

Method and Device for Instantly Changing Speed of Speech

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The invention relates to a speech speed conversion method and a device for assisting the hearing of hearing impaired persons and the elderly.

In general, the listening capability of humans, e.g., the critical speed of speech recognition (the maximum speech speed at which the speech can be precisely identified), falls with age and may be affected by a variety of medical disorders. Thus, many people find it difficult to identify rapid or even ordinary speed speech. In such cases, the listener may use a hearing aid to augment their natural listening capability. However, the conventional hearing aid simply makes up for the poor propagation characteristics of the auditory organ's external ear and middle ear by virtue of its improved frequency characteristic, gain control, etc. Therefore, any fall in speech identification capability that is mainly associated with degradation of the auditory center cannot be compensated.

This invention is designed to overcome the above problem by processing the speech of the speaker such that the speech speed can be adjusted to the listening capability of the listener in substantially real time. The figure illustrates an embodiment of a speech speed converting device comprising the following steps.

Initially, an analysis processor processes the input speech data to obtain block lengths for the attributes of voiced sound, voiceless sound and silence. A block data splitter splits the input speech data into blocks having block lengths dependent on the respective attributes. A block data memory sequentially stores speech data split by the block data splitter as block speech data and the block lengths.

Subsequently, a connection data generator uses this block speech data to produce connection data for connecting adjacent block speech data to each other. A connection data memory sequentially stores the connection data. The scaling factor for extending the speech period is determined from the desired speech speed, as selected by the listener, and the connection order generator produces the block connection order of the block speech data and the connection data according to the block lengths output sequentially from the block data memory and the temporal scaling factors for the respective attributes.

Finally, the speech data connector sequentially links together the block speech data and the connection data based on the block connection order.

By controlling the order of previously stored block speech data and the connection data, the output voice can thus be created based on speech speed conversion control information created in response to the operation of the listener. Speech can be output promptly at the desired speed even when the listener manually changes the speech speed, which makes it possible for the listener not to perceive the time delay when the speech speed changes during the broadcast.

The invention can also be used to help the listener learn foreign languages, because the speech speed can be adjusted to one's hearing ability. Furthermore, it can be applied to a variety of audio and/or video devices such as TV-sets and radios.

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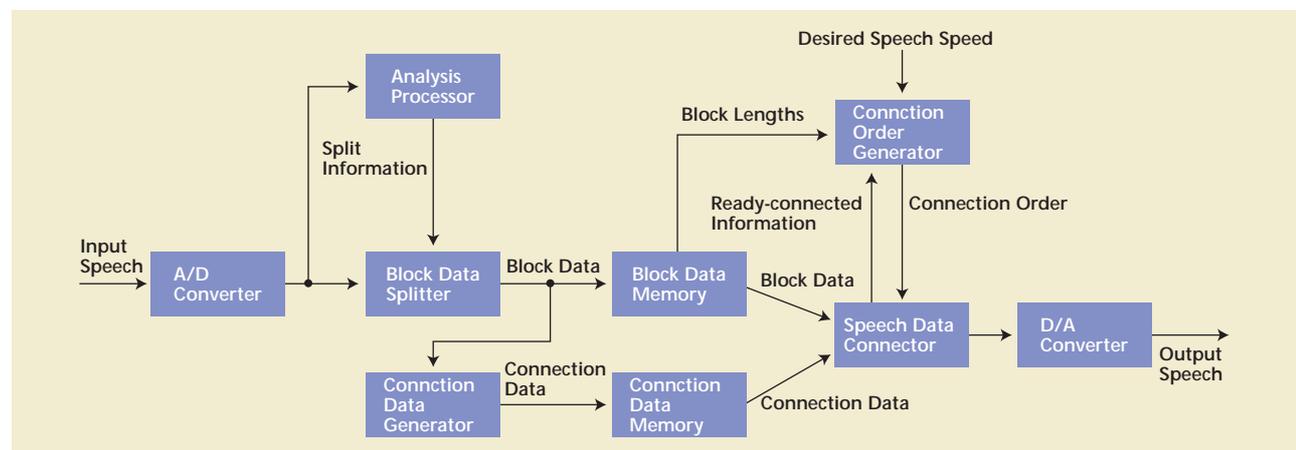


Figure: Speech speed converting device