Acoustic Environment Recognition

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Recognizing the environment

www.downloadableyoutube.com

http://upload.wikimedia.org/wikipedia/commons/f/f1/Oxford.street.london.arp.jpg

http://i2.cdn.turner.com/cnn/dam/assets

Research Applications and Future Developments

www.hearing-aids-wizard.com

Data Samples

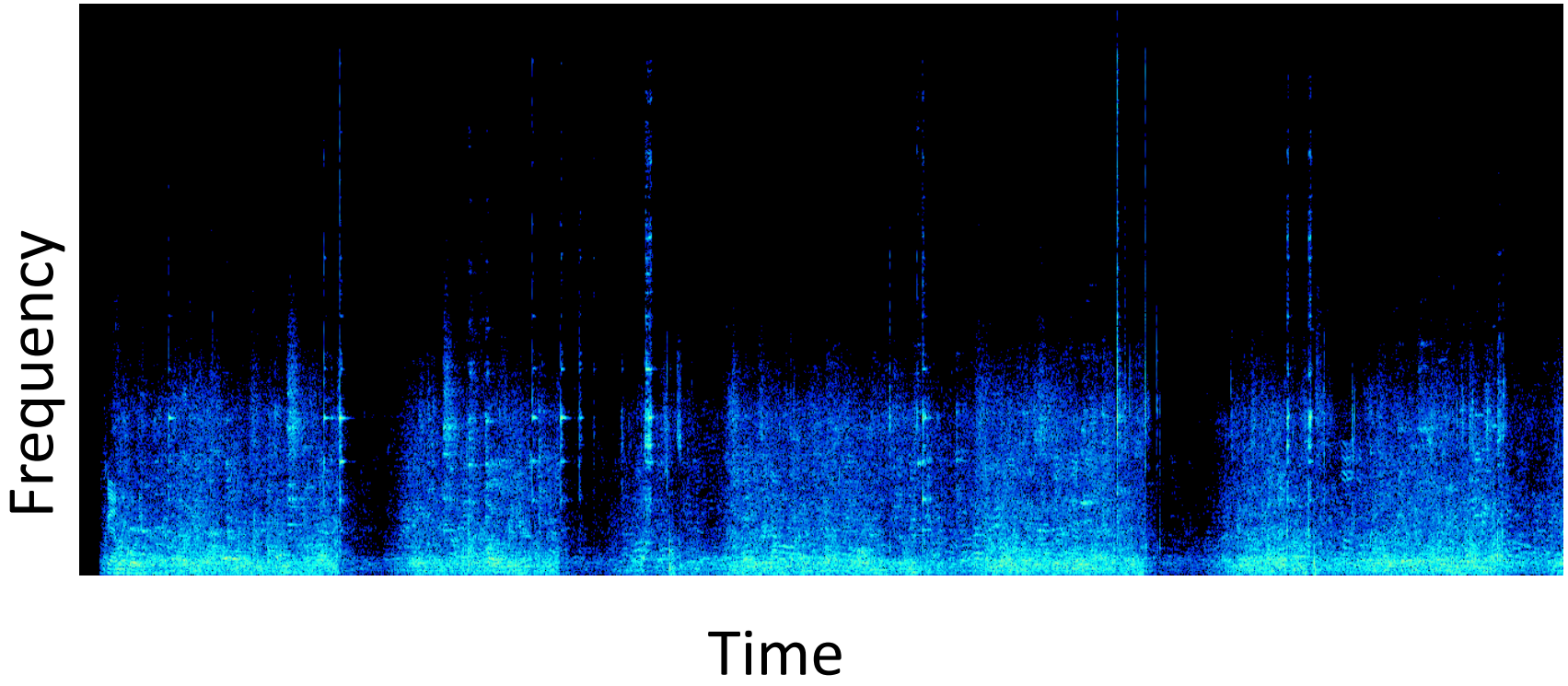
- 3 Environments: cafeteria, beach and street
- 30 samples of 20sec and 40sec lengths per environment
- Used 20 samples for training and 10 samples for testing purposes

UCSB entrance

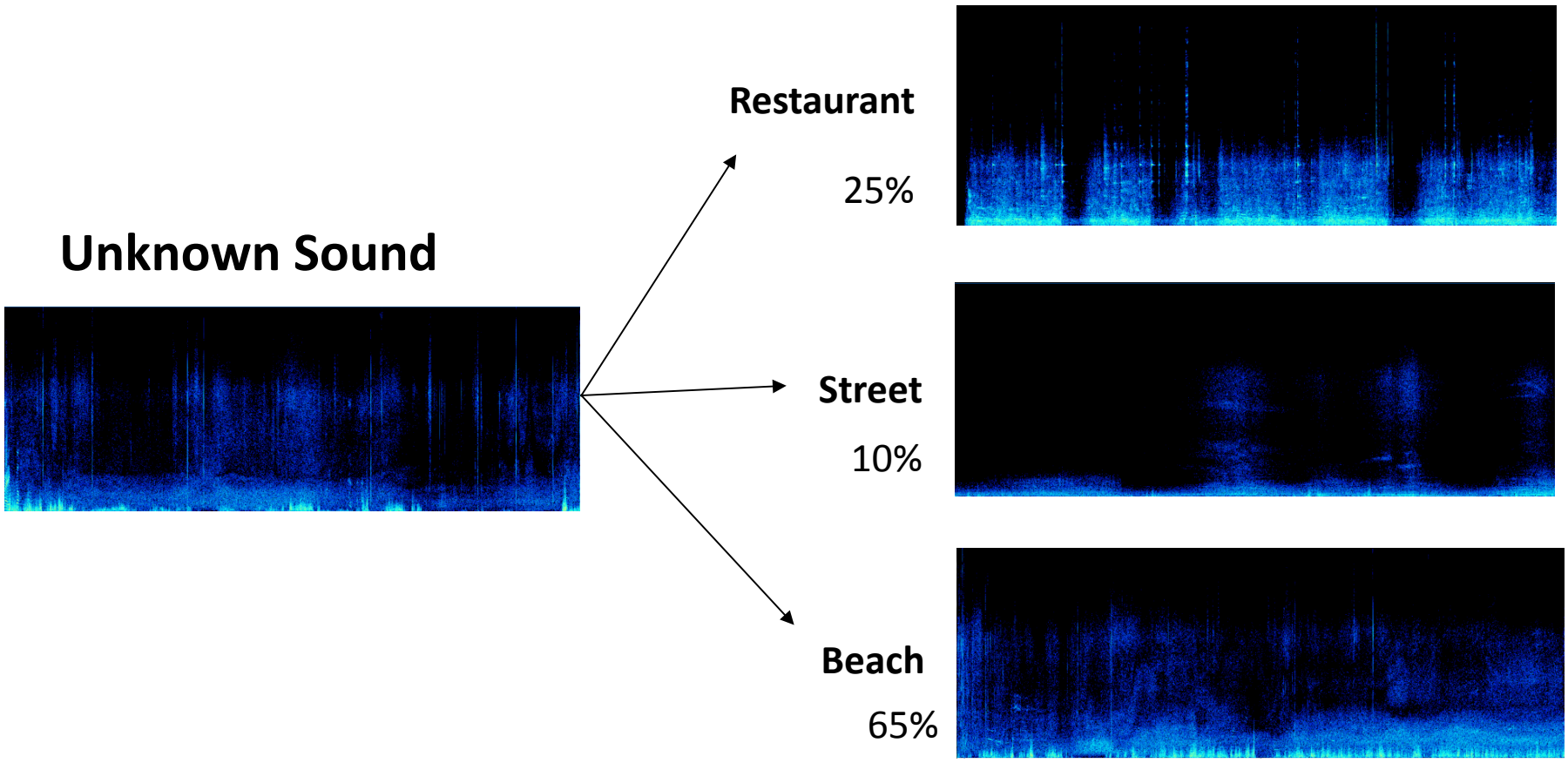
De La Guerra Cafeteria

Goleta Beach

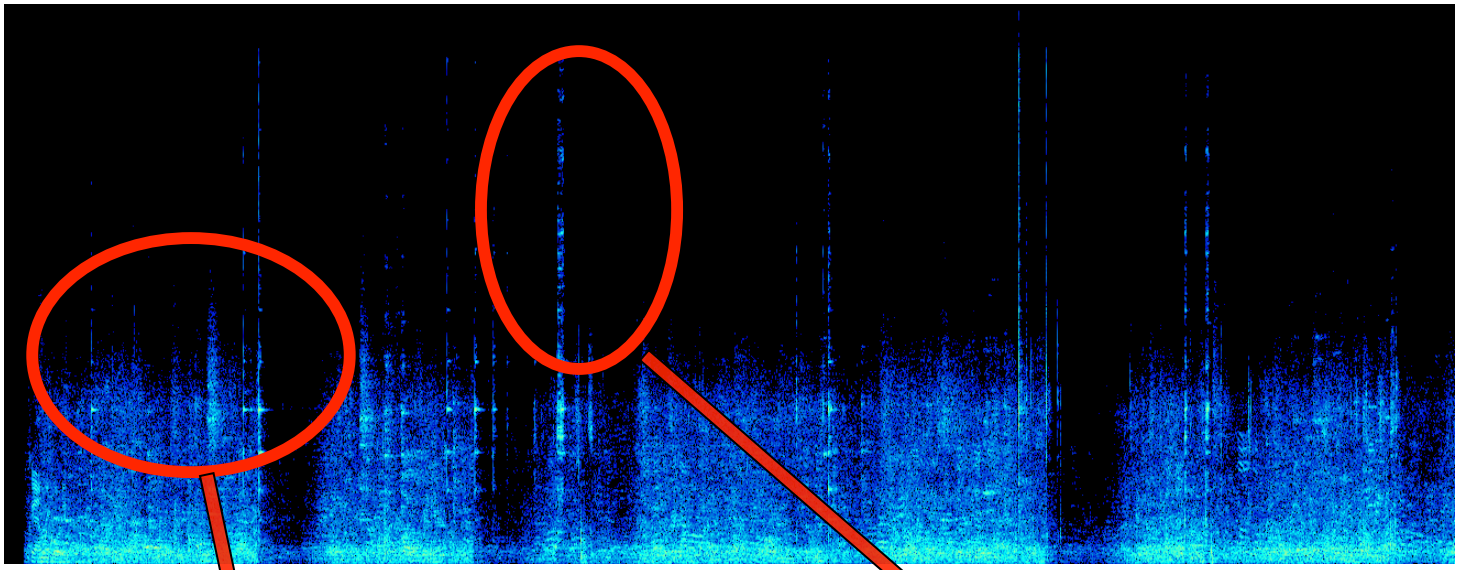
Spectrograms Represent Sounds



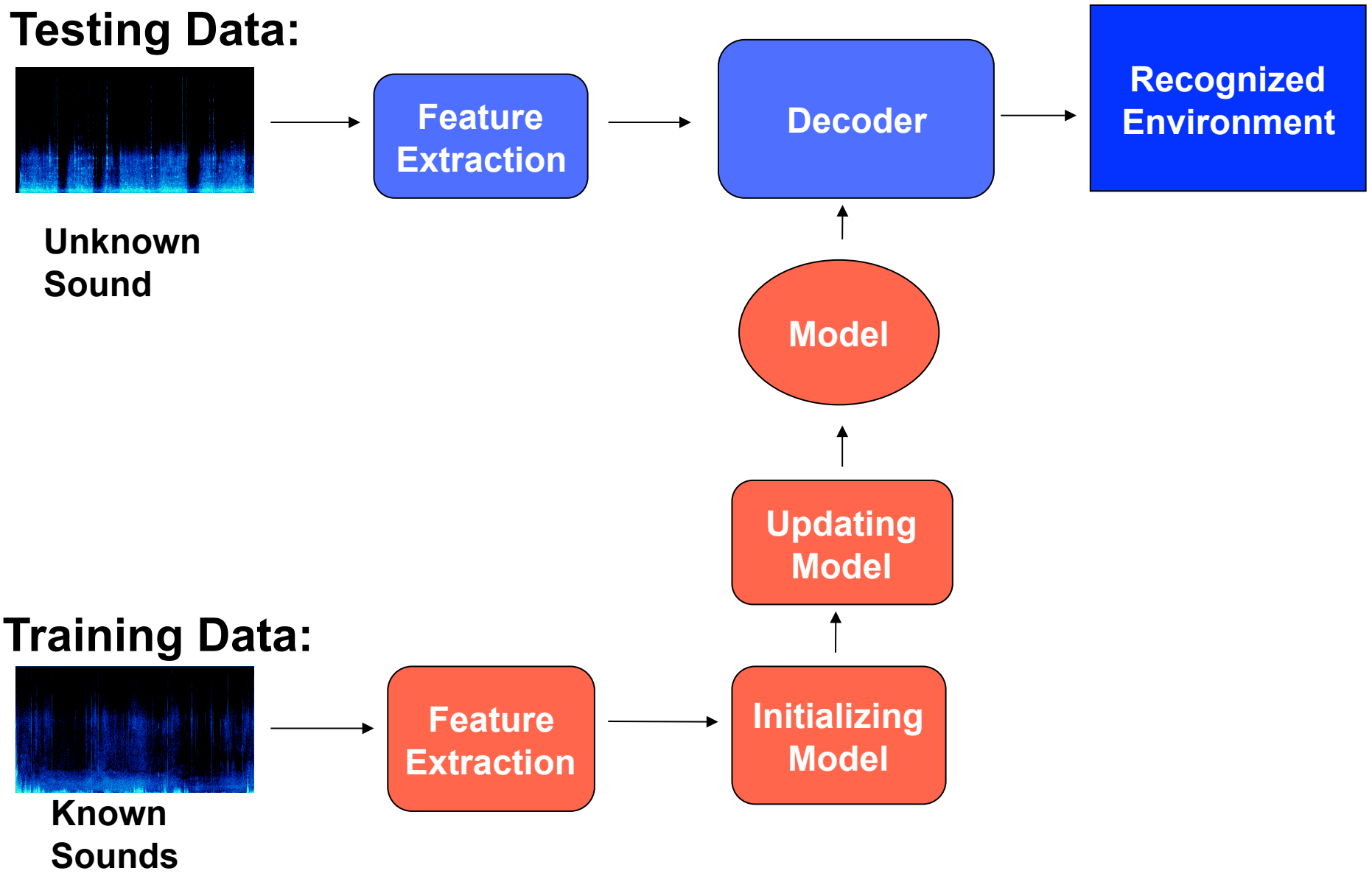
Recognizing Sounds



Hidden Markov Model



From sound to an environment



Accuracy for 20 second samples

Accuracy %	Street	Beach	Restaurant
Street (**10** samples)	4	3	3
Beach (**10** samples)	2	4	4
Restaurant (**10** samples)	0	0	10
Overall Accuracy: 61%			

Accuracy for 40 second samples

Accuracy %	Street	Beach	Restaurant
Street (**10** samples)	10	0	0
Beach (**11** samples)	6	1	4
Restaurant (**10** samples)	0	0	10
Overall Accuracy: 67%			

Longer lengths = More accuracy

Future Improvements

- Better sound quality recording device
- Collecting more data samples
- Experiment with different data lengths
- Add more environments
- Finding the optimal number of states in Hidden Markov Model

Thank you!

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