

EE513
Audio Signals and Systems

LPC Analysis and Speech

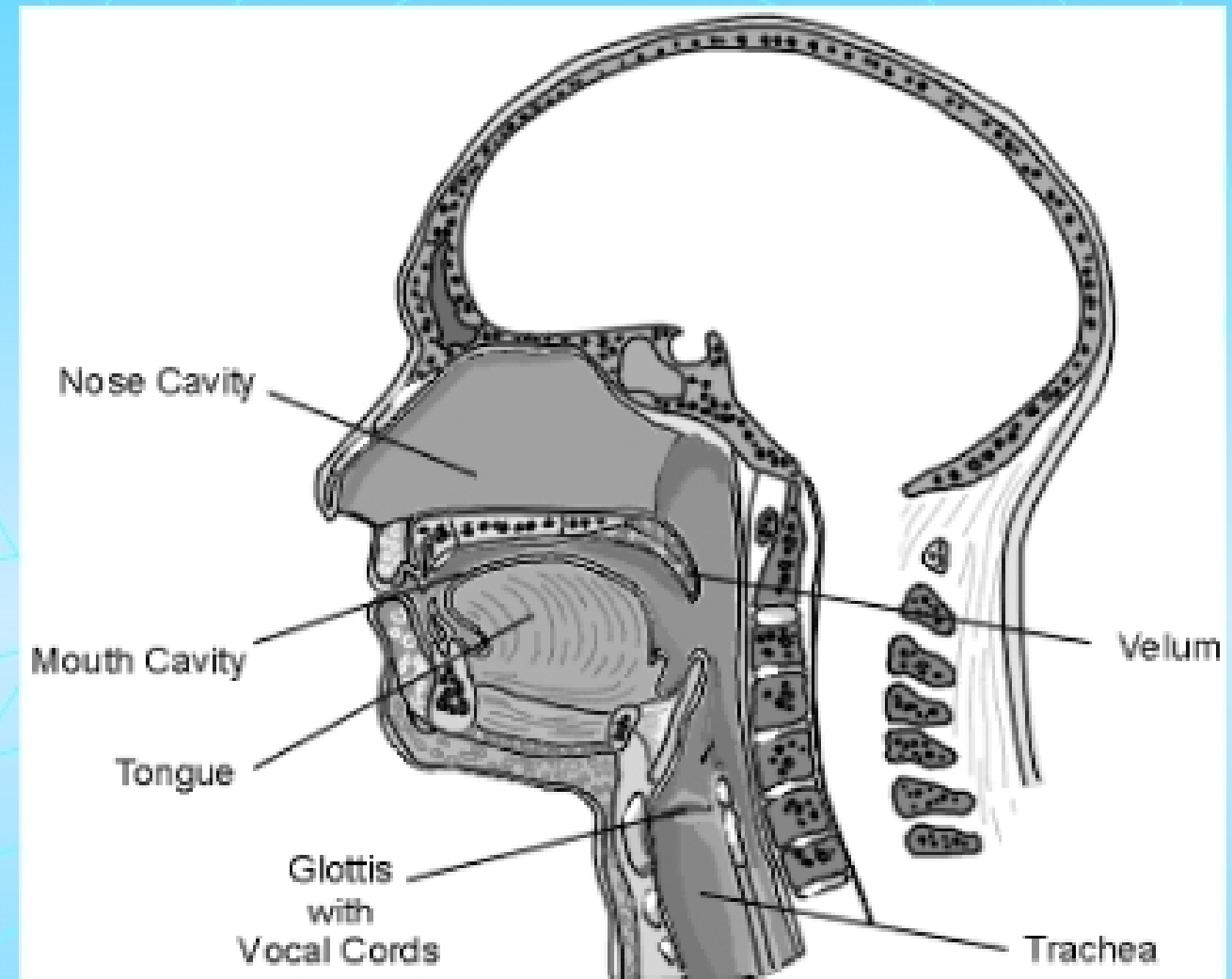
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Speech Generation

Speech can be divided into fundamental building blocks of sounds referred to as **phonemes**. All sounds result from turbulence through obstructed air flow

The vocal cords create quasi-periodic obstructions of air flow as a sound source at the base of the vocal tract. Phonemes associated with the vocal cord are referred to as **voiced speech**.

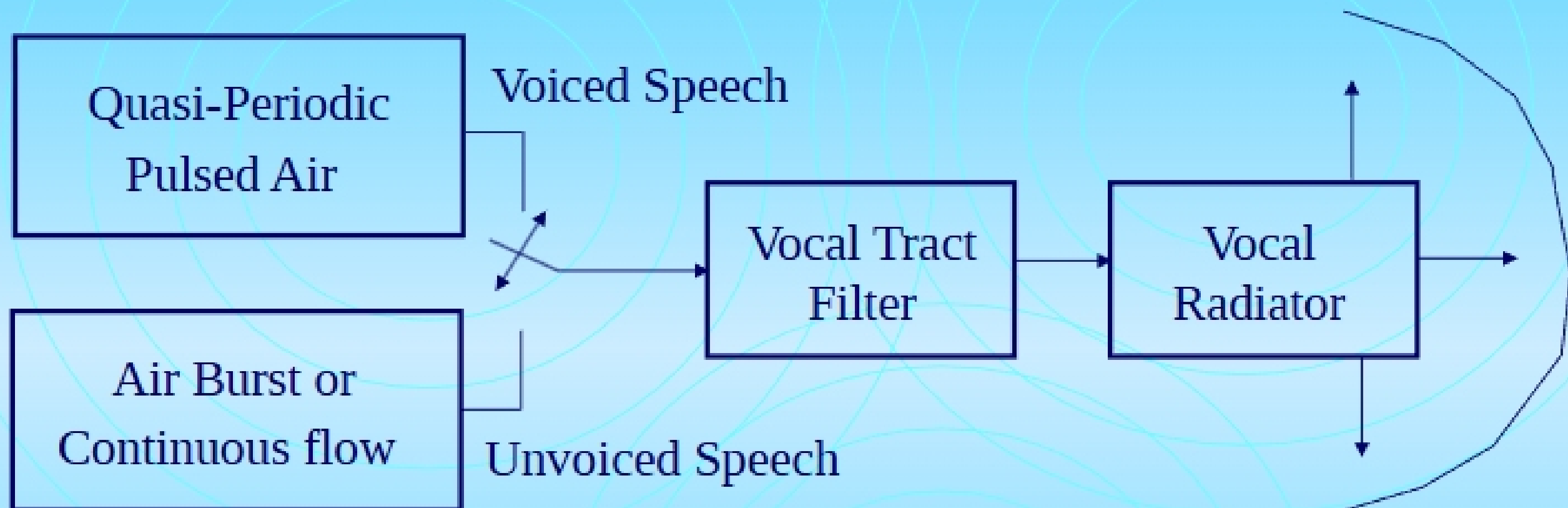
Single shot turbulence from obstructed air flow through the vocal tract is primarily generated by the teeth, tongue and lips. Phonemes associated with non-periodic obstructed air flow are referred to as **unvoiced speech**.



Taken from <http://www.kt.tu-cottbus.de/speech-analysis/>

Speech Production Models

The general speech model:



Sources can be modeled as quasi periodic impulse trains or random sequences of impulses.

Vocal tract filter can be modeled as an all-pole filter related to the tract resonances.

The radiator can be modeled as a simple gain with spatial direction (possibly some filtering)