



# **NewsPod:**

## **Automatic and Interactive News Podcasts**

Philippe Laban & Elicia Ye & Srujay Korlakunta &  
John Canny & Marti Hearst

IUI 2022 Recorded Presentation

## Podcasts on the rise

In 2020, **57%** of US adults obtain some of their news on an audio-only platform (radio & podcasts).

# Hand-crafting Podcasts is Expensive

Hand-crafted podcasts require teams of professionals. An episode of the NY Times' daily usually involves hosts, producers, editors and engineers.



**The Daily**

Apple Podcasts • Google Podcasts

**Hosted by Michael Barbaro**

**Produced by Austin Mitchell, Asthaa Chaturvedi, Rachelle Bonja and Michael Simon Johnson**

**Edited by Marc Georges and Lisa Tobin Original music by Dan Powell**

**Engineered by Chris Wood**

# Automation exists, but is limited

Automatic news audio is often limited to *playback options*.

Q Search

Bloomberg

Si

## Technology

### Microsoft Targets 5G Wireless Networks to Make Its Cloud Faster

By Dina Bass

February 28, 2022, 2:00 AM GMT+1

Listen to this article

▶ 2:27

As mobile carriers build out the next-generation 5G network, Microsoft Corp. wants to make that equipment part of its

Example playback option on Bloomberg.com

Use of music, sounds to enrich  
experience

Multiple voices (Guest speakers,  
multiple hosts, weather person...)

Narration adapted to audio

**Handcrafted Podcast**

Can be monotonous

Single synthetic voice

Content not adapted to audio

**Automatic Podcast**

**Can we  
go further with  
automatic podcasts?**

# NewsPod Design

# NewsPod System: Overall Organization

## Podcast Selection

Select **4** stories to include in the podcast.

- ☐ Jeep Cherokee Name
- ☐ Daft Punk Breakup
- ☐ Khashoggi Murder
- ☐ Large Iceberg Break-off
- ☐ Switzerland Burqa Ban
- ☐ Rohingya Crisis in India
- ☐ Amazon Workers' Union
- ☐ Tesla Self Driving Safety

Select 4 more stories.

PLAY

The user selects stories to include in the podcast.

*Optionally, the user can select a desired podcast duration.*



# NewsPod System: Overall Organization

## Podcast Selection

Select 4 stories to include in the podcast.

- ☐ Jeep Cherokee Name
- ☐ Daft Punk Breakup
- ☐ Khashoggi Murder
- ☐ Large Iceberg Break-off
- ☐ Switzerland Burqa Ban
- ☐ Rohingya Crisis in India
- ☐ Amazon Workers' Union
- ☐ Tesla Self Driving Safety

Select 4 more stories.

PLAY

The user selects stories to include in the podcast.

*Optionally, the user can select a desired podcast duration.*

A podcast is generated on demand:  
a sequence of segments  
(a) an introduction  
(b) one segment per story  
(c) a closing sentence.

Amazon Workers' Union

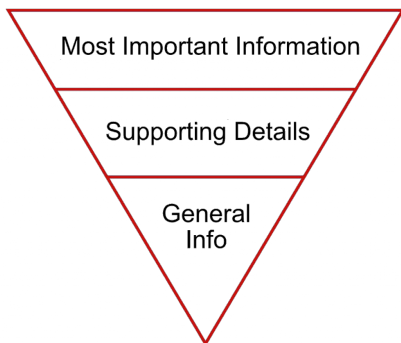


# NewsPod System: Narrative Format

Each story segment is generated in the following format:

Intro > Q&A Session > Quote.

This format adopts the inverted pyramid writing style.



## Switzerland Burqa Ban

INTRO

**Switzerland votes to ban wearing of the burqa or niqab in public spaces**

Referendum denounced by rights group as 'needlessly fueling division and fear', after Swiss right-wing party had framed it as verdict on the role of Islam in public life

**What would the ban mean?**

The ban will mean that nobody can cover their face completely in public -- whether in shops or the open countryside.

**What percentage of the population are Muslims?**

Muslims make up around 5 percent of the Swiss population of 8.6 million, or about 390,000 people, most of whom have their roots in Turkey, Bosnia and Kosovo.

Q&A SESSION

**When was the veil banned?**

France banned the wearing of a full-face veil in public in 2011 and Denmark, Austria, the Netherlands and Bulgaria have full or partial bans on wearing face coverings in public.

**Which countries have similar bans?**

The so-called anti-burqa vote came after years of debate in Switzerland following similar bans in other European countries -- and in some Muslim-majority states -- despite women in Islamic full-face veils being an exceptionally rare sight in Swiss streets.

QUOTE

Ines Al Shikh, spokeswoman for the Purple Headscarves feminist Muslim women's group said: "This is clearly an attack against the Muslim community in Switzerland. What is aimed here is to stigmatise and marginalise Muslims even more"

Legend: ■ Voice 1: Host | Voice 2: Questions ■ Voice 3: Quotations

# NewsPod System: Narrative Format

Parts of the segment are assigned to different voices, based on role in the story:

- **Voice 1:** Main Host
- **Voice 2:** Questioner
- **Voice 3:** Quote Reader

**Objective:** make the podcast feel more conversational, reduce monotony, and invite the listener to join the conversation.

## Switzerland Burqa Ban

INTRO

**Switzerland votes to ban wearing of the burqa or niqab in public spaces**

Referendum denounced by rights group as 'needlessly fueling division and fear', after Swiss right-wing party had framed it as verdict on the role of Islam in public life

**What would the ban mean?**

The ban will mean that nobody can cover their face completely in public -- whether in shops or the open countryside.

**What percentage of the population are Muslims?**

Muslims make up around 5 percent of the Swiss population of 8.6 million, or about 390,000 people, most of whom have their roots in Turkey, Bosnia and Kosovo.

Q&A SESSION

**When was the veil banned?**

France banned the wearing of a full-face veil in public in 2011 and Denmark, Austria, the Netherlands and Bulgaria have full or partial bans on wearing face coverings in public.

**Which countries have similar bans?**

The so-called anti-burqa vote came after years of debate in Switzerland following similar bans in other European countries -- and in some Muslim-majority states -- despite women in Islamic full-face veils being an exceptionally rare sight in Swiss streets.

QUOTE

Ines Al Shikh, spokeswoman for the Purple Headscarves feminist Muslim women's group said: "This is clearly an attack against the Muslim community in Switzerland. What is aimed here is to stigmatise and marginalise Muslims even more"

Legend: ■ Voice 1: Host | Voice 2: Questions : Voice 3: Quotations

# NewsPod System: Q&A Session

## How is the Q&A Session Generated?

1. For each story, we obtain several relevant public news articles (on average 6 articles).

# NewsPod System: Q&A Session

## How is the Q&A Session Generated?

1. For each story, we obtain several relevant public news articles (on average 6 articles).
2. We organize content into paragraphs, on a story has article around 60 paragraphs.

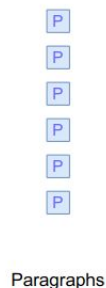
# NewsPod System: Q&A Session

## How is the Q&A Session Generated?

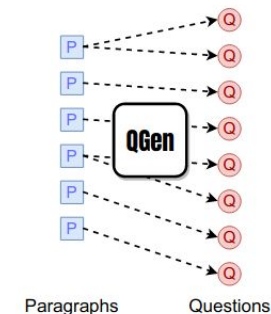
1. For each story, we obtain several relevant public news articles (on average 6 articles).
2. We organize content into paragraphs, on a story has article around 60 paragraphs.
3. Use a QGen & QA pipeline to create a sequence of (question, paragraph) pairs. – *More details in paper.*

*In Usability Study A, we check whether the format we propose is enjoyed by users.*

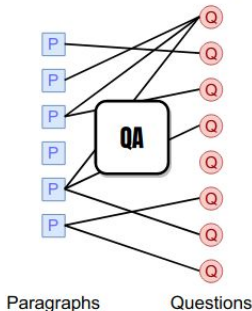
### 1. Select Paragraphs



### 2. Generate Questions



### 3. Build Q&A Graph



### 4. Select Q&A Session



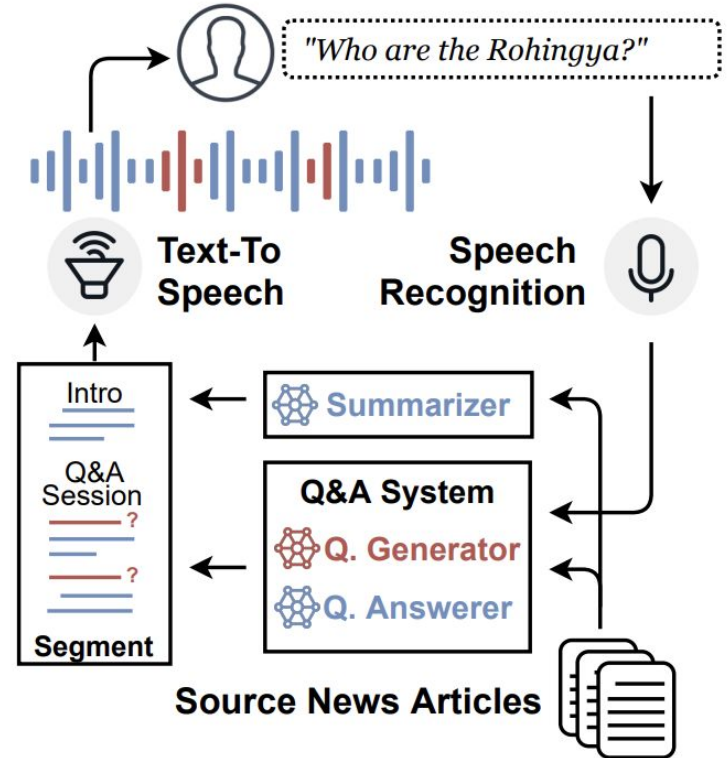
# NewsPod System: Interactive

We allow the user to participate in the podcast conversation by **asking their own question**.

When a user asks a question:

1. The podcast is paused
2. A Q&A system attempts to find the answer to the question.
3. The podcast system answers, and resumes the conversation.

*In Usability Study B, we check if and what types of questions users are interested in asking.*



# NewsPod

## Demo



# Usability Study A: Narration





# Study A: Introduction

Recruited 60 participants for 15-minute study. Participants:

1. Selected 5 stories of interest (out of a list of 7)
2. Listened to an 8-minute podcast
3. *(Could not ask their own questions)*
4. Shared thoughts on the experience


# Study A: Introduction

Participants were randomly assigned to one of **4** formats:


-  **Formal News:** The section is the first 5 paragraphs of a news article in the event.
-  **QA Random:** Conversation format (questions & answers), choosing the questions randomly
-  **QA Best:** Conversational format (questions & answers), choosing most informative questions greedily
-  **QA Reference:** Conversational format (questions & answers), hand-written by authors of the paper


# Study A: Research Questions

Participants were randomly assigned to one of **4** formats:

 **Formal News:** The section is the first 5 paragraphs of a news article in the event.

 **QA Random:** Conversation format (questions & answers), choosing the questions randomly

 **QA Best:** Conversation format (questions & answers), choosing most informative questions greedily

 **QA Reference:** Conversational format (questions & answers), hand-written by authors of the paper



**RQ1:** Is the Q&A format adequate for news podcasting compared to top-down article reading?


# Study A: Research Questions


Participants were randomly assigned to one of **4** formats:

 **Formal News:** The section is the first 5 paragraphs of a news article in the event

**RQ2:** How do automated Q&A sessions compare to handcrafted Q&A sessions?

 **QA Random:** Conversation format (questions & answers), choosing the questions randomly


 **QA Best:** Conversational format (questions & answers), choosing most informative questions greedily


 **QA Reference:** Conversational format (questions & answers), hand-written by authors of the paper




# Study A: Research Questions

Participants were randomly assigned to one of **4** formats:

 **RQ3:** How effective is the algorithm we use to select the most relevant questions & answers.

 **QA Random:** Conversation format (questions & answers), choosing the questions randomly

 **QA Best:** Conversational format (questions & answers), choosing most informative questions greedily

 **QA Reference:** Conversational format (questions & answers), hand-written by authors of the paper

# Study A: Results

Podcast Format	#Voice	#Part	★Interesting	★Coherent	% Would use?
Formal News	1	16	3.55	4.10	63%
QA Random	3	15	3.19	3.32	47%
QA Best	3	15	3.60	4.15	80%
QA Reference	3	15	<b>4.03 *</b>	<b>4.48 *</b>	<b>87%</b>

*Participants rated podcast sections on interestingness (1-5) and coherence (1-5). As well as whether they would use the podcast again (yes/no).*

- Participants prefer conversational over formal format
- But automated Q&A (QA Best) loses in quality compared to reference

# Usability Study B: **Interaction**

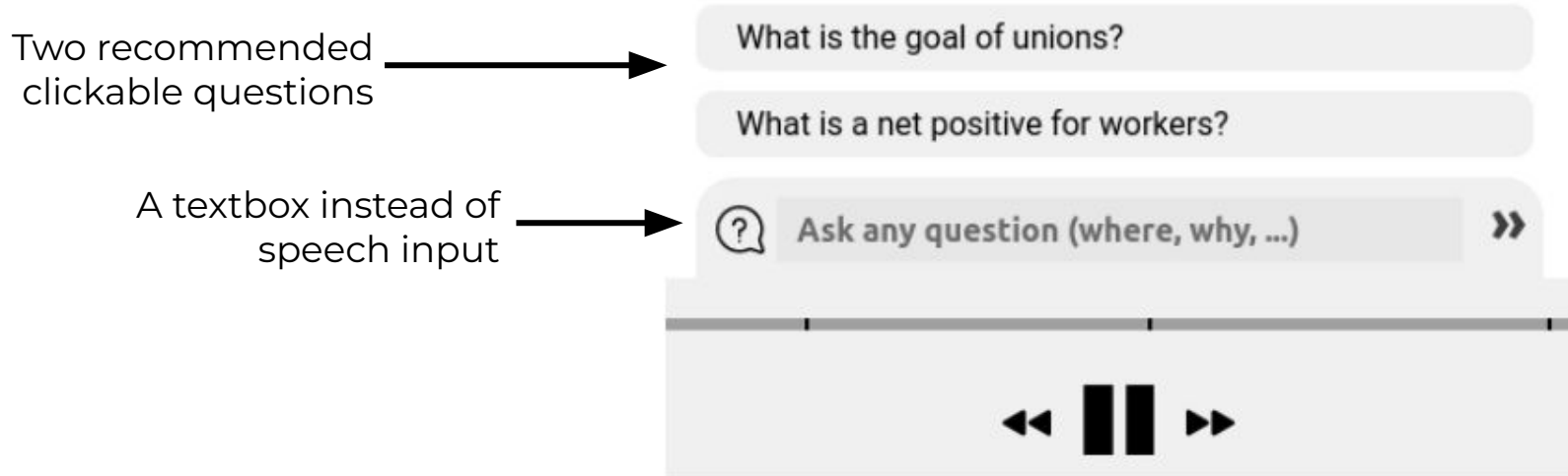


# Study B: Research Questions

- **RQ4:** Are news podcast listeners interested in interacting with the podcast by asking questions?
- **RQ5:** Does including breaks specifically designed for listeners to ask questions help increase user interaction?
- **RQ6:** Are current automated question-answering models equipped to answer news listeners' questions?



# Study B: Setup

Similar to **Study A**, the study ran in 15 minutes. We adapt the interface to lower the barrier to ask questions:



# Study B: Setup

40 participants were randomly assigned to one of two settings:

-  **With Break:** Additional 12 seconds / segment encouraging user to ask questions: *“We’re at the end of this segment, if you have any questions now is a good time...”*
-  **Without Break:** No break when transitioning from one segment to the next.

# Study B: Results

Setting	#Part	# Q. Asked	% Any Q.?
Without Breaks	20	2.4	55%
With Breaks	20	4.3 *	85% *

- **RQ4:** Yes! A majority of participants are interested in asking questions.
- **RQ5:** Including breaks encourages participants to ask questions.

# Study B: Question Typology

**RQ6:** Are current automated question-answering models equipped to answer news listeners' questions?

**79%** of participants were satisfied with answers to  
**recommended questions.**

**vs.**

**26%** of participants were satisfied with answers to their  
**own questions.**

# Study B: Question Typology

An analysis of the users' questions reveals why:

Question Type	Percent	Example
* Factoid	36%	What percent of Amazon workers are in a union?
Synthesis	18%	How many people reacted to the ban?
* Encyclopedic	14%	What type of government does Senegal have?
* Clarification	13%	Who is Bethesda, again?
Prediction	9%	When will Tesla release a new edition?
Rhetorical	5%	What about driving safety?
Self-Relevance	5%	How can I join in this union?

Current Q&A model are only good at answering the \* categories.

# Thank you

**TL;DR:** With NewsPod, we create conversational news podcasts that allow the listener to interact by asking questions.

Try out the demo:

<http://newspod.github.io>

Questions? Get in touch:

[plaban@salesforce.com](mailto:plaban@salesforce.com)