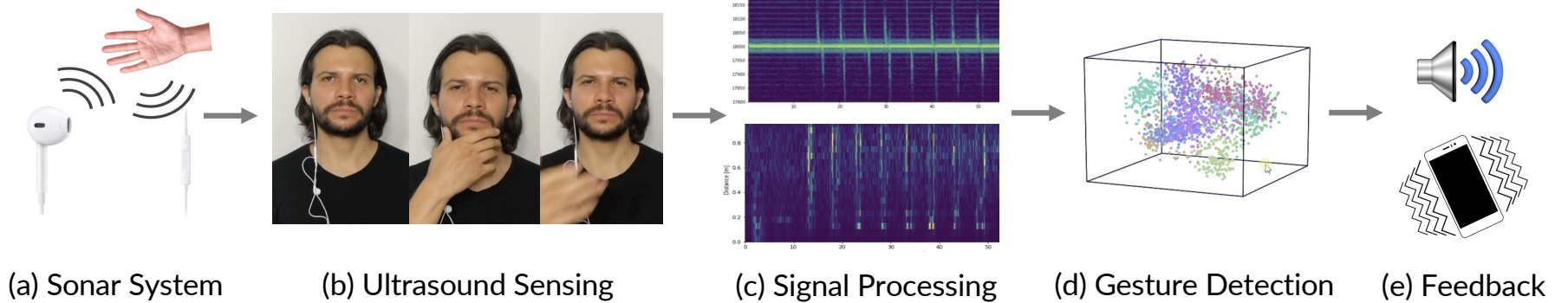


Working Principle



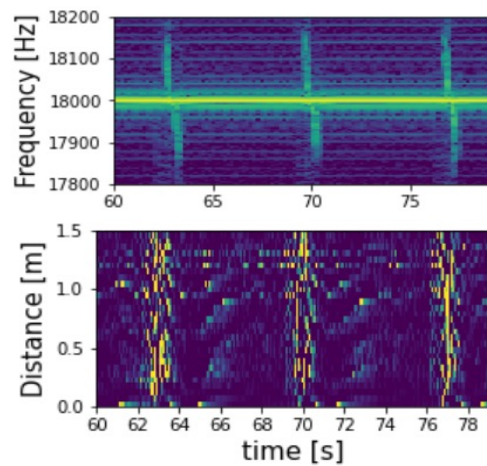
Saving Face transforms a pair of wired earbuds into a sonar system

1. Designing the System

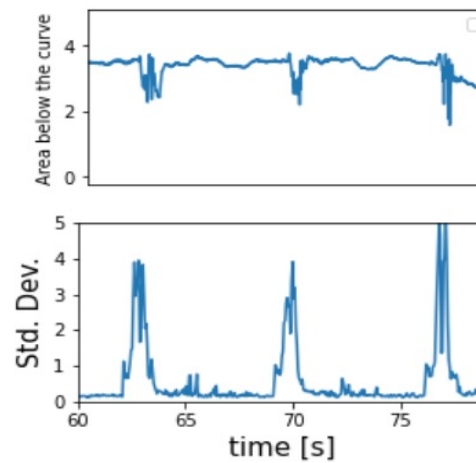


Design and implementation of the Saving Face system

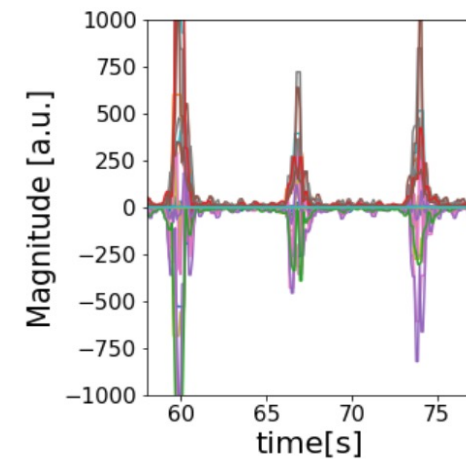
2. Processing the Data



(a) Generating Spectrograms



(b) Extracting Features

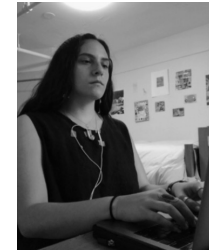
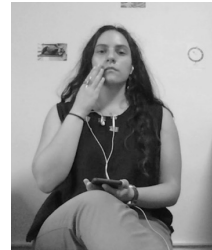


(c) Convolutional Filters

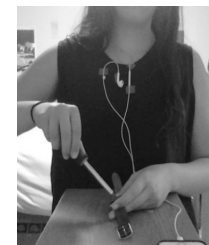
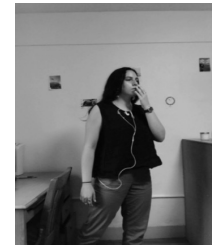
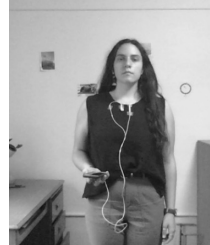
Characteristic patterns of a face touch gesture at three main stages of processing

3. Building the Dataset

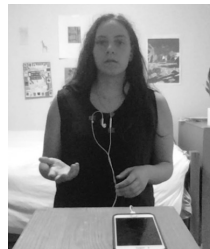
Office



Manufacturing



Supermarket



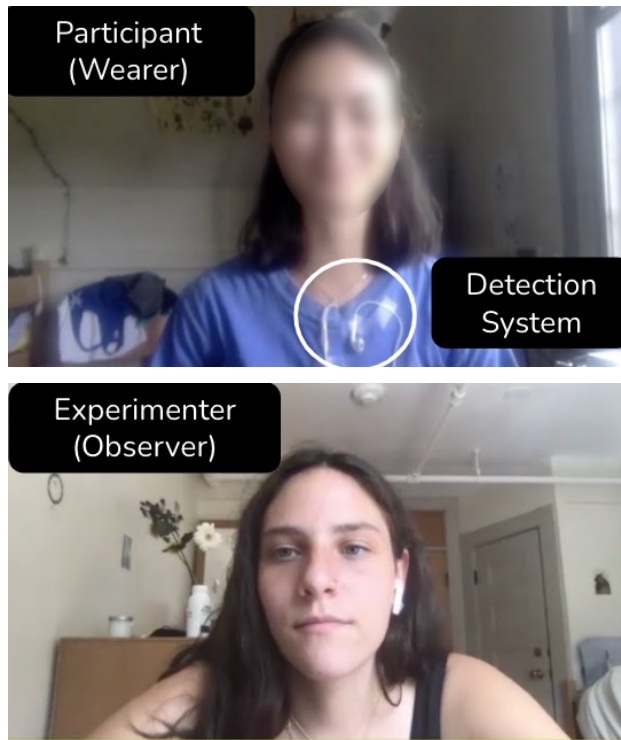
Nine different tasks used to train the machine learning model

4. Developing the Model

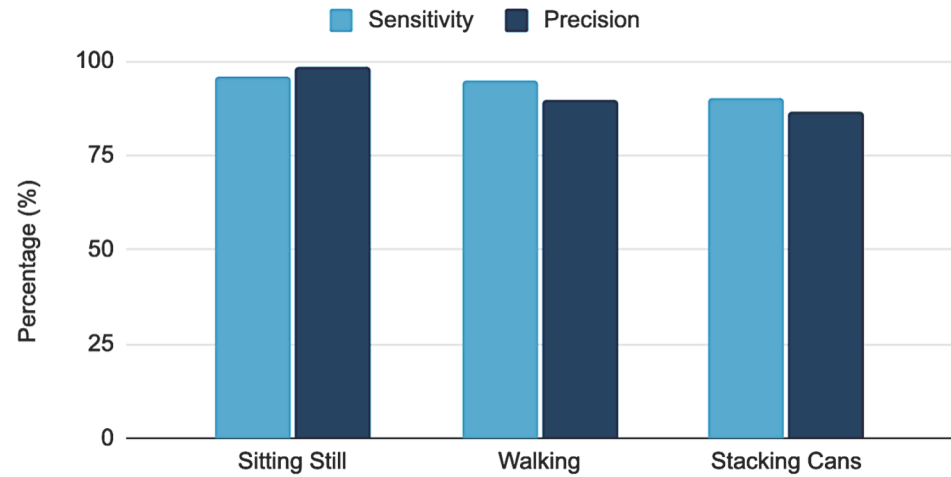
		Doppler		FMCW		Doppler and FMCW	
Training	T	0.71	0.29	0.75	0.25	0.73	0.27
	F	0.18	0.82	0.17	0.83	0.15	0.85
Testing	T	0.78	0.22	0.91	0.09	0.93	0.07
	F	0.14	0.86	0.13	0.87	0.04	0.96
		T	F	T	F	T	F
		Predicted					

Evaluation of the machine learning model

5. Conducting User Studies



User Study Setup and Design



Sensitivity and Precision measured during user studies

Acknowledgements

▷ Thanks to the Saving Face Team and MIT Media Lab ¹

▷ Contact: savingface@media.mit.edu

Paper: Scalable Solution for Signaling Face Touches to Reduce the Spread of Surface-based Pathogens (IMWUT Vol 5, Issue 1) ²

[1] <https://www.media.mit.edu/projects/saving-face/people/> [2] <https://dl.acm.org/doi/10.1145/3448121>