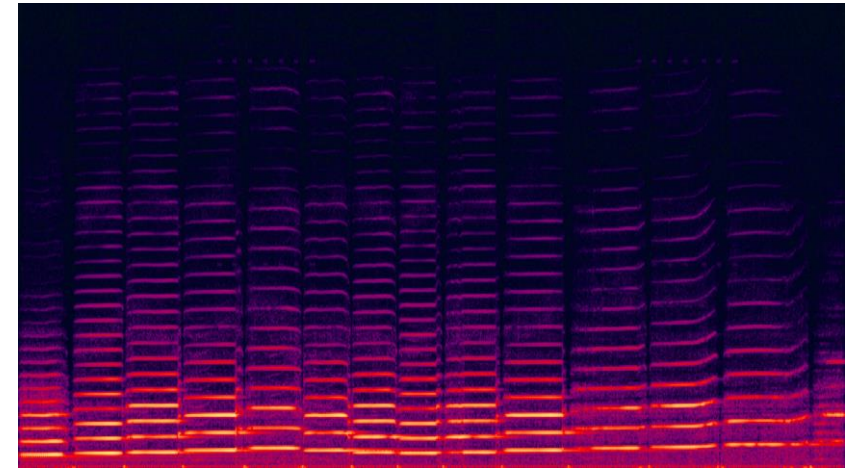


Sound Classification using ML.Net

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.net | bangalore
Learn. Share. Network. meetup

Introduction

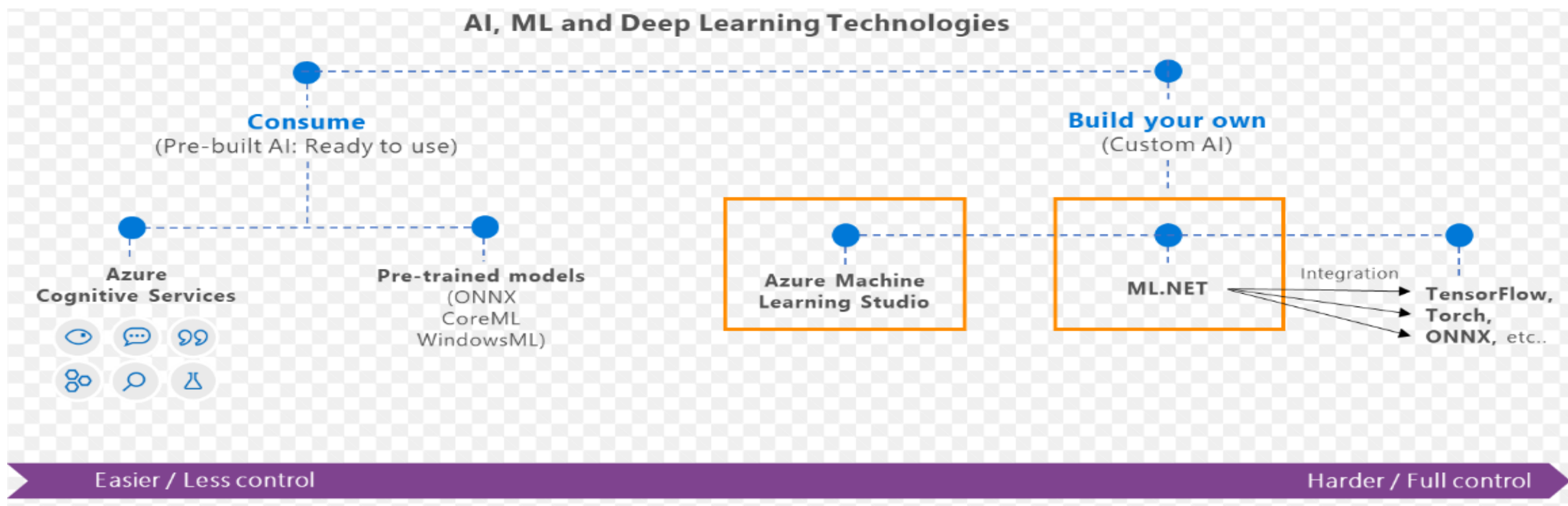
- Technical Architect @ Harman, A Samsung Company
- Area of Expertise: Cloud, Distributed computing
- Area of Interest: AI/ML and IoT
- Location: Bangalore, India
- Member: .Net Foundation

Agenda

- What is ML.Net
- Basics of Sound
- Sound Classification
- Exploratory Data Analysis
- Framework and Tools
- Classification using ML.Net
- Demo

What is ML.Net ?

- ML Framework from Microsoft for developing custom AI/ML applications.
- Originated in 2002 as part of Microsoft Research Project



What is ML.Net ?

ML.NET

Machine Learning framework made for .NET developers



Build-your-own

Build your own custom models by writing C# or F# code



Developer focused

ML.NET provides just the right amount of productivity and control



Extensible

Tap into other machine learning toolkits with the rich extensibility model like TensorFlow



Proven

ML.NET has been used internally in products like Office and Bing for years

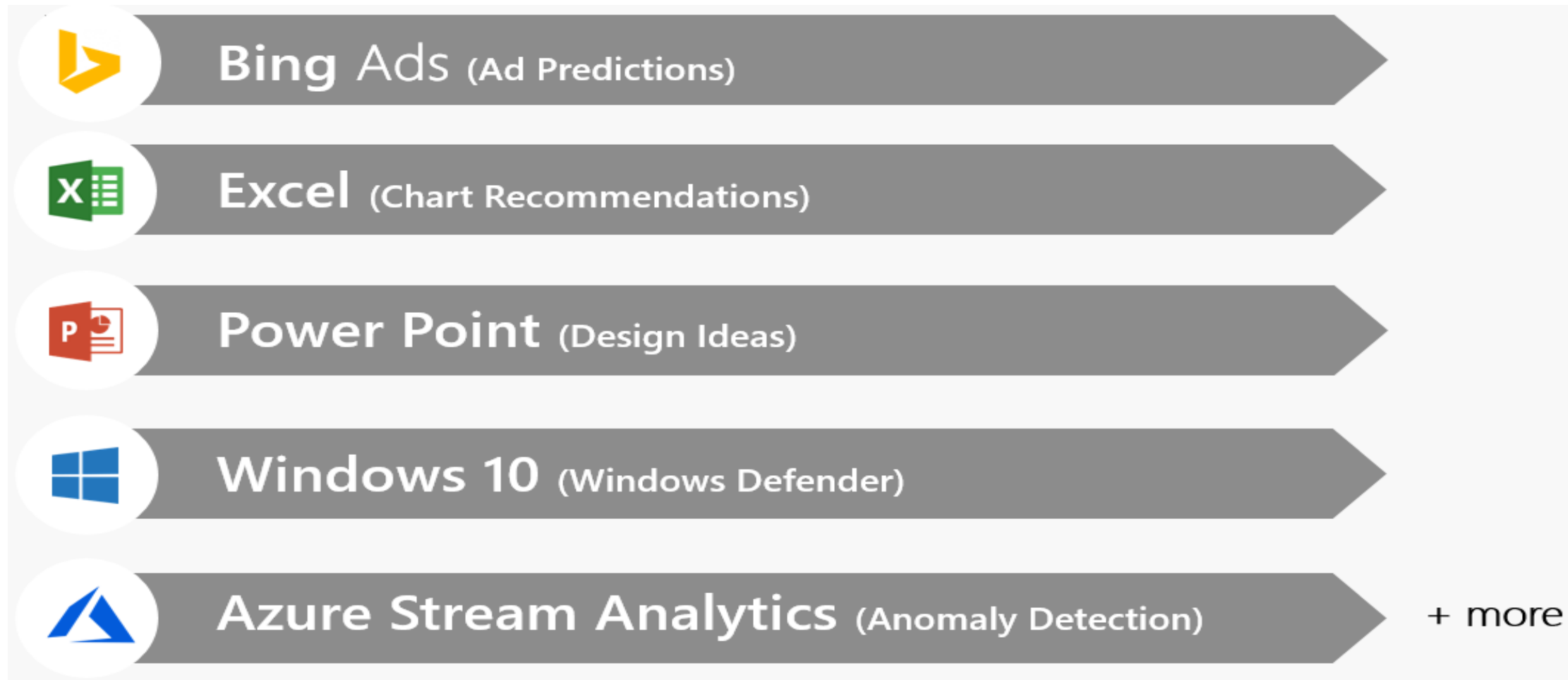


Open source and Cross-platform

Runs on Windows, macOS and Linux and developed in the open on GitHub

<https://github.com/dotnet/machinelearning>

ML.Net-Proven at scale, Enterprise Ready



ML.Net-Possibilities



Sentiment Analysis



Forecasting



Issue Classification



Predictive maintenance



Image classification



Recommendations



Object detection



Customer segmentation

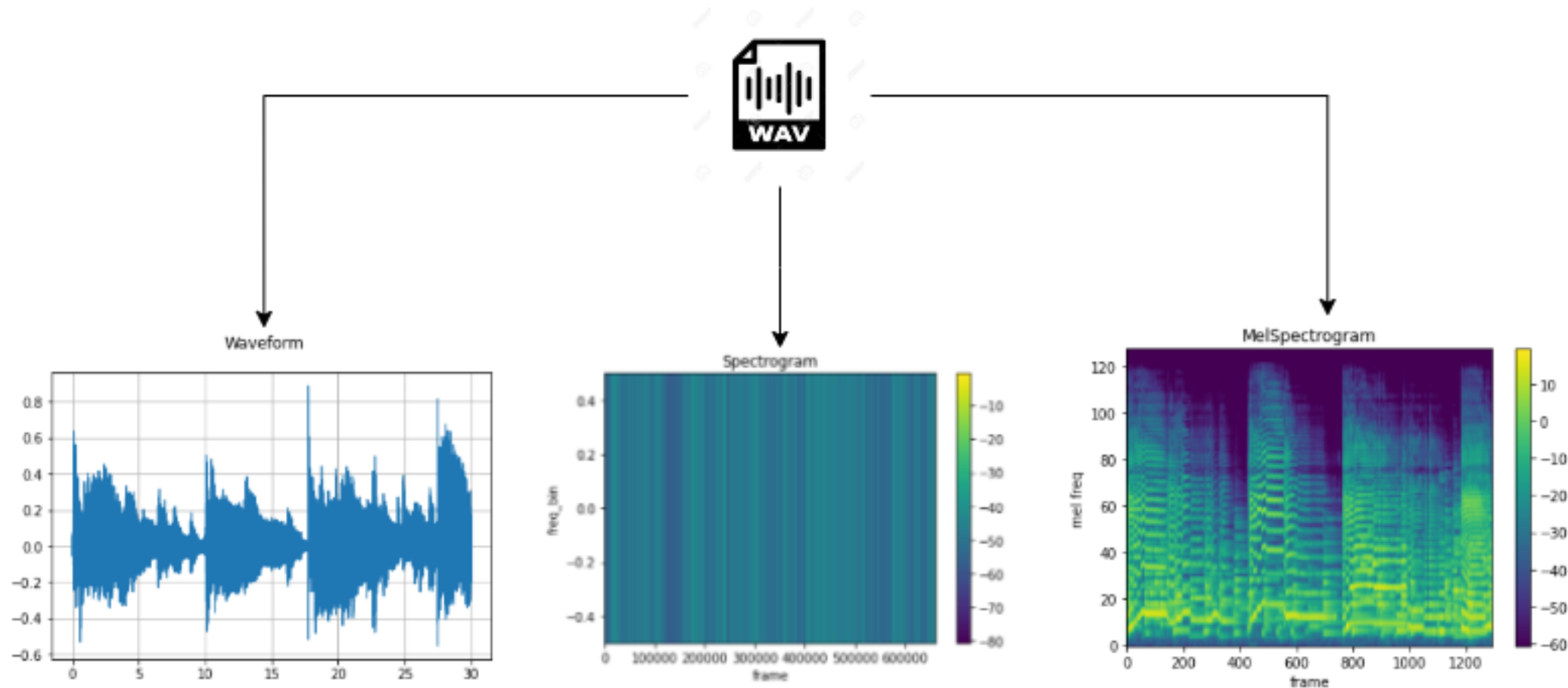


And more! Samples @ <https://github.com/dotnet/machinelearning-samples>

Basics of Sound

- **Sound** : A pressure wave created by a vibrating object.
- **Amplitude** : Measure of height of a wave or loudness
- **Frequency** : Total # of waves produced per second. Human(20Hz – 20KHz)
- **SampleRate** : How many times per second a sound is sampled. 44.1KHz, 96KHz
- **BitRate** : Amount of data transferred into audio. 8-bit, 16-bit, 24-bit.
- **Channels** : Represents spatial experience of sound. Mono/Stereo/Surround
- **FFT** : Fast Fourier Transform. A way to convert signal from time to frequency domain

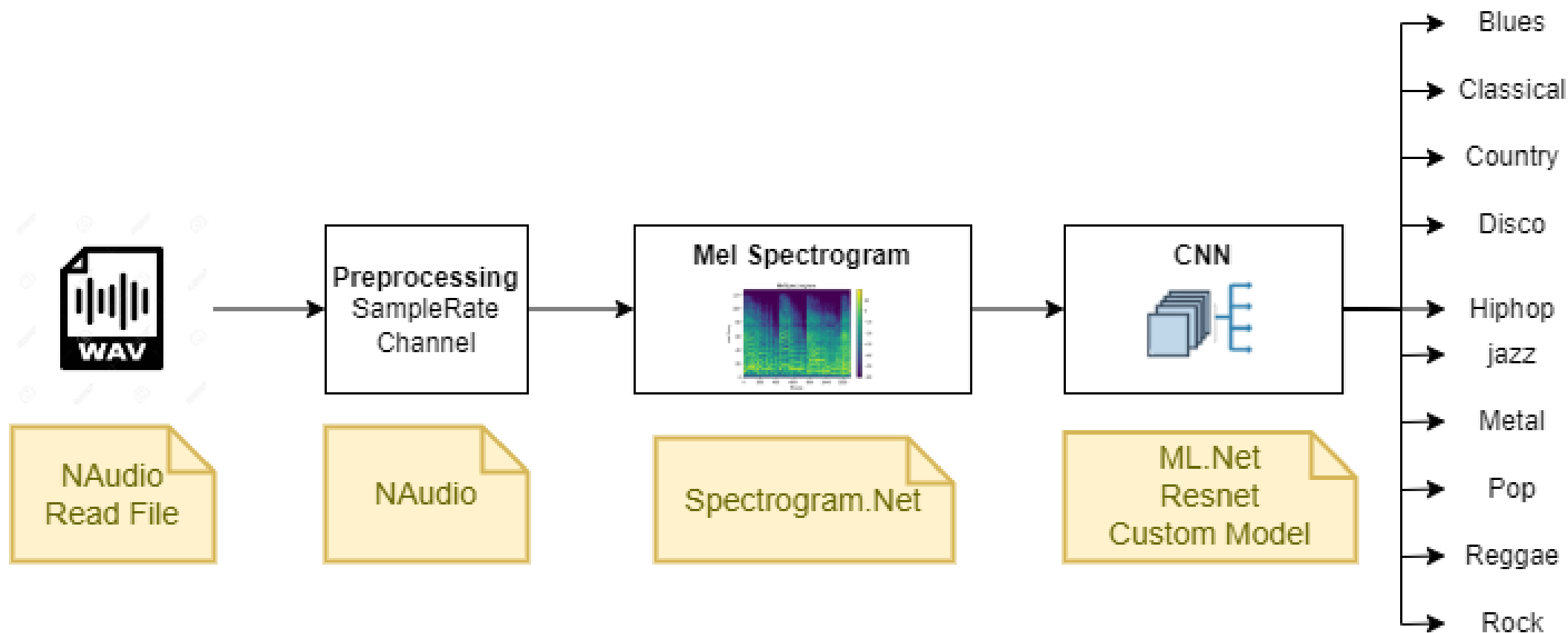
Visual Representation



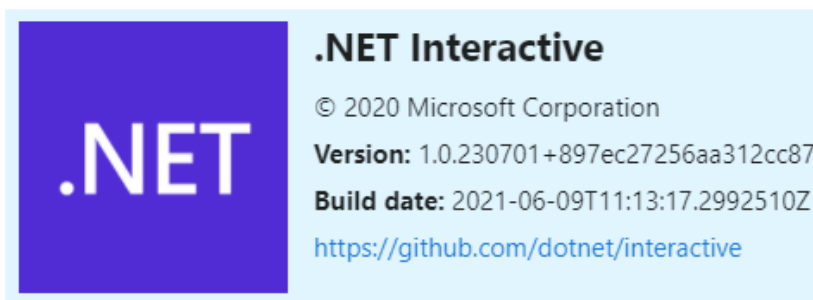
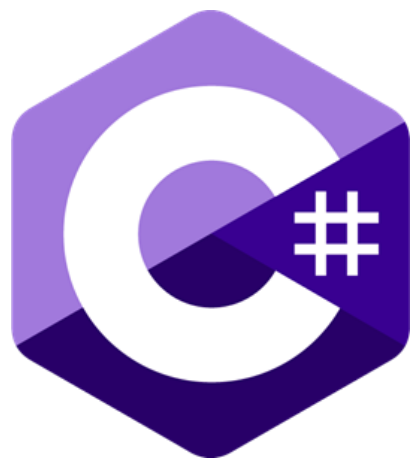
<https://musiclab.chromeexperiments.com/spectrogram>

<https://www.youtube.com/watch?v=6vS8mHg0U6Q>

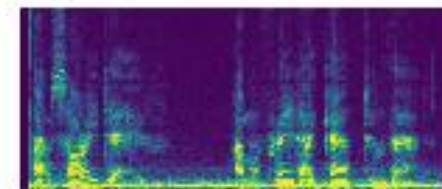
Sound Classification



Framework and Tools



Spectrogram .Net



Demo

Resources



<https://github.com/praveenraghuvanshi/tech-sessions/tree/master/14042022-Practical-ML-Net-Sound-Classification>

Thank you

Q & A



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https://t.me/joinchat/lifUJQ_PuYT757Turx-nLg