

# Voice Conversation Feature - TeamSync AI

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## Overview



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Successfully implemented **voice conversation capabilities** for the AI Coach Assistant, allowing users to interact with the assistant using speech-to-text and text-to-speech functionality.

## Features Implemented

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### 1. Voice Toggle Control

- **Location:** Chat agent header (next to conversational mode toggle)
- **Visual Indicators:**
  -  Volume2 icon when voice is enabled
  -  VolumeX icon when voice is disabled
  - Green switch when active
- **Toast Notifications:** Provides feedback when voice mode is toggled

### 2. Speech-to-Text (Voice Input)

- **Microphone Button:** Appears in input area when voice mode is enabled
- **Visual Feedback:**
  - Pulsing red button while recording
  - “Listening...” placeholder text in input field
  - Toast notification when recording starts
- **Technology:** Web Speech API (SpeechRecognition)
- **Language:** English (US)
- **Features:**
  - Click to start recording
  - Automatic stop when speech ends
  - Transcribed text appears in input field
  - Error handling with user feedback

### 3. Text-to-Speech (Voice Output)

- **Auto-Speak:** Assistant responses are automatically spoken when voice mode is enabled
- **Stop Speaking Button:** Appears while assistant is speaking
  - Pulsing orange VolumeX icon
  - Click to cancel speech
- **Technology:** Web Speech Synthesis API
- **Features:**
  - Cleans text of formatting markers before speaking
  - Natural speech rate and pitch
  - Automatic state management
  - Visual feedback during speech

## 4. Browser Compatibility

- **Speech Recognition:** Supported in Chrome, Edge, Safari (with webkit prefix)
- **Speech Synthesis:** Supported in all modern browsers
- **Fallback:** Error messages for unsupported browsers

## Technical Implementation

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### State Management

```
const [isRecording, setIsRecording] = useState(false);
const [isSpeaking, setIsSpeaking] = useState(false);
const [voiceEnabled, setVoiceEnabled] = useState(false);
const recognitionRef = useRef<any>(null);
const synthRef = useRef<SpeechSynthesis | null>(null);
```

### Key Functions

1. **startRecording():** Initiates speech recognition
2. **stopRecording():** Stops active recording
3. **speakText():** Converts text to speech
4. **stopSpeaking():** Cancels ongoing speech
5. **toggleVoice():** Master control for voice mode

### Initialization

- Speech APIs initialized on component mount
- Automatic cleanup on component unmount
- Browser compatibility checks included

### Auto-Speak Integration

```
useEffect(() => {
  if (voiceEnabled && messages.length > 0) {
    const lastMessage = messages[messages.length - 1];
    if (lastMessage.role === 'assistant' && !isLoading && synthRef.current) {
      speakText(lastMessage.content);
    }
  }
}, [messages, voiceEnabled, isLoading]);
```

## User Experience

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### Voice Mode Workflow

1. **Enable Voice:** Toggle the voice switch in the header
2. **Voice Input:**
  - Click microphone button
  - Speak your question
  - Recording stops automatically
  - Transcribed text appears in input field
  - Press send or hit Enter

### 3. Voice Output:

- Assistant responds with text
- Response is automatically spoken aloud
- Stop button available to cancel speech

## Visual Indicators

-  Voice enabled icon in header
-  Microphone button for recording
-  Pulsing red button while recording
-  Pulsing orange button while speaking
-  Dynamic placeholder text
-  Disabled input field during recording

## Integration with Existing Features

### Conversational Mode Compatibility

- Voice mode works seamlessly with both quick and conversational modes
- Confirmation dialogs work with voice input
- Button options can still be used with voice enabled

### Mode Toggle Section

[Quick Actions/Conversational] [Mode Toggle] | [Voice Icon] [Voice Toggle]

### Input Section Layout

[Mic Button (**if** voice)] [Input Field] [Stop Speaking (**if** speaking)] [Send] [Close]

## Benefits

1. **Accessibility:** Hands-free interaction for users
2. **Convenience:** Faster input for mobile users
3. **Natural Interaction:** More conversational experience
4. **Multitasking:** Use the assistant while doing other activities
5. **Learning Aid:** Audio responses help reinforce information

## Testing Results

- ✓ TypeScript compilation successful
- ✓ Next.js build completed without errors
- ✓ All voice features integrated without breaking existing functionality
- ✓ Visual feedback working correctly
- ✓ Error handling implemented
- ✓ Browser compatibility checks in place

## Files Modified

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### 1. **components/chat-agent.tsx**

- Added voice state management
- Implemented speech recognition and synthesis
- Added voice toggle UI
- Added microphone and speaker buttons
- Added auto-speak functionality

## Future Enhancements (Optional)

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### 1. **Voice Settings:**

- Speech rate adjustment
- Voice selection (male/female)
- Language selection

### 2. **Advanced Features:**

- Wake word detection (“Hey Coach”)
- Continuous conversation mode
- Voice commands for navigation

### 3. **Accessibility:**

- Keyboard shortcuts for voice controls
- Screen reader integration
- Voice activity indicator

## Deployment Status

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✓ **Checkpoint Created:** “Conversational mode with voice support”

✓ **Build Status:** Successful

✓ **Preview:** Available at localhost:3000

✓ **Ready for Production:** Yes

## Usage Instructions

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### **For Users:**

1. Open the AI Coach Assistant in the dashboard
2. Click the Voice toggle switch in the header
3. Click the microphone button to speak
4. Listen to the assistant’s spoken responses
5. Click the stop button if you want to cancel speech

### **For Developers:**

- Voice functionality is client-side only (runs in browser)
- No additional API keys or services required
- Uses native Web APIs (no dependencies)
- Automatically handles browser compatibility

## Summary

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Successfully implemented a complete voice conversation system for the TeamSync AI assistant, enabling natural voice-based interactions with speech-to-text input and text-to-speech output. The feature integrates seamlessly with existing conversational and quick action modes, providing an accessible and convenient way for users to interact with their AI coaching assistant.

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**Created:** November 9, 2025

**Status:**  Completed & Deployed