**Project Overview**

**Introduction**

Nowadays, voice recognition system is widely used in many areas such as the telephone enquiry system and the voiceprint security system. Applications of voice control in these areas prove that it not only enhances their efficiencies, but also reduces workload of manpower. However, just few applications are developed for medical purpose. Hence, a voice controlled medical instrument was developed in this project to help doctors controlling the medical instrument more efficiently.

**Implementation**

The project was divided into two major blocks, one is the recognition system and the other is the interfacing block.

**Recognition System**

The recognition system was subdivided into three parts. The first one was the endpoint detection block, which was used to detect the presence of the input speech and differentiate it from background noise. The second part was the feature extraction, which was used to extract the feature vectors from the speech. The third part was the recognizer; its function was to recognize the input speech. An User-Dependent and User-Independent recognition system were developed. The User-Dependent system was developed based on Dynamic Time Wrapping (DTW). The User-Independent system was developed based on Hidden Markov Model (HMM).

**Interfacing Block**

General Purpose Interface Bus (GPIB) card was used to send the command to the Digital Oscilloscope. LabView program was the driver program of Digital Oscilloscope. ActiveX software interface was to connect the recognition system and the driver program of Digital Oscilloscope.
**RESULT**

<table>
<thead>
<tr>
<th></th>
<th>DTW based recognizer</th>
<th>HHM based recognizer</th>
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<tbody>
<tr>
<td><strong>Accuracy</strong></td>
<td>90%</td>
<td>93%</td>
</tr>
<tr>
<td><strong>Speed</strong></td>
<td>0.3s</td>
<td>0.15s</td>
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</tbody>
</table>

User dependent system interface

User independent system interface

Virtual Instrument of Digital Oscilloscope

Waveform from CRO