STUTTERING MEASURING DEVICE

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Abstract: Stuttering is the communication disorder characterized by disfluencies that are frequent and disruptive to communication. Stuttering measuring device is used to count the number of words spoken by the client. This approach decides whether a client should be treated, to assess treatment progress, and to document treatment outcomes. Our approach is real-time perspective. The main motive behind developing this system is to recognize the words in which the speaker says through the microphone. The signal strength is increased by preamplifier and later compared with the reference voltage. The digitized signal is interfaced with AVR ATmega16 microcontroller to count the number of words

Keywords: Stuttering, RPS, AVR studio

1. INTRODUCTION

The Stuttering Measuring Device, in this we propose a new method using microcontroller to count number of words spoken by a stuttered person in unit time. The stuttering is defined as the speech disorder in which the flow of speech is disrupted by involuntary repetitions and prolongations of sounds of sounds, syllables, words or phrases as well as involuntary silent pauses or blocks in which the person who stutters is unable to produce sounds.

Stuttering is generally not a problem with the physical production of speech sounds or putting thoughts into words acute nervousness and stress do not cause stuttering, but they can trigger stuttering in people who have speech disorder, and living with a highly stigmatized disability can result in anxiety and high allosteric stress load.

The Use of better system for counting number of words spoken by a stuttering person has many applications in speech and hearing hospitals. They use this device while training the stuttering person. Before treatment doctors counts the number of words spoken by a stuttering patient and they give training

To that patient so that words spoken per unit time is increased. Again they use this device for word count. This device is used for the main aim of the project is to design and develop a device to count number of words spoken by a stuttering person in unit time.

The different types of stuttering are,

1. Interjections (extraneous sounds and words such as “uh” and “well”); 2.Revisions (the change in content or grammatical structure of a phrase or pronunciation of a word as in “there was a young dog , no , a young rat named Arthur”); 3.Incomlpete Phrases (the content not completed); 4.Phrase-Repetitions; 5.Word-repetitions; 6.Part-word repetitions; 7.Prolonged sounds (sounds judged to be unduly prolonged);

The remainder of the paper organized as follows: Section(2) focuses on design methodology in detail, Section (3) emphasizes on hardware working of this paper, section (4) focuses on the software requirements of this paper concludes by comparing present work with previous.

2. DESIGN METHODOLOGY

Human voice signal is grabbed over Microphone, which is an acoustic to electric transducer or sensor which is used to converts sound in air in to electrical signal. Speech signal also contains noise in the background or prolongation of the stammered person which is eliminated by noise cancellation method. The converted electrical signal is given to pre amplifier in order to increase its voltage level. Next, the pre amplified output is given to comparator, to compare pre amplified output with preset value. And digital output of the comparator is given to microcontroller in which we write codes to count number of words spoken by a stuttered person. Finally the word count is displayed.

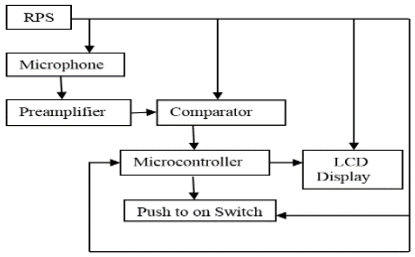

Fig 2.1: Block diagram of stuttering measuring Device

3. CIRCUIT DIAGRAM

The circuit diagram shows detailed description of the project. The input speech signal is grabbed by the microphone, were audio signal will be converted to electrical signal using condenser microphone which is highly sensitive. We use sensitive pot to adjust sensitivity of condenser microphone. RC filter eliminates the electrical noise which present at the background and it even provides impedance matching. The sensitivity of a signal is adjusted which provides reference for the input speech signal.

The electrical signal obtained by microphone is in the range of millivolts, in order to increase its voltage level, it is given to pre amplifier, LM358. The signal is then compared, using LM358 comparator, and it is given as the interrupt signal to PORTB1 (pin 2). The push to on switch which provides the start and end duration of words is given to pin 1 of PORTB0. All digital computer systems are driven by some form of oscillator circuit.

The oscillator circuit is the 'heartbeat' of the system and is crucial to correct operation. For example, if the oscillator fails, the system will not function at all; if the oscillator runs irregularly, any timing calculations performed by the system will be inaccurate. Here we use 16MHz of frequency of crystal oscillator which is very much sufficient. The regulated power supply which is of 7805 IC which regulates the power to 5V and this voltage is driven by the entire block as the supply source. The AVR ATmega16A processes and counts the digitized compared signal.

The word counts are displayed by using LCD display (2X16). This is the real time basis and we counts the words using timer for about 60 minutes. PORTB is used as the input port and PORTD is used as the output port.

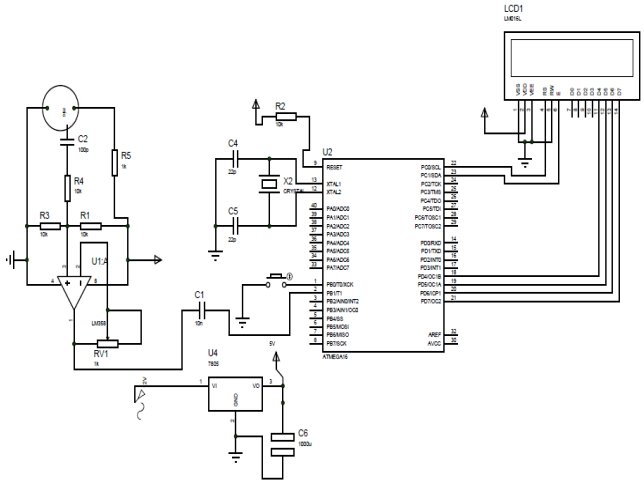

Fig 3.1: Circuit diagram of stuttering measuring Device

4. HARDWARE DESIGN

Regulated Power Supply is used to convert unregulated voltage to 5V constant direct voltage supply. The input for this regulated power supply is 6-12V dc voltage. This Regulated supply converts this given input voltage to 5V constant voltage. Which is given to comparator circuit, preamplifier circuit, push to on switch and also it is given to Microcontroller. Speech signal from the stuttered person is received by microphone. The microphone which is used here is condenser microphone, which is very sensitive compared to that of the dynamic microphone.

And this microphone converts speech signal into electrical signal. This electrical signal is in the range of millivolts. In order to increase its voltage level the signal is given to preamplifier circuit .The pre amplifier also cancels the background electrical noise and later this signal is compared with predefined voltage value. If the pre-amplified value is more than preset value then comparator output is one.

The predefined value is set by adjusting the potentiometer value. Impedance matching is the practice of designing the input impedance of an electrical load or the output impedance of its corresponding signal source to maximize the power transfer or minimize signal reflection from the load The output of comparator is then given to microcontroller where the program for counting the number of words spoken by a stuttered person in a given interval of time is fed . The program is written using embedded C. The counting start as soon as push to on switch is switched on. . The word count is displayed on LCD display The LCD and push button are also directly interfaced with the microcontroller. LCD display is connected to port D of Microcontroller and push to on switch is connected to port B0 of the microcontroller.

5. SOFTWARE DESIGN

The software implementation of various blocks mentioned in previous chapter is done using the AVR studio software. The AVR Studio is the integrated Development Environment (IDE) for developing and debugging embedded Atmel AVR applications. This chapter we describe the various Embedded C commands in AVR studio software used for our software implementation.

FLOW CHART FOR INITIALIZATION:

1. At first, we will initialize the micro controller and then initialize the variables and functions and data that are passed through the port pin.
2. Enable watchdog timer.

3. The LCD Display macro is called and "stuttering measuring device" is displayed on LCD Screen by providing the cursor positions.

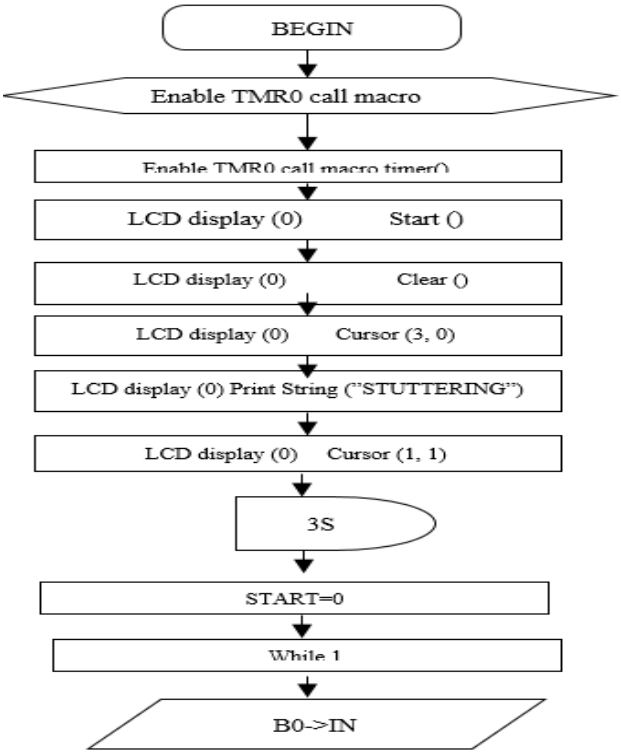

Fig 4.1: Flow chart for Initialisation

4. A delay is provided for three seconds and calculation is started.
5. Switch is connected to B0 port. If the switch is pressed, then B2 port is checked for input.
6. The port B2 recognizes the speech and starts the timer.

FLOW CHART FOR CALCULATION:

1. The message "press to start" will be displayed when the circuit is switched on.
2. The timer is initiated and divided into 60 cycles. 1 second is equal to 60 cycles, hence when the timer crosses 60 cycles, seconds count will be increased.
3. The spoken words will be counted within 1 minute when the start button is pressed.
4. When the pause is given between words, the word count is increased.
5. After the completion of 1 minute, the counting of number of words will be stored.

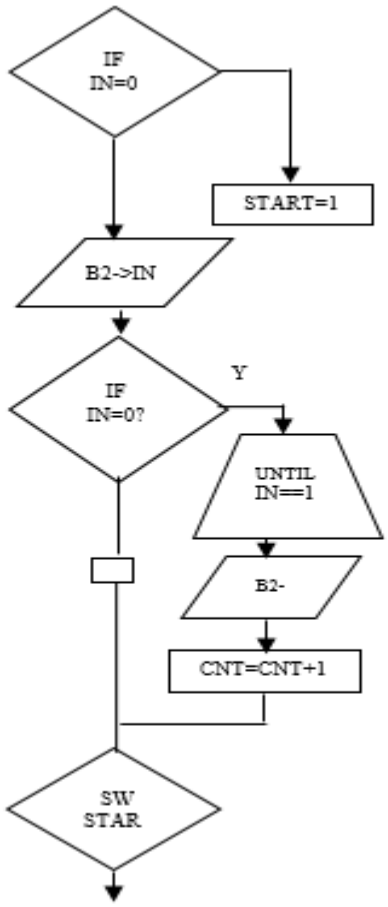

Fig 4.2: Flow chart for Calculation

FLOW CHART FOR DISPLAY:

1. Switch case is used to display on LCD screen. Three cases are considered.
2. The first case will be executed if start button is pressed. "Press to start" will be displayed when the circuit is switched on.
3. In the second case, after start button is pressed, "Please wait" message will be displayed.
4. In the third case, number of words spoken will be displayed. After certain delay, say, 5 seconds, the calculation starts from first, by initializing start to zero.

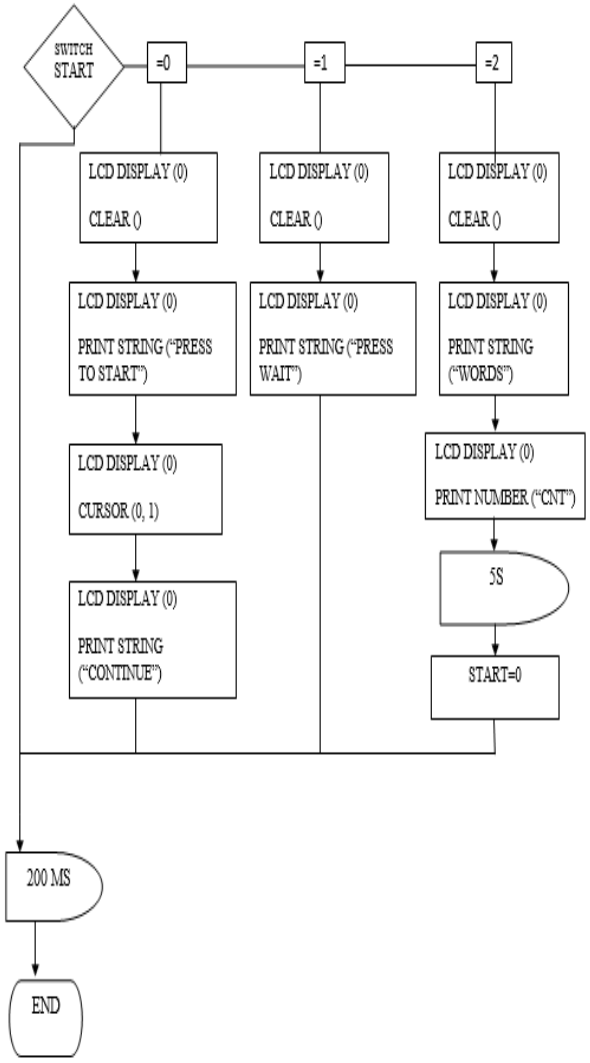

Fig 4.1: Flow chart for Display

5.CONCLUSION

Speech is the primary, and the most convenient means of communication between people. Whether due to technological curiosity to build machines that mimic humans or to desire automatic work with machines. The Flow chart for counting number of words spoken by the stuttered person has been presented in the paper in detail. This paper attempts to provide a comprehensive survey of research on prolongation disfluencies in stuttering. The paper suggest that how we can count the stuttered events .In order to perform the objective studies for effective communication.

6. RESULTS

The complete model is shown were hardware is interfaced with AVR microcontroller that is ATmega16.It is a real time module. The proposed system is speaker dependent and it achieves the detection score of 91%.The software coding part is done in AVR studio4 and an image of a code which is build is shown below.

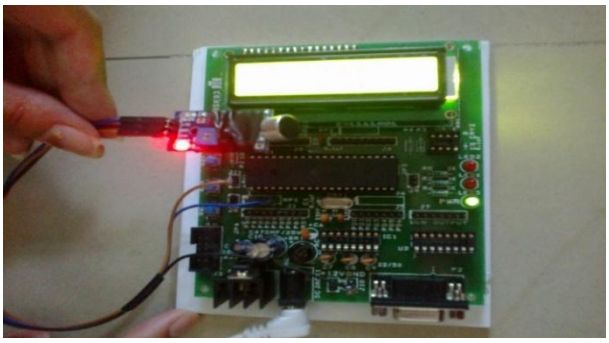

Fig 5.1: Physical Implementation of stuttering measuring device.

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BIOGRAPHIES

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