TwoTone and Morph Introduction with TwoTone Demo

Hi, my name is Deborah Anderson, co-founder of Datavized Technologies, a data studio in New York City, and also adjunct faculty at the New School for Public Engagement and Parsons School of Design, where I teach about data visualization, data driven storytelling and immersive technologies such as virtual and augmented reality.

Today, I'm here to introduce you to two different tools that our studio Datavized built with the support of Google News Initiative. The first is called TwoTone, a data sonification web app that enables you to easily upload a spreadsheet or use a sample spreadsheet to turn data into sound and music. The second tool is called Morph, which enables you to take a spreadsheet and turn that into graphic design, interactive animations and art. I'd like to introduce you briefly to Datavized creators of TwoTone and Morph built with the support of Google News Initiative.

Our website is datavized.com and you can find more out about us and the tools on our website. You'll see here that we have featured TwoTone right on the cover page. And another tool we built with the support of Google called Morph to create design animations and interactive visuals from data. You can also find this information on the product page and link directly to these applications from our website. Scroll down here and here is the Morph product site, which you can link to and TwoTone.

So I'd like to introduce these tools briefly. TwoTone lets you turn data into sound and music. It uses the process of sonification to let you hear data. It's free and open source and runs 100 percent on the web. So you don't need to download anything. TwoTone works on desktop, tablets and phones. It's a progressive web app. It's designed to be fast, fun and easy to use. TwoTone is built by Datavized Technologies, my studio here in New York City, along with the support of Google News Initiative. Let's go ahead and visit the product site, twotone.io.

As you can see, the Web application is accessible right on the website. You can start the application, which we'll do in a minute. First, I'll just walk you through briefly, some of the general information about the application. TwoTone is made by Datavized Technologies with the support of Google News Initiative. It can be used for understanding data, turning data into sound through the process of sonification, or turning it into more expressive creations, including musical creations. It also makes data more accessible for people who are blind or visually impaired. TwoTone can be used by itself or in tandem with visualization. Just like the cinema, sound adds another layer to understanding information. TwoTone is also a fun and intuitive way to make your own compositions without any prior musical knowledge.

The recently created TwoTone as an easy to use web application, is because the process of process of sonification to date has been primarily something that has been developed through custom applications, meaning you need to code an application to create a sonification piece and oftentimes use additional music software to turn that into an interactive sonification or a musical experience. TwoTone is also freely available, it's open source, and you can see here we can access the tool through the GitHub page. So you can contribute to the tool and we welcome your feedback.

It has built in features to easily create sound from tabular data such as spreadsheets and comma-separated values, and turn that into audio and or music. The data uploaded to TwoTone are processed fully in the web browser. No server side operations or storage is required. It's also optimized for mobile and designed for a cross platform progressive web app experience. So you can even add the application to your own device.

TwoTone is a playful technology and easy to use, but allows for output to industry-standard format so that users can export their compositions for use in professional projects. There is no limit to the type of data that can be uploaded, leaving the tool open for a broad range of users and use cases. This software can be used by journalists, data professionals and researchers as an exploratory tool or by artists, musicians, media makers and composers as a creative tool. It can be also used to share data with the blind and visually impaired. To help understand data in new ways completely through the sense of hearing.

The goal of TwoTone is to explore the potential of turning data into sound as the primary sense instead of sight. To uncover anomalies and insights through audio escapes, rather than using a purely simple visual chart or graph to communicate data or a data story. In attaching individual time based datasets and individual columns of data to variables in sound, pitch and volume, the tool can be used as a useful data communications tool to create a sonic representation of information. For the user, the experience is interaction as a niche instrument. When a selection is made in the data set, it will trigger an audio scape that can be combined with the next interaction to create a real time composition. Each composition can be recorded and shared easily across web or social channels. The tool, therefore, allows users to create new and unique pieces of music by exploring a dataset. It is playful but also has practical uses, since the representation of the data is as true as a visual rendering and any anomalies can be heard, identified and acted upon.

TwoTone is designed to be seamlessly integrated into the workflow of a newsroom and is either used as a standalone tool for publishing sonification on the Web or as a soundtrack builder for multimedia projects. The tool is fully customizable to enable creators to map any data input to the desired output. OK, now let's go to the tool itself.

So we're going to visit twotone.io and we're going to get started. So let's just start the application. When we open the application app.twotone.io, you can see that all the sample datasets that we've built into the tool are visible. Let's go ahead and pick one of these sample data sets to get started. Honey production in the USA from 1998 to 2012. So what happens when we select this dataset, is TwoTone automatically generates a musical scale based on the first column of data in the spreadsheet. In this case, the year of honey production going from 1998 to 2012. So you can see here the year is mapped on the musical scale to the left side, and we have our data preview here on the right side and we can kind of scan that whole dataset that's built in. Also, what happens is TwoTone automatically assigns an instrument to this column of data. In this case, the piano. And we'll be able to customize this with other instruments as we go forward. But for now, we'll just stick with the default instrument in the tool.

So let's go ahead and just starting there. Play this dataset. So as you can hear, each value of the year is assigned to the musical instrument. And in this case, it's in the key of C major. And as the value of the data increases, the pitch and volume of that also increases. Now that we've learned to use the basic function of the tool, let's go ahead and add another musical scale. So by clicking on that musical scale, TwoTone also again

automatically assigns an instrument to the second column of data. In this case, the number of colonies for honey production in the USA. So here you can see a bit more variation in the data. It's not as incremental as years 1998 to 2012. We have some different numerical values and thus the sound of this data will be represented accordingly.

So let's mute our year and play the number of colonies. In this case, the double bass is a default. But I'm gonna go ahead and change that to a marimba instrument. Switch it up a little bit. And we'll hit play. And you can see in the data preview we can follow the numerical values through the data graph here and also, of course, listen to each data point being sonified.

Now, let's go ahead and add a third musical scale here. In this case, the total production of honey in pounds and the number of colonies. And let's keep that marimba instrument for a number of colonies and total production. We'll keep as the default instrument, the tools chosen a double bass and let's go back to year. And we can just turn back on our piano. But we can also use an added functionalities such as this dropdown feature to perhaps minimize the volume of years. So it's just a little bit more subtle as that is incremental. And let's play that sontification. Sounds pretty good.

OK, so let's go back and also now just look at some other features of the TwoTone application. So we can also filter the data. So we may just want to tell a story or represent data based on certain peaks or values or especially over-time based data or seasonal data, things that occur through events over time. So we'll drop down our advanced feature here and adjust the filter value. So let's just choose data in terms of number of colonies over, twenty five million. And then we'll play that.

So as you see here, by filtering the data, we're only sonifying the represented values. Now let's go in and just show you some of the other features using this basic tool. By the way, we have built in a fantastic guided app tour which walks you through each of the steps of the tool. Let's show you that briefly. You can select the data, either the samples that we built into the product or upload your own data set. We can sign the audio track in this case again if default by the first column in your spreadsheet and then you can customize that. And playing the audio in the bottom left at any point in time.

We also have another feature using Google's Text-to-Speech API to enable the title to be spoken. So you can enter a title, you can customize that title. Type it in and turn the speech features, the speech title on. You can also customize the speech title option for language, gender and voice options. Next. Of course, you can create another audio track which will, TwoTone automatically assign that from your dataset based on each column. Or you can also upload an audio track of your own. This feature is very useful for assigning a particular sound to a data value or a particular column that you want to have to stand out from perhaps the other default instruments built into the tool. You can also adjust your rate duration of the entire sonified piece and soundscape. So in this case, you can adjust the road to a duration or tempo to speed up or slow down your composition.

And also, finally, we have the advanced features to adjust the volume of the track, filter it by data columns or by value, change the key of your musical scale or adjust octave scale range and tempo to also create an arpeggio. And finally, I should say, is exporting your sonification. So here you can export as an MP3 file or Waveform file format.

So let's go into some of those advanced features with this sample dataset. So we showed kind of filtering by value. Let's also look at the different options for changing the key, the scale and creating a change of tempo and arpeggio to the sonification. We have C major and you can see the other options are available down here, and we'll keep C major for now. But let's change the octave. Let's go to four octaves. And the Start Octave, we'll adjust that. And the tempo, we'll speed up. So by doing that, you see we've been able to enable the arpeggio feature to have an ascending or descending value. On this feature is quite useful as well. If we want to distinguish a kind of pattern or repetition in the song application, distinguish that from some of the other musical scales kind of sets it apart. Create something a little bit more musical.

So we've done that for the column of the year. We might choose to do this for, perhaps a larger data set range, something more seasonal over the span of, let's say, perhaps even a decade and hundreds of thousands of rows of data to really create and distinguish some of the sonification of those data values according to different points in time.