



# 음성인식 머신러닝에 기반한 핵심추출 웹 서비스

17조 SUMMER

김기성 김윤성 양성호 정경진 정예원

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- 사용자 시나리오
- 수행 기술



## 프로젝트 소개

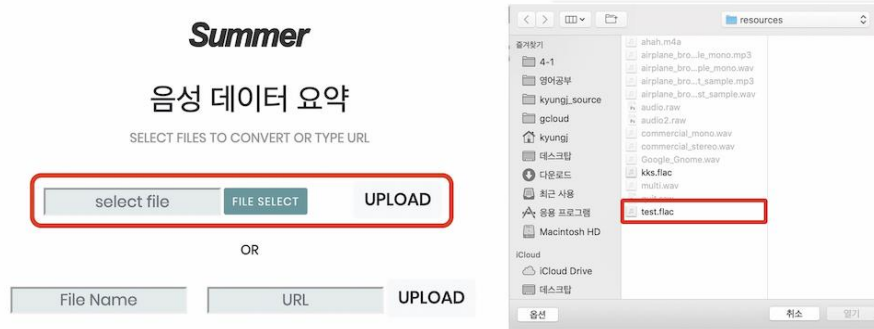
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- **Summary(요약)**와 **-er** 을 결합하여 '요약해주는 프로그램' 이라는 의미
- 강연 음성 데이터를 텍스트로 변환한 후 텍스트를 중요 문장 단위로 추출하여 제공하는 프로젝트



# 사용자 시나리오



1. 강연 음성 데이터를 불러온 후, UPLOAD 버튼을 클릭한다.



2. 요약될 텍스트의 길이를 선택한 후 SUMMARY 버튼을 클릭하면 요약이 진행된다. 30%는 전체 텍스트의 30% 길이만큼 요약한다는 의미이다.

instrument\_benefits - Summary View

Overall ViewDownload

Script

They may look calm and focused reading the music and making the precise and practice movements required but inside their brains, there's a party going on.  
How do we know this?  
Well in the last few decades neuroscientists have made enormous breakthroughs in understanding how our brains work by monitoring them in real-time with instruments like fmri and pet scanners when people are hooked up to these machines tasks such as reading or doing math problems, each have corresponding areas of the brain where activities can be observed but when researchers got the participants to listen to music, they saw fireworks multiple areas of their brains were lighting up at once as they process the sound took it apart to understand elements like Melody and Rhythm and then put it all back together into unified musical experience and our brains do all this work in the split-second between one  
First hear the music and when are foot starts to tap a long but when scientists learn from observing the brains of Music listeners to those of musicians, the little backyard fireworks became a jubilee. it turns out that while listening to music in (age's) the brain in some pretty interesting activities playing music is the brain's equivalent of a full body workout the neuroscientist some multiple areas of the brain light up simultaneously processing different information in intricate interrelated and astonishingly fast sequences. But what is it about making music that sets the brain a light the research is still fairly new but neuroscientist have a pretty good idea playing a musical instrument engage is practically every area of the brain at once especially the visual auditory and motor cortices. And as with any other workout disciplined structured practice in playing music strengthens those brain functions allowing us to apply that strength to other activities.  
The most obvious difference between listening to music and playing it is that the latter requires fine motor skills, which are controlled in both hemispheres of the brain, it also combines the linguistic and mathematical Precision in which the left hemisphere is more involved with the novel and creative content that the right excels in for these reasons playing music has been found to increase the volume and activity in the brain is corpus callosum the bridge between the two hemispheres allowing messages to get across the brain faster and through more diverse routes. This may allow musicians to solve problems more effectively and creatively in both academic and social settings because making music also involves crafting and understanding its emotional content and message musicians often have higher levels of executive function a category of interlink tasks that includes planning strategizing and attention to detail and requires simultaneous analysis of both cognitive and emotional aspects.  
He also has an impact on how our memory systems work and indeed musicians exhibit enhanced memory functions creating storing and retrieving memories more quickly and efficiently Studies have found that musicians appear to use their highly connected brains to give each memory multiple tags such as a conceptual tag and emotional tag and audio tag and a contextual tag like a good internet search engine. So how do we know that all these benefits are unique to music as opposed to say sports or painting or could it be that people who go into music? We're already smarter to begin with neuroscientist have explored these issues. But so far they've found at the artistic and aesthetic aspects of learning to play a musical instrument are different from any other activity studied including other arts and several randomized studies of participants who showed the same levels of cognitive function and neural processing at the start found that those who were exposed to a 12-Week Music Learning showed in hands.  
In multiple brain areas compared to the others this recent research about the mental benefits of playing music has advanced our understanding of mental function revealing the inner rhythms and complex interplay that make up the amazing Orchestra of our brain.

## <요약된 텍스트>

3. Overall View 버튼을 클릭하면 요약 전 텍스트를 볼 수 있다.

instrument_benefits - Overall View		Download
Time	Script	
00:12:05	Did you know that every time musicians pick up their instruments there are fireworks going off all over their brain on the outside. They may look calm and focused reading the music and making the precise and practice movements required but inside their brains, there's a party going on. How do we know this? Well in the last few decades neuroscientists have made enormous breakthroughs in understanding how our brains work by monitoring them in real-time with instruments like fmri and pet scanners when people are hooked up to these machines tasks such as reading or doing math problems, each have corresponding areas of the brain where activities can be observed but when researchers got the participants to listen to music, they saw fireworks multiple areas of their brains were lighting up at once as they process the sound took it apart to understand elements like Melody and Rhythm and then put it all back together into unified musical experience and our brains do all this work in the split-second between one	
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04:12:04	In multiple brain areas compared to the others this recent research about the mental benefits of playing music has advanced our understanding of mental function revealing the inner rhythms and complex interplay that make up the amazing Orchestra of our brain.	

## <요약 전 텍스트>

4. Download 버튼을 클릭하면 요약된 텍스트와 요약 전 텍스트를 로컬에 저장할 수 있다.



## 수행 내용

.....

- Google speech-to-Text API
- TextRank Algorithm(enhanced version)
- AWS
- Django
- Mongo DB





## 수행 내용

Google Speech-to-Text API 음성인식률 향상

- 데이터 로깅을 이용한 고급 모델 사용

구글이 데이터 로깅 프로그램을 이용해 STT를 사용한 고객의 데이터를 수집한다.  
수집된 데이터로 학습된 고급 모델을 사용해 인식률을 향상시킨다.

- Speech recognizer에게 phrase hint를 주어 구문에 더욱 일맞은 단어로 인식

사용자가 원하는 단어를 나오게 하기 위해 phrase hint를 제공한다.  
hint를 제공해주면 speech recognizer는 발음이 비슷한 다른 단어 대신 올바른 단어로 인식한다.  
예를들면 아래의 사진은 'enhancement'라는 hint를 주니 'in hands'라고 인식하던 것을  
'enhancement'로 인식한 것을 보여준다.

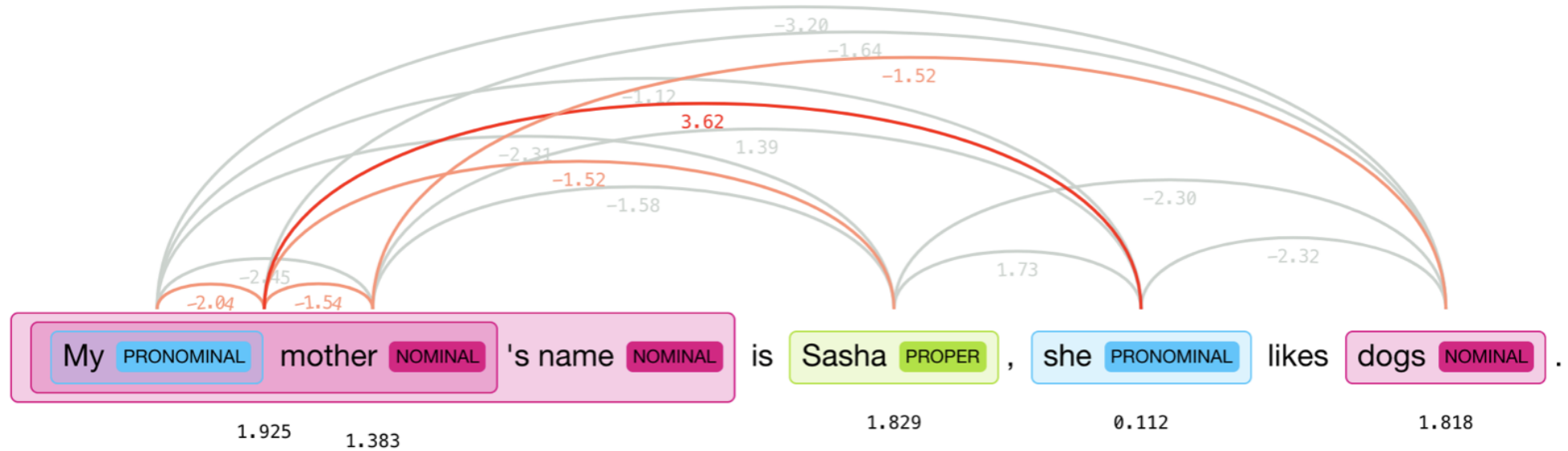
cognitive and emotional aspects.  
Music Learning showed in hands.

cognitive and emotional aspects.  
Music Learning showed enhancement.



## 수행 내용

TextRank Algorithm 정확도 향상



- Neuralcoref 라는 대용어처리 라이브러리 사용
- 대용어처리로 애매모호하게 지칭하는 대명사 의미 파악 가능
- 대명사 의미파악으로 인해 요약문의 정확도 향상 가능



# 수행 내용

## TextRank Algorithm 정확도 향상

abridgement(coresol) - 메모장

파일(F) 편집(E) 서식(O) 보기(V) 도움말(H)

It's easy to forget that because Apple seemingly forgot that it made the iPad mini: the last update, the iPad mini. But people really love their iPad minis, and they just kept buying the iPad mini 4, even as the rest of the world Apple told me it was surprised to find that people were buying the mini primarily because of its size, not price. So there's a new iPad mini now, updated with some of Apple's latest tech, and starting at \$399. All the changes to this new mini are on the inside, and they're significant — which they should be, given the price. The only reason to buy an iPad mini is because you want a killer small tablet. There simply isn't another tablet at this size that can compete: the Android tablet app ecosystem is far more mature. With the new iPad mini, you get basically the entire feature set of the new iPad Air in a smaller package. If you are the sort of person who wants a powerful small tablet, the new iPad mini is the best choice, for the price. It's basically the only choice. THERE SIMPLY ISN'T ANOTHER TABLET AT THIS SIZE THAT CAN COMPETE WITH THE MINI That's not to say that this new iPad mini is perfect, or even state-of-the-art. Those bezels are a real throwback, and the decision to use the first-gen Apple Pencil instead of the far more useful second-gen is a real throwback. And there's that Lightning connector on the bottom, not USB-C like the new iPad Pros. Apple told me that they think of USB-C as a pro feature, and that it was really important to maintain compatibility with the first-gen Apple Pencil. THE FIRST-GEN APPLE PENCIL HAS NEVER BEEN A TRIUMPH OF DESIGN Apple Pencil support is equally confusing: the iPad Pro came out late last year with a new second-gen Apple Pencil. Instead, you've got Apple's first-gen Pencil, which has never been a triumph of design or usability. Using the old Pencil is why I say it feels like Apple raided the iPad parts bin: the new Pencil is so much more useful. If there was vibrant market competition for small tablets, I'd bet Apple would have gone with the second-gen. The Pencil itself works just like the first-gen Apple Pencil on any other iPad: it's fast and responsive, works great with the new iPad mini, but not too much, and that feels right for a device that obviously sits in the middle. That feels like a miss: if Apple is serious about iPad developers supporting the Pencil, it should put it in the new iPad mini. You can do a lot on an iPad mini, but not too much, and that feels right for a device that obviously sits in the middle. And after using the new iPad mini for a while, I was reminded of why people like them so much. I like reading on the mini better than my big iPads, I feel less rude using it in meetings than my phone. The only thing I wish it had was a smart keyboard connector so I didn't have to fiddle with a Bluetooth keyboard. THE MINI IS OBVIOUSLY WORTH IT IF YOU WANT A SMALL, CAPABLE TABLET Apple's got an intense lineup of iPads now. There's the cheap \$329 9.7-inch iPad with an older processor and just-okay display, the new \$399 iPad mini. But the decision to get an iPad mini is simple: do you want a small, capable tablet? If you do, the mini is obviously worth \$399, especially when you consider how long Apple has supported the mini.

대용어 처리 전

abridgement - 메모장

파일(F) 편집(E) 서식(O) 보기(V) 도움말(H)

It's easy to forget that because Apple seemingly forgot that it made the iPad mini: the last update, the iPad mini. But people really love their iPad minis, and they just kept buying the iPad mini 4, even as the rest of the world Apple told me it was surprised to find that people were buying the mini primarily because of its size, not price. So there's a new iPad mini now, updated with some of Apple's latest tech, and starting at \$399. But it turns out I really loved using the iPad mini these past few days. The only reason to buy an iPad mini is because you want a killer small tablet. There simply isn't another tablet at this size that can compete: the Android tablet app ecosystem is far more mature. With the new iPad mini, you get basically the entire feature set of the new iPad Air in a smaller package. If you are the sort of person who wants a powerful small tablet, the new iPad mini is the best choice, for the price. THERE SIMPLY ISN'T ANOTHER TABLET AT THIS SIZE THAT CAN COMPETE WITH THE MINI That's not to say that this new iPad mini is perfect, or even state-of-the-art. Those bezels are a real throwback, and the decision to use the first-gen Apple Pencil instead of the far more useful second-gen is a real throwback. And there's that Lightning connector on the bottom, not USB-C like the new iPad Pros. Apple told me that they think of USB-C as a pro feature, and that it was really important to maintain compatibility with the first-gen Apple Pencil. You have dreams, the iPad mini has reality. THE FIRST-GEN APPLE PENCIL HAS NEVER BEEN A TRIUMPH OF DESIGN Apple Pencil support is equally confusing: the iPad Pro came out late last year with a new second-gen Apple Pencil. Instead, you've got Apple's first-gen Pencil, which has never been a triumph of design or usability. Using the old Pencil is why I say it feels like Apple raided the iPad parts bin: the new Pencil is so much more useful. If there was vibrant market competition for small tablets, I'd bet Apple would have gone with the second-gen. But there isn't, so you get the first-gen Pencil, which is obviously worse. The Pencil itself works just like the first-gen Apple Pencil on any other iPad: it's fast and responsive, works great with the new iPad mini, which is too small to carry any of those lofty expectations. iOS 12 on a screen this size feels light and zippy, and the iPad multiple-app features just feel like the same as on a laptop. You can do a lot on an iPad mini, but not too much, and that feels right for a device that obviously sits in the middle. And after using the new iPad mini for a while, I was reminded of why people like them so much. THE MINI IS OBVIOUSLY WORTH IT IF YOU WANT A SMALL, CAPABLE TABLET Apple's got an intense lineup of iPads now. There's the cheap \$329 9.7-inch iPad with an older processor and just-okay display, the new \$399 iPad mini. But the decision to get an iPad mini is simple: do you want a small, capable tablet? If you do, the mini is obviously worth \$399, especially when you consider how long Apple has supported the mini.

대용어 처리 후

- 대용어처리 전과 후를 비교해보면 정확도가 향상되었다.





## 수행 내용

### ROUGE 평가

## 모범 답안 요약문과 비교하여 유사도 평가

ROUGE-Type	Task Name	System Name	Avg_Recall	Avg_Precision	Avg_F-Score
ROUGE-L+StopWordRemoval	TASK1	TEXTRANKSU	0.42466	0.43662	0.43056
ROUGE-1+StopWordRemoval	TASK1	TEXTRANKSU	0.66753	0.6211	0.64348
ROUGE-2+StopWordRemoval	TASK1	TEXTRANKSU	0.58333	0.52591	0.55313
ROUGE-SU4+StopWordRemoval	TASK1	TEXTRANKSU	0.60546	0.54986	0.57632

대용어 처리 전



ROUGE-Type	Task Name	System Name	Avg_Recall	Avg_Precision	Avg_F-Score
ROUGE-L+StopWordRemoval	TASK2	TEXTRANKSU	0.47032	0.47685	0.47356
ROUGE-1+StopWordRemoval	TASK2	TEXTRANKSU	0.68299	0.63549	0.65839
ROUGE-2+StopWordRemoval	TASK2	TEXTRANKSU	0.60345	0.54404	0.57221
ROUGE-SU4+StopWordRemoval	TASK2	TEXTRANKSU	0.62283	0.56532	0.59268

대용어 처리 후

- 대용어처리 전 후를 각 수치로 비교해보면 향상되었다.

Thank you

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