



クローズアップ現代

毎週月-木曜放送 総合 午後7時30分-午後7時56分  
[再放送] 毎週火-金曜 総合 午前0時10分-午前0時36分(月-木曜深夜)

NHK ONLINE

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ウェブ特集

動画

スタッフの部屋

番組紹介

## Broadcasting so far

No.3166

February 28, 2012 (Tuesday) broadcasting



# secret-of Hatsune Miku singing voice make a voice that thought is transmitted

♪ "most princess in the world"

CG characters sing on stage.

Now, the singer has become a popular live work all over the world, is Hatsune Miku.

This voice is what is artificially synthesized.

It has become a big thing because it can be to sing easy song that I made with myself if I use the software on your computer.

The secret to hear someone singing naturally, is in the speech synthesis technology based on the latest science.

"You create what sounds like a human being that sings well with only drove it was difficult quite"

In addition, speech synthesis technology developed in Japan are beginning to be applied in the medical field overseas.

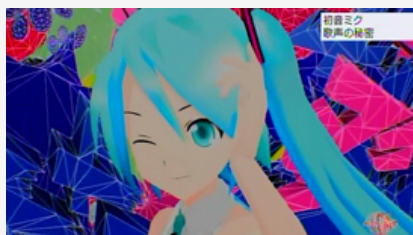
Again, it is that attempts to speak in the voice of the person on a computer synthesized voice of those who have gone because of the voice of the disease.

Voice of the person who is put a variety of thought.

This is the forefront of speech synthesis technology evolving and trying to convey to the thought.

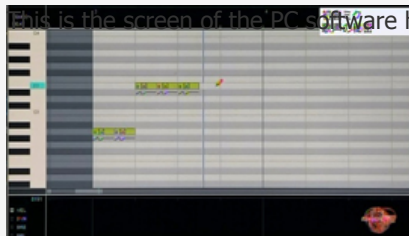
I see the video

## Secret of Hatsune Miku singing voice



The popularity of Hatsune Miku does not know where to stay.  
I am popular music CD so that the fly at the event to be held every month.

Some of them won first place in the charts in Japan in.  
January this year, this song was delivered in countries and regions of the world 217.



This is the screen of the PC software here to synthesize singing voice.

Singing voice is synthesized in the material human voice that is built into the software and enter the height of the sound and lyrics one by one.

♪ "girl with spear Nowadays"

It has become a big boom, it is because anyone can make a natural singing voice as expected.

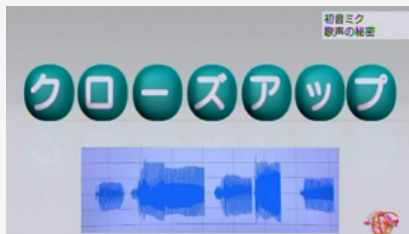
What technologies are already in use in this natural singing voice.

Engineer of instrument manufacturers who developed the synthetic technology, is Kenmochi Hideki's.

Unlike sound synthesis of musical instruments such as guitar, I say song is difficult because of the lyrics.

**"That there are still lyrics I is that juggle a place called found lyrics beauty and I is that you must know the meaning"**

There is a latest science to explore humans, or to recognize the words how the back of the technology to synthesize natural singing voice.



For example, if you want to synthesize these words.

When I tried connect one by one simply if.

Sound does not catch well chopped.

But You can use the synthesis technology of Kenmochi's.

So, it is smooth.

Heck, what is not.

For example, part of the sound of the two-ku b.

Kenmochi's, was connecting the sound of six what.



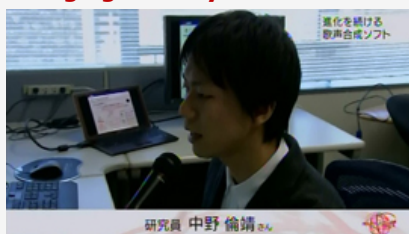
Of particular importance is the part of the sound, such as r changes from u and u from k.

Actually man, is that they tame the sound is concentrated in nerve in part the sound changes.

Where they carved the words by focusing on changing portions of the sound, Kenmochi's degradation to the sound of 500.

I completed the speech synthesis software that natural sounding By joining, this.

### • singing voice synthesis software evolving



Now, the development of new synthetic software that creates a human voice even is on the way.

Nakano is Lun Yasushi.

We are developing a program to automatically mimic the vocalization of people for the synthesis of the singing voice

humanoid.

First of all, let's sing a ballad in the traditional synthesis software.

Is not it is a little bland Hmm.

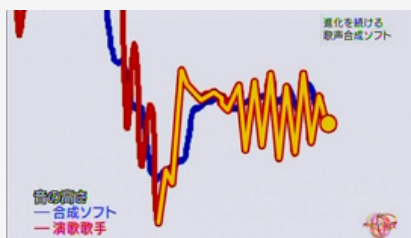
Let's listen to the voice of a real ballad singer.

## ♪ "I drank merrily and is said to Nome"

Again, I will not.

There is a deep taste to the voice of the ballad singer.

There was a big difference compared the height of the sound of the singing voice.



I'll try to look at the part of the so-called fist at the end of the song.

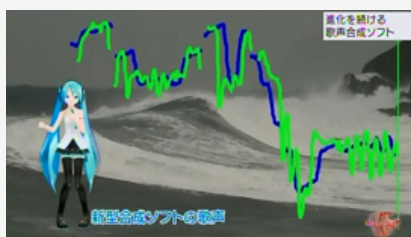
Enka singer is back from up higher than the sound of the original in place to increase the sound synthesis software of traditional while singing the score as expected.

And you have to raise or lower the height of the sound finely also

the location of a certain height.

It was a secret of raising and lowering the voice of subtle sound not a score as is human.

So Mr. Nakano has developed a synthesis software to mimic automatically singing voice of a human being.



Please enjoy the results.

## ♪ "I drank merrily and is said to Nome"

Human taste has been beautifully reproduced.

Future, Nakano was in the and let the pursuit of further human singing voice.



"We believe if Ikere working on future research to achieve such a diverse sing how to sing and whisper or shout for example"

I see the video

## Japan's state-of-the-art! Singing voice synthesis technology

**Guest** Mr. Masataka Goto (National Institute of Advanced Industrial Science and Technology)

### ● point of human singing voice



It is not certain where that mimics the song of human Again, mimics the point.

Where naturally form, it does not mimic how, the size and height of the voice was the point.

I mean that synthesized it to approach by comparing automatically the song and human sound was actually synthesized.

I mean that taking out the natural singing voice to say the computer software Oh aware of the difference. situation where you create or how naturally, the part that (sound) change was the point.

The synthesis technology of the instrument sound of traditional'm highly developed, but the sound I'm not

there to change the instrument sound.

The human voice there and there is something unnatural, even a little, the there that have lots of change much richer than the instrument sound again?

It is a point where it is synthesized naturally it has been difficult human, so would have been noticed and Na I've never heard this song.

I do not know what word or come out to the lyrics say (sound must also type 500,) it and why.

When it comes you do not go unless you have provided it all is why different by lyrics at all "is" is coming "or" is coming next to the "A", it is necessary to provide a combination of connection of all sounds.

In addition, the song that does not exceed the height to be synthesized in various height, also the various height, do not unless you have ready to prerecorded properly.

And so I also need 500.

I did set aside the order of the sound of the two now, but we will become more natural when things like that keep a list of three as well as two it.

I think that the ongoing development of automatically further place called or mimic naturally how the height of the voice, such as the previous is important with respect fist.

### • background was developed in Japan


The'm progressing amazing technology (in Japan) is of course, the point of this is not only technology, Toko strengths of each technology of Japan, Japanese society, Japanese culture is kept alive in synergy It is there I think.

In other words, (in the video sharing site on the Internet,) it is possible to get the next day that comments and opinions and ask to listen to various people unspecified number immediately the song everyone was made by ourselves and say what it means .

On the spot, it is possible to get.

It was in Japan and it is the society that allows that kind of thing, and even, is that culture is important to the character like Hatsune Miku earlier.

In Japan, as of this time people with such enthusiasm to have full has had buried until now, those people will come together, on top of that, of that creator that has a high capacity potential Hatsune I think great phenomena such as Miku and I'm awake.

 [I see the video](#)

## And capitalize on the medical text-to-speech

Edinburgh in the north of England.

In this town, medical project to regain the voice of the people that are no longer put out the voice of the disease has begun.



It is Junichi Yamagishi's project leader.

Yamagishi, who has studied the speech synthesis in Japan, was invited to the University of Edinburgh the results will be evaluated six years ago.

Mr. Yamagishi's the subject of medical applications is the incurable disease called progressive motor neuron disease.

That the disease the muscles of the whole body is gradually waning, emits a voice soon becomes difficult.

Yamagishi Sun will record the voice of the patient before the get worse.

This is because it devoted a letter on your computer, to be able to speak in the voice of the people.

**Michael Arnott's "It's a little twisters that I was impressed very good but this is my voice"**

**"It was amazing powerful voice like he heard" Joy's wife**

Speech synthesis technology of Yamagishi's has gained a high reputation from the patient.

However, there was a big problem in the process of development.

Patients that are difficult to issue a voice already when you record a voice also is not uncommon.

It is one person's Ewan MacDonald of such patients.

Here is a picture of when you recorded five years ago voice.

Enough pronunciation had become difficult already.

So Yamagishi's decided to take the help of his brother Angus's Ewan's.

Because the way of speaking voice and was like, I was a reference to the recorded voice.

Thus Mr. Yuan is now possible to talk in your own voice by entering the characters on the screen move the line of sight.

**Ewan McDonald's "has impressed everyone about the quality of voice (Yamagishi) Junichi's made up then I'm willing to synthesized speech of him."**



It will help to synthesize the voice of the patient and if you gather the voices of many people.

Yamagishi, who thought so recruit volunteers voice from Britain.

I have collected a variety of voices and dialects of each region and the elderly from the young people.

1 hour per capita.

I made a database of voice recorded the voice of 200 persons.

As a result, it is now possible to reproduce the voice of the person, if possible recording even 10 minutes the voice of the patient.

**"I believe I think of myself is transmitted to the Nari family and friends again than speak in the voice of others, so I think his or her own identity is included also somewhat speech synthesizer"**

#### ● To make a voice that I think is transmitted

Speech synthesis technology has started to become the gospel for people who have lost their voice, such as laryngeal cancer in Japan.

It is the people Yamauchi Xing, who lives in Nara.

Thirteen years ago, I cut the vocal cords in the larynx cancer.





It is a machine now, Yamauchi's use for conversation that electric artificial larynx.



Yamauchi has frustrated because you can talk freely by changing the shape of the mouth, voice becomes to sound mechanical.

**"It's not such as I think I'll know I'll such as heard the same arguendo contents After me to talk a good voice 's impression that humans receive"**

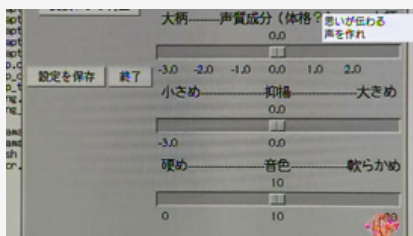
If you'll let you change the voice that seems to own the voice of the artificial larynx, Yamauchi-san, I visited the laboratory there.

Toda is Tomoki's.

We are developing a technique for real-time conversion of the sound quality of the voice.

**The "want to be particular you want to make a technology that can be used in this voice communication It is the normal conversation of this we still"**

First, I will choose the voice of Yamauchi's based on the database of the voice of the Japanese.



I create a voice like Yamauchi to adjust the seven elements tension and how height, such as tone of voice.

Voice of artificial larynx the original is here.

Voice of artificial larynx "Japanese is said that fluently"

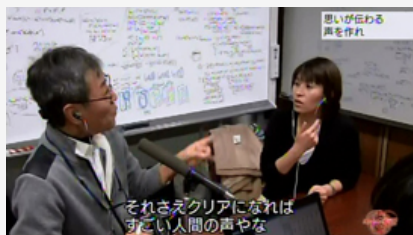
When you convert the technology of Toda's this.

Voice was converted "Japanese is said that fluently"

**"I think around here and I hope I can really" Yamauchi people Kosan**

Today, let's talk to Ayako's daughter in a voice that was synthesized.

**"I thank you for helping me in various ways I really thank you always"**



**The "Do or voice of the great human it even becomes clear Ninen hear but I think you there is a feeling Mogomogo" Ayako's daughter**

Possibility, which is said to think in a voice like myself was able to see.

**"That it 's is eliminated at least because there a lot until now that we can be understood by mistake or not transmitted to the time that must be communicated really right? But thankfully terribly" Yamauchi people Kosan**

### • medical applications in a database of voice

An innovative technology really, of that speech synthesis technology of medical applications of Nara and Edinburgh earlier but I was very domestic technology that has been developed around the Nagoya Institute of Technology of Japan.

This is a technology very different from the techniques of Hatsune Miku in the first half but, when it is traditional, in the 10 minutes that could not be synthesized unless recorded the voice of the people a few hours have passed, can be synthesized in the voice of the people I think that that's really revolutionary.



What is important is to keep a database to collect the voice of a lot of people.

The sound that if "A" and "A" is not a sound of "i" Who can talk to is the sound of "A" or if "Yes" who can talk and say why.

The sound of "s" voice of the people there as long keep collected in advance exactly such a thing is, without get only a little example, even without entering the hand and "a" only "Yes",

Oh! This person from a very do say in this kind of sound "a".

Do not I say in this kind of sound "i".

If it was, so it is possible to synthesize computer to automatically guess it seems like it is must to say in such sound "s" kit.

I think it was a secret that can now be synthesized in 10 minutes there, that's why a very important application field of medical applications such as this and I was Kirihiyake.

It is not likely to be synthesized to match the voice of the person more if people voice close to (family and his brother and even if you can not collecting).

#### • speech synthesis technology to take advantage of what

and (that could lead to incorrect use) worry about that you know very well, and everyone on it is very serious matter there after all you are aware of the problem because people of researchers, such as came out this time But, is why everyone thinks that is whether going to spread to the community how the technology that is required by the patient, such as a while ago also.

So after all, and I think Na more scary, I think it would be be exploited within who do not even know that such technology would have been developed.

If you know all that already, various synthesis that has become possible as photo and video, for example this even look at the pictures,

Oh! This is why I care that it might have been synthesized Maybe.

It also voices, if Re care and seems like it is may have been synthesized Maybe in the same way, and be fooled like that is is not going to run out.

#### • possibility of speech synthesis technology future

For example, I think there may be such a development as it is your own voice, to me synthesized in the words of other countries when it is willing to synthesized by automatic translation to the words of other countries, so like can travel .

I think (in the person of the music possibility of artistic expression) and do not do emerge beyond the constraints of the throat,'s will expression in the absence of various physical constraints.

 I see the video



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