CTIMIT: A SPEECH CORPUS FOR THE CELLULAR ENVIRONMENT WITH APPLICATIONS TO AUTOMATIC SPEECH RECOGNITION

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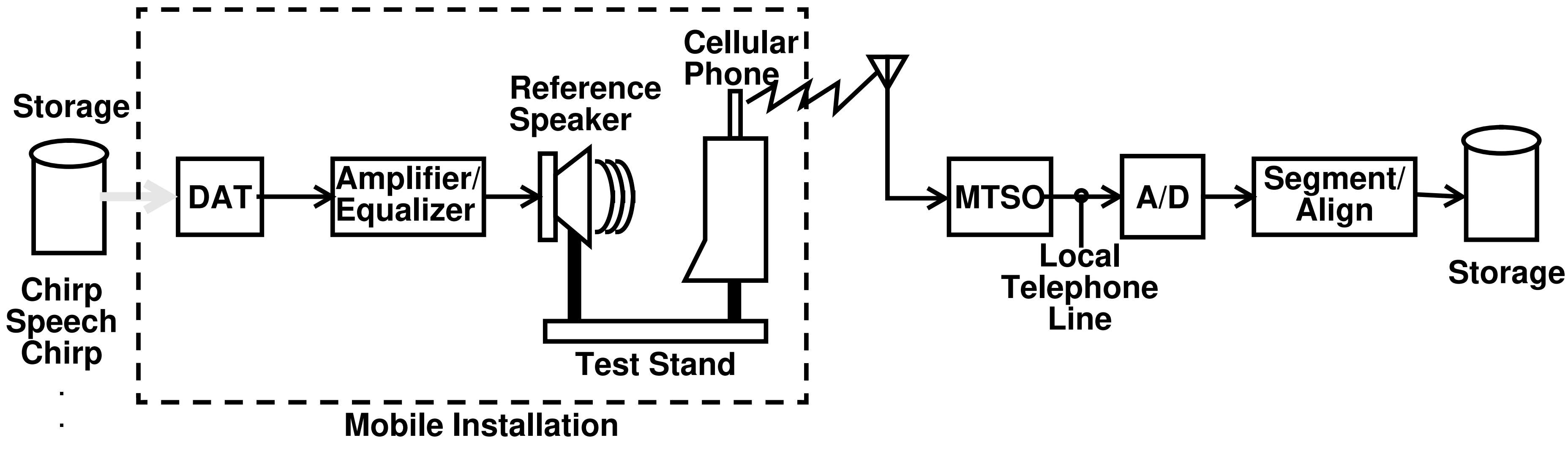
CTIMIT DATABASE

- ***Continuous Speech, Multi-Speaker, Cellular Bandwidth***
- ***Orthographically and Phonetically Labeled***
- ***Collected by Transmitting the TIMIT Speech Database over the Cellular Network***
- ***Increases Cellular Phone Recognition Accuracy by 82%***
- ***Additional HF-TIMIT Database has been Collected using a Simulated HF Channel***

CTIMIT DESCRIPTION

- ***630 Speakers: 438 male, 138 female***
- ***Eight Dialect Regions***
- ***Total of 3367 Utterances Collected***
- ***Caveat: Not all Speakers have the two dialect ("sa1 and sa2") Sentences***

COLLECTION CONFIGURATION



- ***Controls designed to increase diversity, repeatability:***

  ❑ ***Acoustic isolation/stabilization of speaker/phone using test stand.***

  ❑ ***Calibration of audio equipment to control level, spectral distortion.***

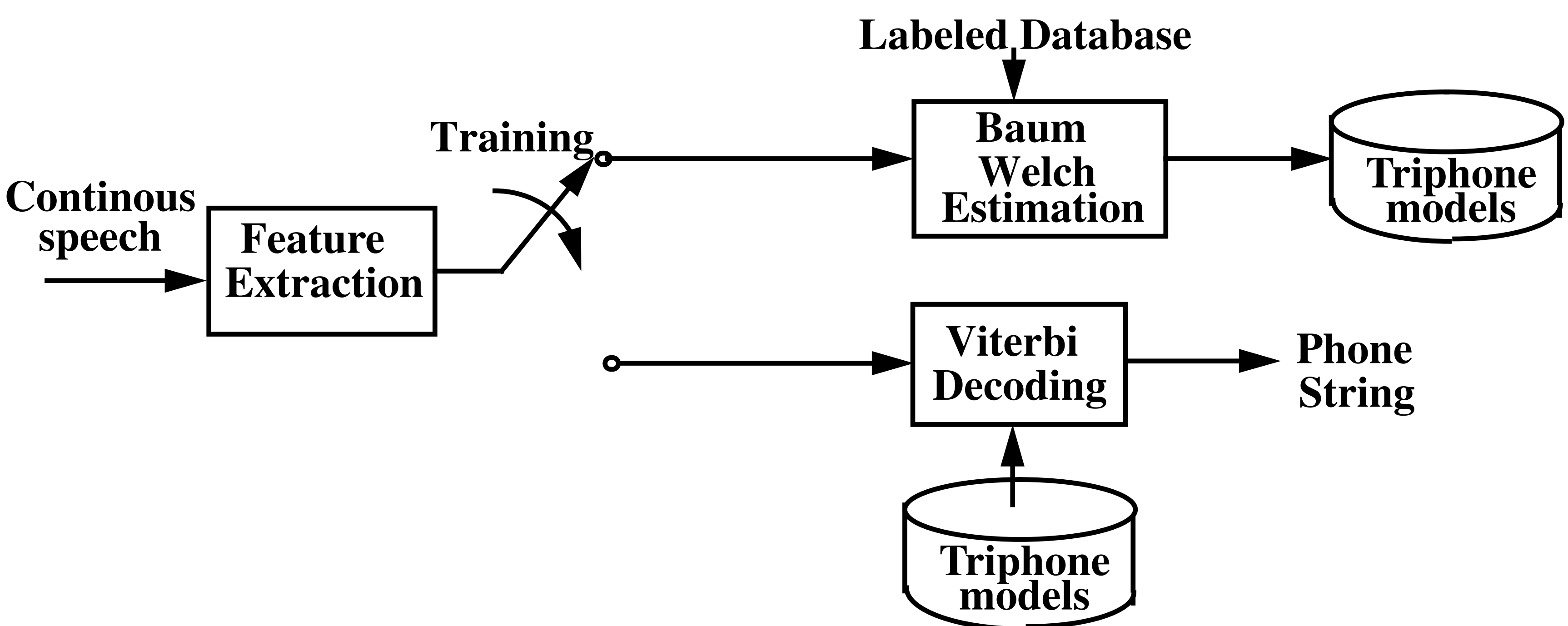
  ❑ ***Multiple phone calls (one per session, 24 total). Multiple phones (one hand-held, two transportables).***

  ❑ ***Database collected with vehicle in motion. Diverse driving environments, cell switching***

- ***CTIMIT Tested in a Phone Recognition Application***
- ***Experimental Description***
  - ❑ ***Two Phone Recognizers Developed***
    - ***CTIMIT Recognizer: Trained using Training Set of CTIMIT***
    - ***TIMIT Recognizer: Trained using the Equivalent Training Set of TIMIT down-sampled to 8 kHz***
  - ❑ ***TIMIT Recognizer Tested Using the Test sets of TIMIT and CTIMIT***
  - ❑ ***CTIMIT Recognizer Tested Using the Test set of CTIMIT***

- ***Phone Recognizer Description***
  - ❑ ***Developed Using Entropic's Hidden Markov Model Toolkit (HTK)***
  - ❑ ***Context-Dependent Triphone Models***
  - ❑ ***Each Triphone Modeled using a 3-state Continuous-density HMM with Five Mixtures / State***

- ***Phone Recognizer Block Diagram***



EXPERIMENTAL RESULTS

- ***TIMIT Recognizer Experiences a 58% Decrease in Phone Accuracy on the CTIMIT Test Data***

- ***CTIMIT Recognizer Achieves an 82% Increase in Phone Accuracy on CTIMIT Test Data Compared to the TIMIT Recognizer***