Alteza Excellence and Innovation in Learning

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Abstract:- In this paper we propose a concept to implement a smart classroom where lights and fans are turned on/off automatically based on sensors, which detect light intensity and temperature. As an aid for the students to understand the teacher much better we make use of speech to text conversion technology to display on the screen what the teacher is saying in real time. We use Python Speech recognition to achieve the voice to text conversion with utmost accuracy. When the teacher is talking the processor takes the voice and converts it to text.

Keywords:- *Speech-to-Text; Sensors; Automation; Python Speech recognition; Arduino.*

I. INTRODUCTION

Quality education is an essential requisite in today's competitive environment. Technology has affected us in every aspect. Alteza is a modernized method of education in Indian education scenario, which provides quality education to students by helping them in better concept formation, concept elaboration, improvement in reading skills and academic achievement.

The traditional approach of lecture and note taking has lost its effectiveness as the modern day around education grows. It is the responsibility of the education system to employ a variety of opportunities for the students to gain interests, orchestrating academic growth and progression throughout childhood and adolescence. It is a new vision in education. The use of Education technology can bring a huge change in education. Internet and e learning devices can make classroom environment extremely amazing. These days, if it's not showing up on a screen, kids aren't interested in it. In schools, administrators and teachers are realizing that new high-tech gadgets can not only hold students' attention for longer but can actually improve their ability to learn. So many school districts are deploying educational technology. In this direction we will be implementing two main features in Alteza.

A. Classroom Automation

First, the lights and fans in the classroom will be controlled automatically using arduino. We use LDR and LM35 to measure the light intensity and the temperature in the classroom. We then control the ON\OFF of the appliances based on the values detected.

B. Speech-Notes

The students will be able to see what the teacher is saying during lectures so that the students can apprehend the teacher much better. Speech Recognition can be used to automatically caption classroom lectures. We convert an instructor's speech into text, which can be instantly displayed on a variety of devices to improve access to classroom content.

II. AUTOMATION

The world is moving towards automation. Automatic controlled devices replace manual operations. One of the basic needs of mankind during hot weather is cooling fan & control of lights based on light intensity in the room. Fan is a device that blows air to provide cooling in hot weather. In present time, speed of fan is manually varied by manual switch called dimmer. By rotating the dimmer, the speed of fan can be changed. It is observed in some areas that temperature is high during daytime however temperature falls down significantly at night. The users do not realize the variation in temperature and may catch cold. So it is the need of time that speed of fan should vary according to temperature. It is particularly useful for those areas where temperature varies significantly during day and night. Since the fan is not an expensive device, therefore the automation should also be economical.

When you hear Automatic Lights, we generally assume it to turn on and off at a particular time. But sometimes it so happens that even after say 6 P.M. there is enough of natural light and you wouldn't need your lights to turn on or sometimes too dark during daytime. What if we make a device that will automatically adjust the brightness of a bulb according to the brightness of the room? This will reduce the wastage of electricity and also contribute to improvement of your home towards a smarter, better home. An LDR (Light Dependent Resistor) is a device whose resistance varies with the change in amount of light incident on it. Hence this is majorly used in Light Sensitive Circuits. A light dependent resistor works on the principle of photoconductivity.

The LM35 is one kind of commonly used temperature sensor that can be used to measure temperature with an electrical o/p comparative to the temperature (in °C). It can measure temperature more correctly compare with a thermistor. This sensor generates a high output voltage than thermocouples and may not need that the output voltage is amplified. The LM35 has an output voltage that is proportional to the Celsius temperature. The scale factor is .01V/°C. The LM35 does not need any exterior calibration and maintains an exactness of +/-0.4°C at room temperature and +/-0.8°C over a range of 0°C to +100°C.One more significant characteristic of this sensor is that it draws just 60 micro amps from its supply and acquires a low self-heating capacity. The LM35 temperature sensor available in many different packages like T0-46 metal can transistor-like package, TO-92 plastic transistor-like package, 8-lead surface mount SO-8 small outline package.

III. SPEECH TO TEXT CONVERSION

Speech to text conversion is a standout amongst the most complex regions of software engineering—and somewhat in light of the fact that it's interdisciplinary: it includes a blend of to a great degree complex phonetics, science, and registering itself. In the event that you read through a portion of the specialized and logical papers that have been distributed around there, you may well battle to understand the multifaceted nature. The goal is to give an rough idea of how PCs perceive speech, so—with no statement of regret at all—To disentangle massively and pass up a great opportunity the majority of the subtle elements. Extensively, there are four diverse methodologies a PC can take on the off chance that it needs to transform spoken words into composed words: Simple pattern matching (where each talked word is perceived completely—the way you right away perceive a tree or a table without deliberately breaking down what you're taking a gander at) Pattern and features analysis (where each word is broken into bits and perceived from key features, for example, the vowels it contains) Language modeling and factual examination (in which an information of punctuation and the likelihood of specific words or sounds following on from each other is utilized to accelerate acknowledgment and enhance precision) Artificial neural networks (brain like PC models that can dependably perceive designs, for example, word sounds, after thorough preparing). Practically speaking, the ordinary speech recognition we experience in things like computerized call centers, PC correspondence programming, or cell phone "agents" (like Siri and Cortana) joins a wide range of methodologies.

The graph in fig 1 shows the various ASR services that offer speech recognition and the percentage of exact recognized phrases. We can clearly see that the best service out of all the available services is Google's Speech to Text API.

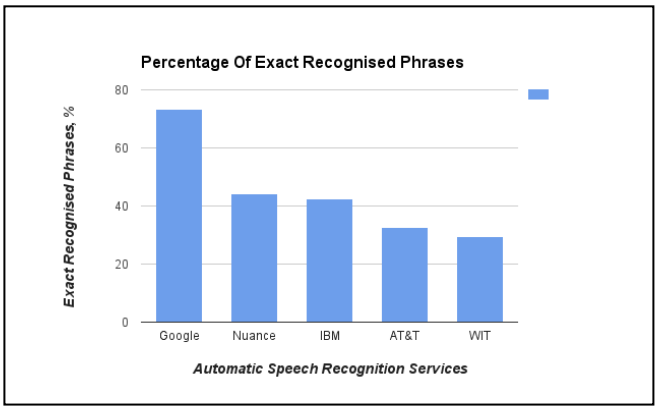

Fig 1:- Comparision of ASR Services

When we talk, our voices create minimal sound bundles called phones (which compare to the hints of letters or gatherings of letters in words); so talking the word cat produces telephones that relate to the sounds "c," "a," and "t." Although you've presumably never known about these sorts of phones previously, you may well be acquainted with the related idea of phonemes: basically, phonemes are the essential LEGO™ pieces of sound that all words are worked from. In spite of the fact that the distinction amongst phones and phonemes is perplexing and can be exceptionally befuddling, this is one "down to business" approach to recollect it: phones are genuine bits of sound that we talk (genuine, solid things), though phonemes are perfect bits of sound we store (in some sense) in our mind (conceptual, hypothetical sound parts that are never really talked). PCs and PC models can juggle around with phonemes, yet the genuine bits of discourse they dissect dependably includes preparing telephones. When we tune in to speech, our ears find phones flying through the air and our jumping brains flip them again into words, sentences, musings, and thoughts—so rapidly, that we regularly recognize what individuals will state before the words have completely fled from their mouths. Moment, simple, and very stunning, our astounding brains influence this to appear like an enchantment trap. What's more, it's maybe in light of the fact that listening appears to be so natural to us that we think PCs (from numerous points of view much more astonishing than brains) ought to have the capacity to hear, perceive, and disentangle spoken words too.

HMMs have ruled speech recognition since the 1970s—for the basic reason that they work so well. In any case, they're in no way, shape or form the main strategy we can use for recognizing speech. There's no motivation to trust that the mind itself utilizes anything like a hidden Markov model. It's considerably more likely that we make sense of what's being said utilizing thick layers of brain cells that energize and smother each other in mind boggling, interlinked courses as indicated by the information signals they get from our cochlea's (the parts of our inward ear that perceive diverse sound frequencies). Back in the 1980s, PC researchers created "connectionist" PC models that could copy how the mind figures out how to perceive designs, which wound up known as artificial neural networks (infrequently called ANNs). A couple of speech recognition researchers investigated utilizing neural systems, yet the predominance and viability of HMMs consigned elective methodologies like this to the sidelines. All the more as of late, researchers have investigated utilizing ANNs and HMMs one next to the other and discovered they give essentially higher exactness over HMMs utilized alone. Vitally, speech recognition programming regularly works recursively (over and again moving forward and backward) as opposed to in a solitary go from the main word to the last. It's somewhat similar to understanding a crossword perplex. The more clues you fill, the more data you have, and the more requirements there are on the rest of the hints. Similarly, you may need to return to a portion of your initial answers, which end up being conflicting with things you discover later. The nearer you get to the finish of a total sentence, the simpler it is to distinguish botches in the punctuation or the linguistic structure—and those could likewise compel you to return to your speculations at the prior words in the sentence. To put it plainly, there's a great deal of forward and backward in speech recognition: the computational procedures work in parallel, and "co-work," to give the most exact speculate the words in the talked expression.

IV. PROPOSED SYSTEM

The shortcomings of old existing system can be overcome by using a computer system that is capable of both, controlling and also extending the smart teaching aids. This paper focuses on using a single board computer, Arduino to serve the purpose.

The proposed system offers a smart classroom with a computer capable of implementing all smart teaching aids. As the system also consists of an embedded system, the students also get exposed to the embedded systems. It also offers the

user good UI to access the physical appliances from anywhere in the world through IoT. Thus the proposed system offers all smart classroom facilities along with classroom automation. This kind of module installed in each classroom and connected to internet will expose the whole college to internet offering college automation in low cost comparing to the existing systems. This system also offers installation of various kinds of programming languages. The existing problems include:

A. Smart classrooms:

Existing smart classrooms system more focuses on providing digital forms of teaching and learning experience at the same time being a little rich to afford as it consists of a PC integrated with the classrooms. The smart classroom system does not allow controlling physical appliances inside the classroom through software.

B. College Automation:

PLC's are widely used for such large automation applications. PLC can be Used to automate the college. PLC based systems are costly and It merely offers only automation, no smart teaching aids can be implemented.

C. Working:

This project uses IC LM35 as a sensor for detecting accurate centigrade temperature. Output voltage of this sensor is linearly proportional to the Celsius (Centigrade) temperature. This sensor uses the fact that, as temperature increases, the voltage across a diode increases at a known rate. Output of IC is 10mv/degree centigrade for E.g. if temperature is 45 degree then the output of sensor will be 450mv or 0.45V Output data of sensor is applied to a current amplifier circuit and feed to a low power DC motor. The block diagram is shown in fig 2.

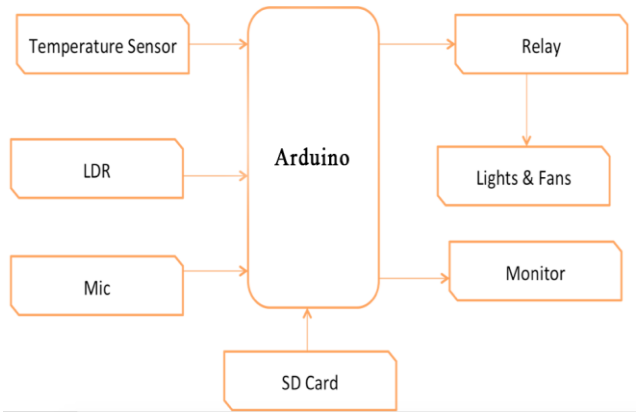

Fig 2:- Block Diagram of the proposed system

The proposed system consists of Arduino as the main component. The previously mentioned LM35 sensor is used as the temperature sensor. We will use LM35 as a temperature sensor, if the temperature is more than the standard room temperature (20º to 25ºC) that we set then the fans will be turned ON. LDR is used to sense the light intensity in the room. We will use LDR as a light intensity-measuring sensor, if the intensity is less than the threshold that we set then the lights will be turned ON. Relay is used to control the lights and fans based on the values of the sensors. The mic module will be used for real time audio input and the speech processing part.

V. FUTURE WORK

Implementation of a similar device in workplaces and other such industries is also an important step towards efficient power usage. Speech to text conversion can be used in situations where a hearing disabled person can communicate with others. A considerable lot of us (regardless of whether we know it or not) have cellphones with voice recognition incorporated with them. Back in the late 1990s, cutting edge cell phones offered voice-actuated dialing, where, in actuality, you recorded a sound bit for every passage in your phonebook, for example, the talked word "Home," or whatever that the telephone could then perceive when you spoke it in future.

VI. ADVANTAGES

The Classroom appliances can be accessed from any Internet connected device. The use of Arduino in the system makes it possible to access the working of it online using the Internet. Offers smart classroom environment to students because of the ability to provide real time notes and Offers exposure about smart learning to students. Allows various programming languages to be installed. Arduino supports many languages to be installed. So any language the user is comfortable with can be used. Low cost compared to existing systems. Existing systems, having less features and limited scalability do not come in cheap. A person has to pay more than five time what he should or would if he designs this same devices himself. The present cell phones make speech recognition significantly to a greater degree an element. Apple's Siri, Google's Now, and Microsoft's Cortana are cell phone "personal assistant apps" who'll listen in to what you say, make sense of what you mean, at that point endeavor to do what you ask, regardless of whether it's looking into a telephone number or booking a table at a nearby eatery. They work by connecting speech recognition to complex natural language processing (NLP) frameworks, so they can make sense of not exactly what you say, but rather what you really mean, and what you truly need to occur as a result. In a rush and tearing down the road, versatile clients hypothetically locate this sort of framework a shelter—at any rate on the off chance that you trust the buildup in the TV ads that Google and Microsoft have been hurrying to advance their frameworks. (Google unobtrusively joined speech recognition into its search engine some time prior, so you can Google just by conversing with your cell phone, on the off chance that you truly need to.)

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