Speech Recognition in HTML and CSS

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Abstract: Using voice commands in HTML and CSS will be an effective way in designing websites. If this is so true, anyone who is willing to design a website, don't need to waste time in coding the whole website. Instead, just give voice commands to the browser, the browser itself does everything. This process is based on drag and drop designing method of website. But here, the whose process is the other way.

I INTRODUCTION:

The term Machine Learning was coined by Arthur Samuel in 1959, an American pioneer in the field of computer gaming and artificial intelligence and stated that "**it gives computers the ability to learn without being explicitly programmed**". And in 1997, Tom Mitchell gave a "well-posed" mathematical and relational definition that "A computer program is said to learn from experience E with respect to some task T and some performance measure P, if its performance on T, as measured by P, improves with experience E. Machine Learning is a latest buzzword floating around. It deserves to, as it is one of the most interesting subfield of Computer Science. Machine Learning is an integrated part of Artificial Intelligence.

II WHAT IS MACHINE LEARNING?

Machine Learning is defined as – "Field of study that gives computers the capability to learn without being explicitly programmed".

In a very layman manner, Machine Learning(ML) can be explained as automating and improving the learning process of computers based on their experiences without being actually programmed i.e. without any human assistance. The process starts with feeding good quality data and then training our machines(computers) by building machine learning models using the data and different algorithms. The choice of algorithms depends on what type of data do we have and what kind of task we are trying to automate.

III HOW IT WORKS?

Machine learning uses two types of techniques: **supervised learning**, which trains a model on known input and output data so that it can predict future outputs, and **unsupervised learning**, which finds hidden patterns or intrinsic structures in input data.

Supervised Learning

Supervised machine learning builds a model that makes predictions based on evidence in the presence of uncertainty. A supervised learning algorithm takes a known set of input data and known responses to the data (output) and trains a model to generate reasonable predictions for the response to new data. Use supervised learning if you have known data for the output you are trying to predict.

Supervised learning uses classification and regression techniques to develop predictive models.

Classification techniques predict discrete responses—for example, whether an email is genuine or spam, or whether a tumor is cancerous or benign. Classification models classify input data into categories. Typical applications include medical imaging, speech recognition, and credit scoring.

Use classification if your data can be tagged, categorized, or separated into specific groups or classes. For example, applications for hand-writing recognition use classification to recognize letters and numbers. In image processing and computer vision, unsupervised pattern recognition techniques are used for object detection and image segmentation.

Common algorithms for performing classification include support vector machine (SVM), boosted and bagged decision trees, *k*-nearest neighbor, Naïve Bayes, discriminant analysis, logistic regression, and neural networks.

Regression techniques predict continuous responses—for example, changes in temperature or fluctuations in power demand. Typical applications include electricity load forecasting and algorithmic trading.

Use regression techniques if you are working with a data range or if the nature of your response is a real number, such as temperature or the time until failure for a piece of equipment.

Common regression algorithms include linear model, nonlinear model, regularization, stepwise regression, boosted and bagged decision trees, neural networks, and adaptive neuro-fuzzy learning.

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Gathering past data in any form suitable for processing. The better the quality of data, the more suitable it will be for modeling Data Processing – Sometimes, the data collected is in the raw form and it needs to be preprocessed. Example: Some tuples may have missing values for certain attributes, an, in this case, it has to be filled with suitable values in order to perform machine learning or any form of data mining. Missing values for numerical attributes such as the price of the house may be replaced with the mean value of the attribute whereas missing values for categorical attributes may be replaced with the attribute with the highest mode. This invariably depends on the types of filters we use. If data is in the form of text or images then converting it to numerical form will be required, be it a list or array or matrix. Simply, Data is to be made relevant and consistent. It is to be converted into a format understandable by the machine Divide the input data into training, cross-validation and test sets. The ratio between the respective sets must be 6:2:2. Building models with suitable algorithms and techniques on the training set. Testing our conceptualized model with data which was not fed to the model at the time of training and evaluating its performance using metrics such as F1 score, precision and recall.

IV LANGUAGES USED FOR MEACHINE LEARNING

Github just announced (https://github.blog/2019-01-24-the-state-of-the-octoverse-machine-learning/) its list of top machine learning languages based on Github contributions. The top 10 machine learning languages in the list are Python, C++, JavaScript, Java, C#, Julia, Shell, R, Type Script, and Scala.

VI USE VOICE COMMANDS IN HTML AND CSS

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The process here used will be based on voice commands. The voice commands will be collected from the user and the machine learning algorithms will first recognize the voice commands and then detect the search key which will be a key factor in setting up the website design.

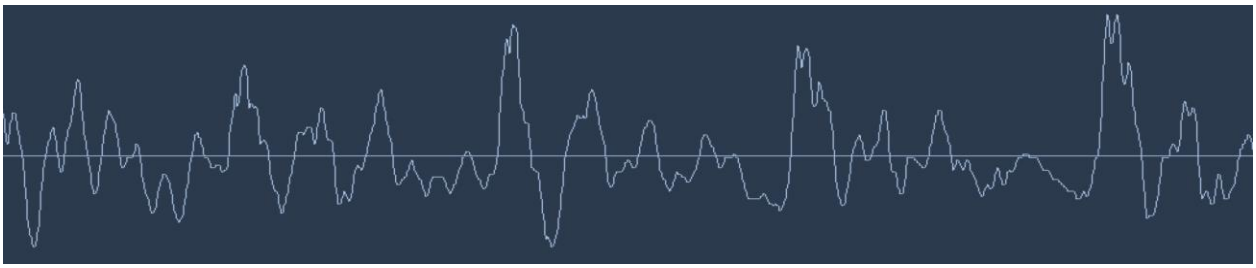
Here the main language to be used to recognize the voice commands is python. As python is an easy and effective programming language used widely in the field of Machine Learning it also works as a user friendly language. Python is an interpreted, interactive and object-oriented scripting language.

V HOW VOICE IS RECOGNISED IN MACHINE EARNING?

The first step in speech recognition is obvious we need to feed sound waves into a computer. Sound is transmitted as waves. How do we turn sound waves into numbers? Let's use this sound clip of me saying "Hello":

Sound waves are one-dimensional. At every moment in time, they have a single value based on the height of the wave.

To turn this sound, wave into numbers, we just record of the height of the wave at equally-spaced points:



This is called sampling. We are taking a reading thousands of times a second and recording a number representing the height of the sound wave at that point in time. That's basically all an uncompressed .wav audio file is.

Can I Build My Own Speech Recognition System?

One of the coolest things about machine learning is how simple it sometimes seems. You get a bunch of data, feed it into a machine learning algorithm, and then magically you have a world-class AI system running on your gaming laptop's video card… Right? That sort of true in some cases, but not for speech. Recognizing speech is a hard problem. You have to overcome almost limitless challenges: bad quality microphones, background noise, reverb and echo, accent variations, and on and on. All of these issues need to be present in your training data to make sure the neural network can deal with them.

To build a voice recognition system that performs on the level of Siri, Google Now! or Alexa, you will need a lot of training data far more data than you can likely get without hiring hundreds of people to record it for you. And since users have low tolerance for poor quality voice recognition systems, you can't skimp on this.

ADVANTAGES:

1. Anyone without a basic programming language can design a responsive and a creative website.
2. No programming language knowledge is required.
3. Minimize the work effort, and cost.

DISADVANTAGES:

1. Must use the specified key-words in the required places.
2. Recognizing speech is a hard problem.
3. You will need a lot of training data.