

The logo for CloudWorld, featuring the word "CloudWorld" in a bold, white, sans-serif font on a dark blue rectangular background. Below the main text, in a smaller, white, sans-serif font, is the text "FEBRUARY 7-9, 2022 | ALL-VIRTUAL".

**CloudWorld**

FEBRUARY 7-9, 2022 | ALL-VIRTUAL

# Serverless Deep Neural Network(DNN) with Azure Functions and ML.Net

Praveen Raghuvanshi

@praveenraghuvan



## Introduction

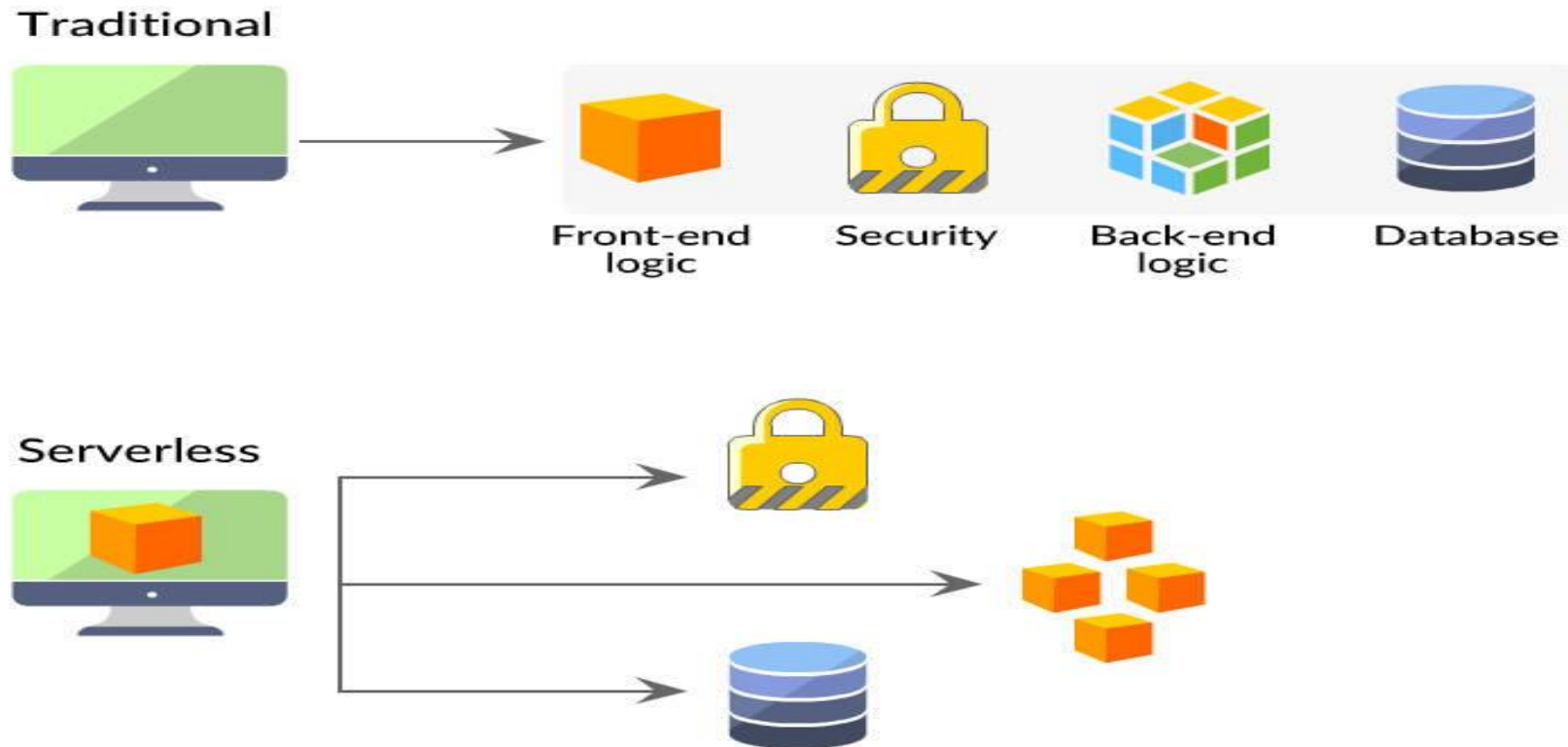
- Cloud Architect @ Harman, A Samsung Company
- Domain: Professional Audio, Video & Control
- Area of Expertise: Cloud, Distributed computing
- Area of Interest: AI/ML and IoT
- Location: Bangalore, India
- Member:



# Agenda

- Serverless
- Azure Functions
- Deep Neural Networks(DNN)
- Image Classification
- ML.Net
- Demo

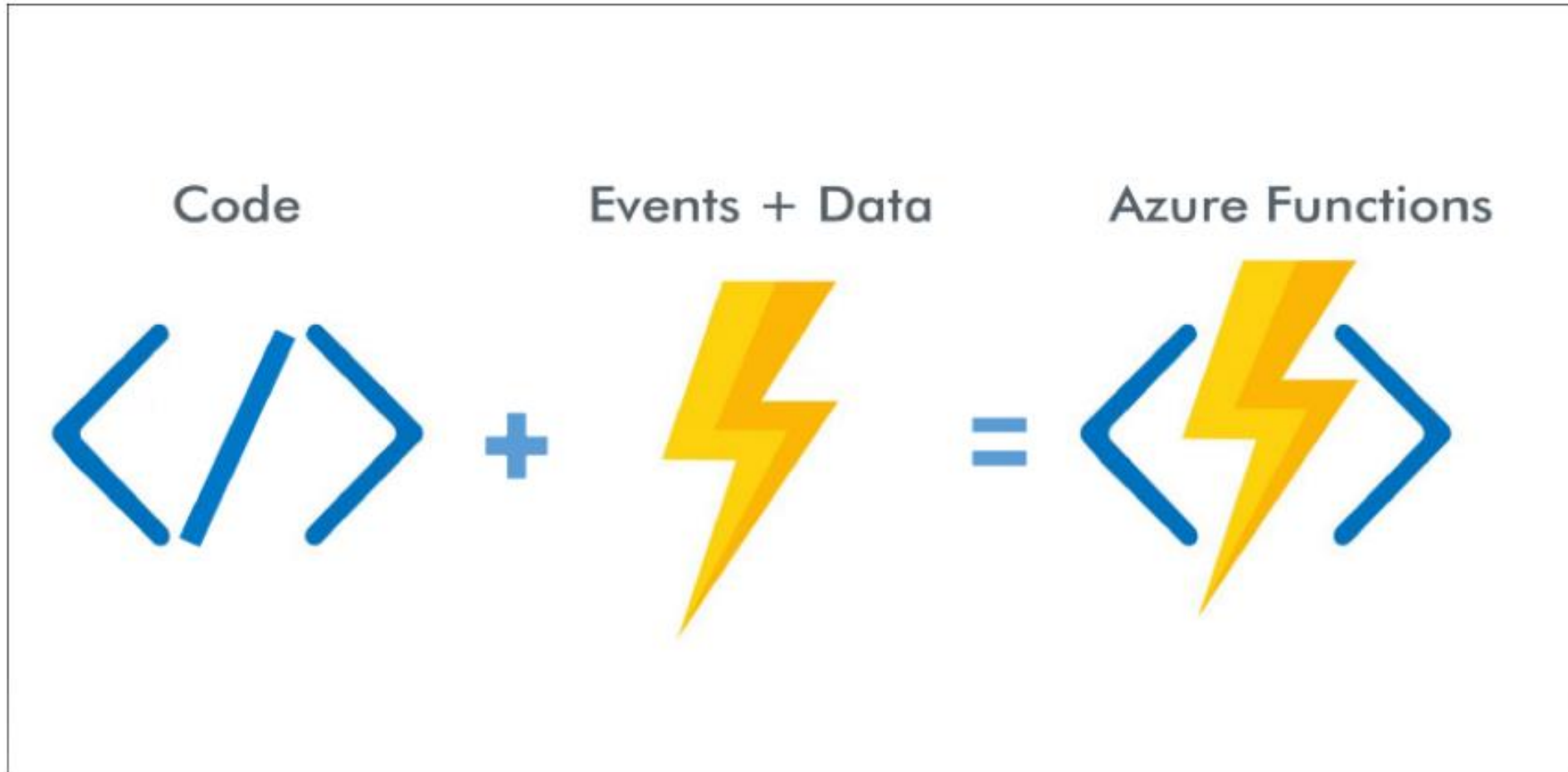
# Serverless



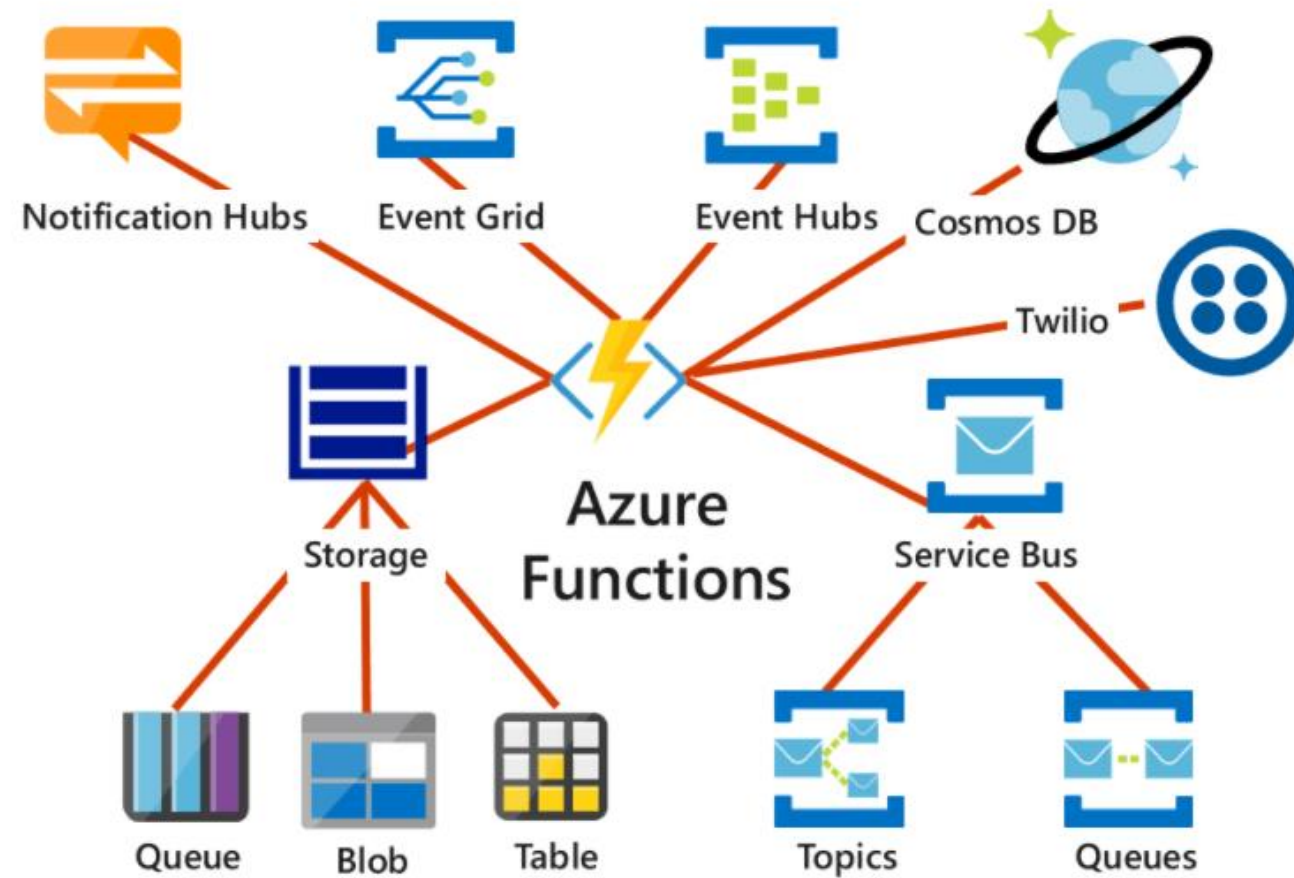
source: <https://danielhkim.net/2020/02/27/serverless-cloud-computing/>

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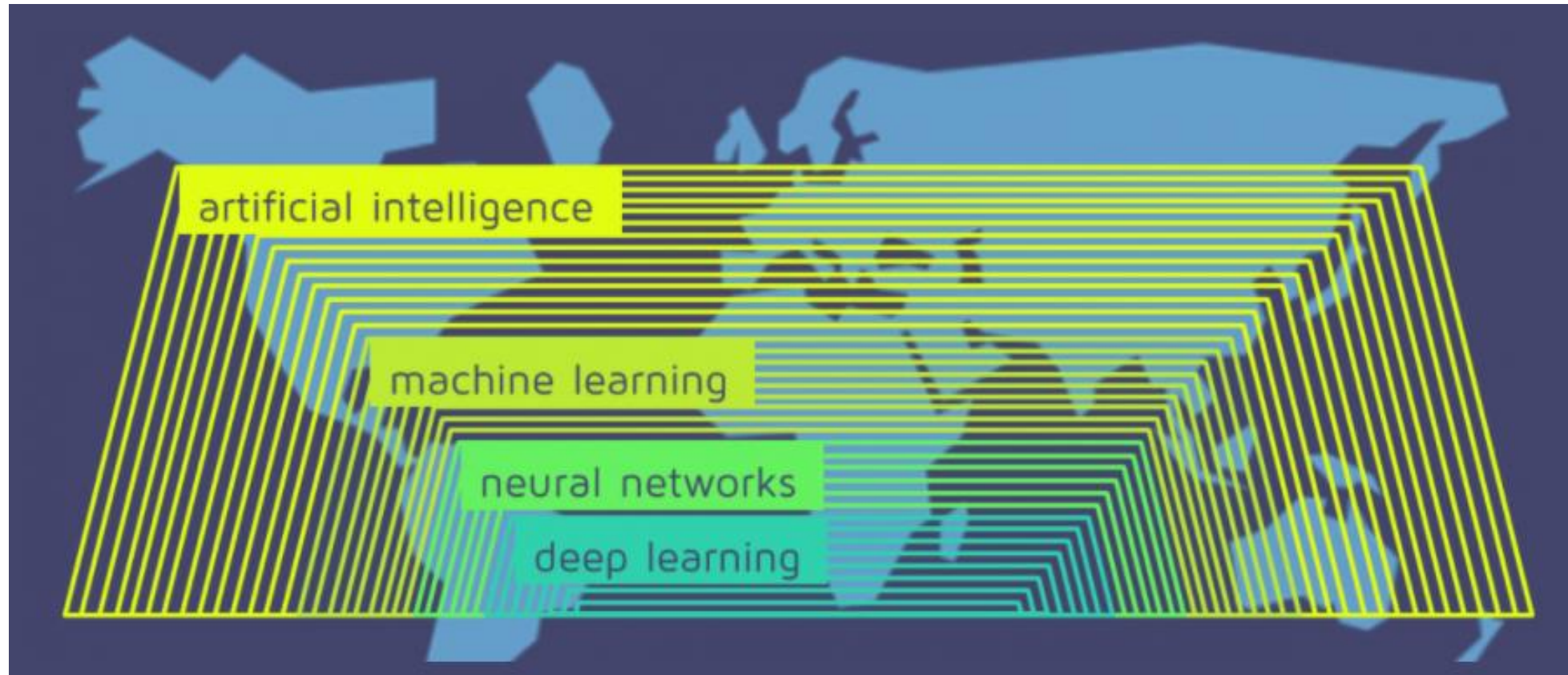
# Azure Functions



# Azure Functions



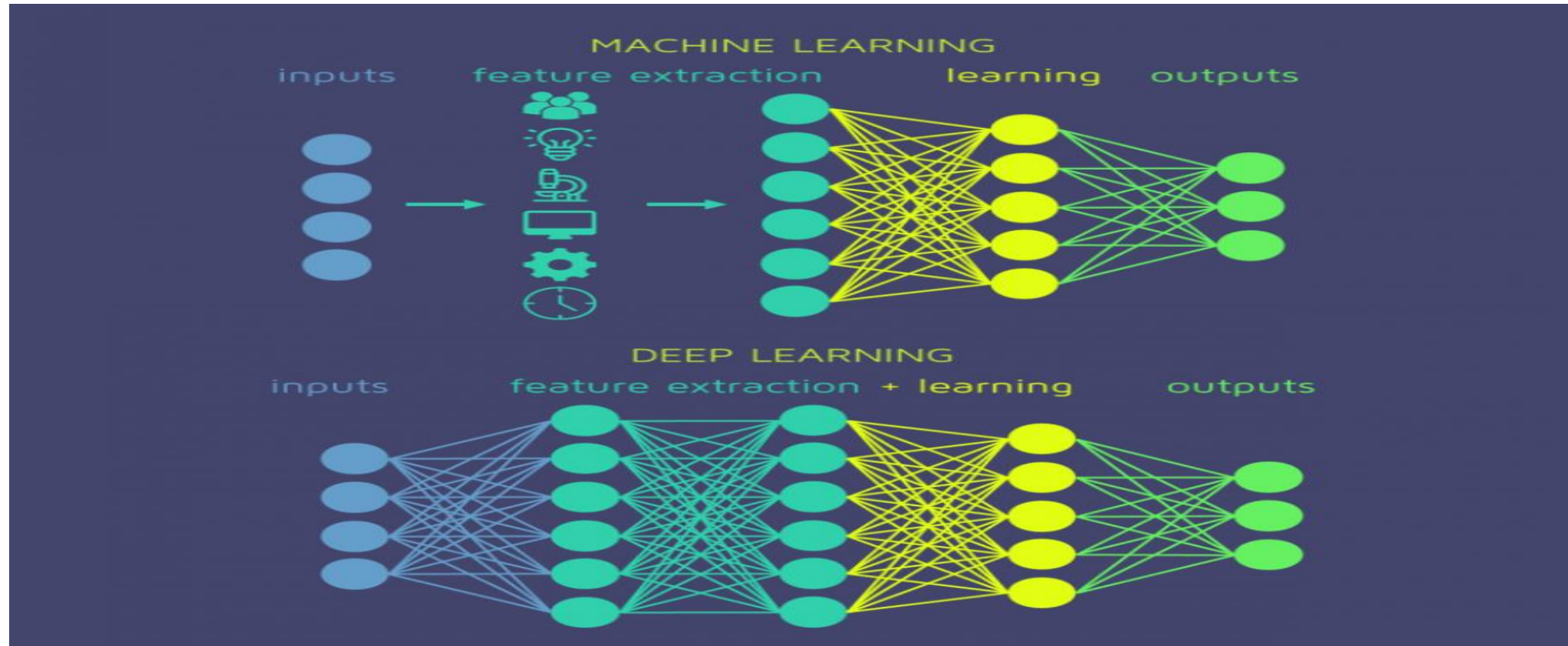
# Deep Neural Network



source: <https://quantdare.com/what-is-the-difference-between-deep-learning-and-machine-learning/>



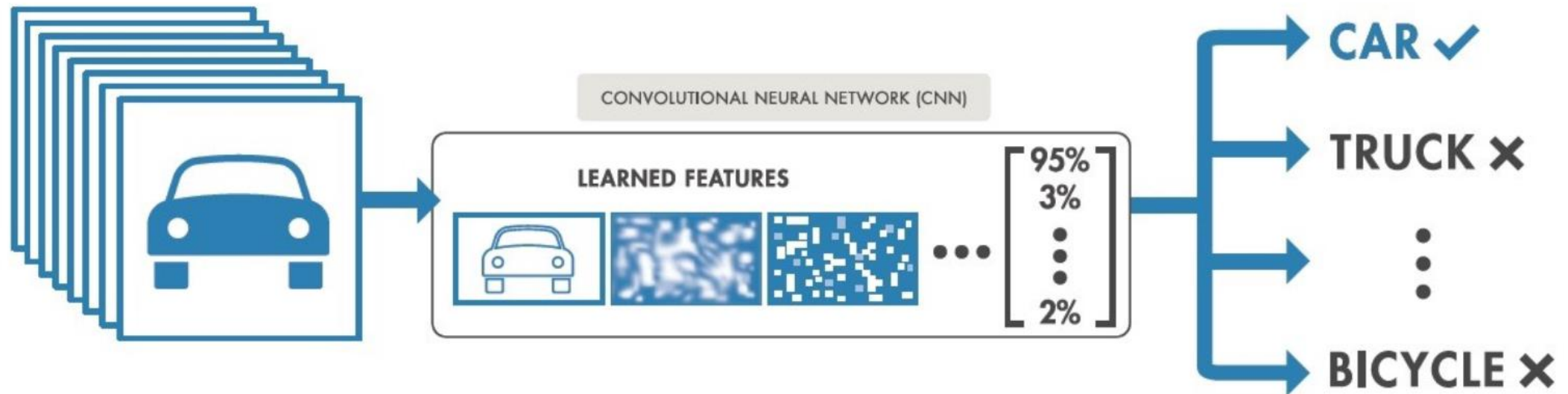
# Deep Neural Network



source: <https://quantdare.com/what-is-the-difference-between-deep-learning-and-machine-learning/>

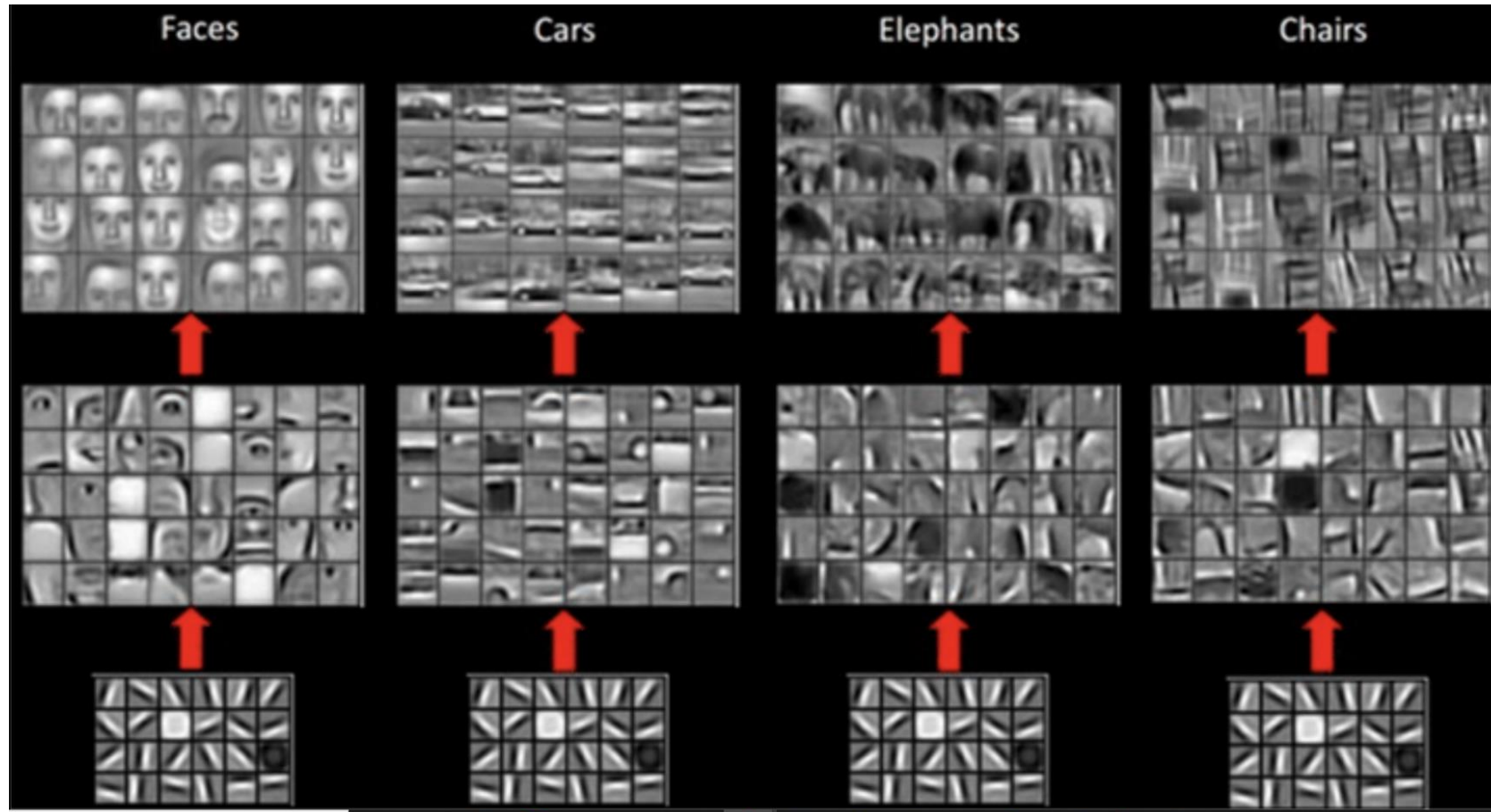


# Image Classification



Source : MathWorks (<https://goo.gl/zondfq>)

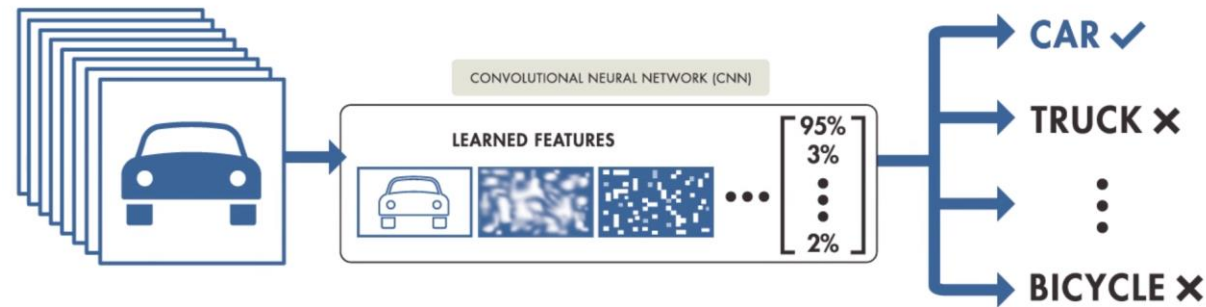
# Image Classification



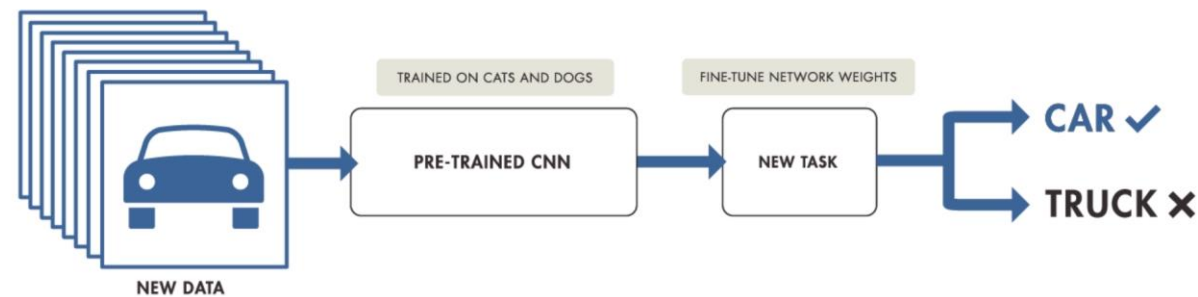
source: [https://miro.medium.com/max/1910/1\\*fLGuAUT5imTIG AeA4zzaWA.png](https://miro.medium.com/max/1910/1*fLGuAUT5imTIG AeA4zzaWA.png)  
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# Transfer Learning – MobileNet V2

## TRAINING FROM SCRATCH



## TRANSFER LEARNING




source: <https://i.pinimg.com/originals/0a/76/eb/0a76eb3c95c249cdff9449af08ac4efc.png>

# 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

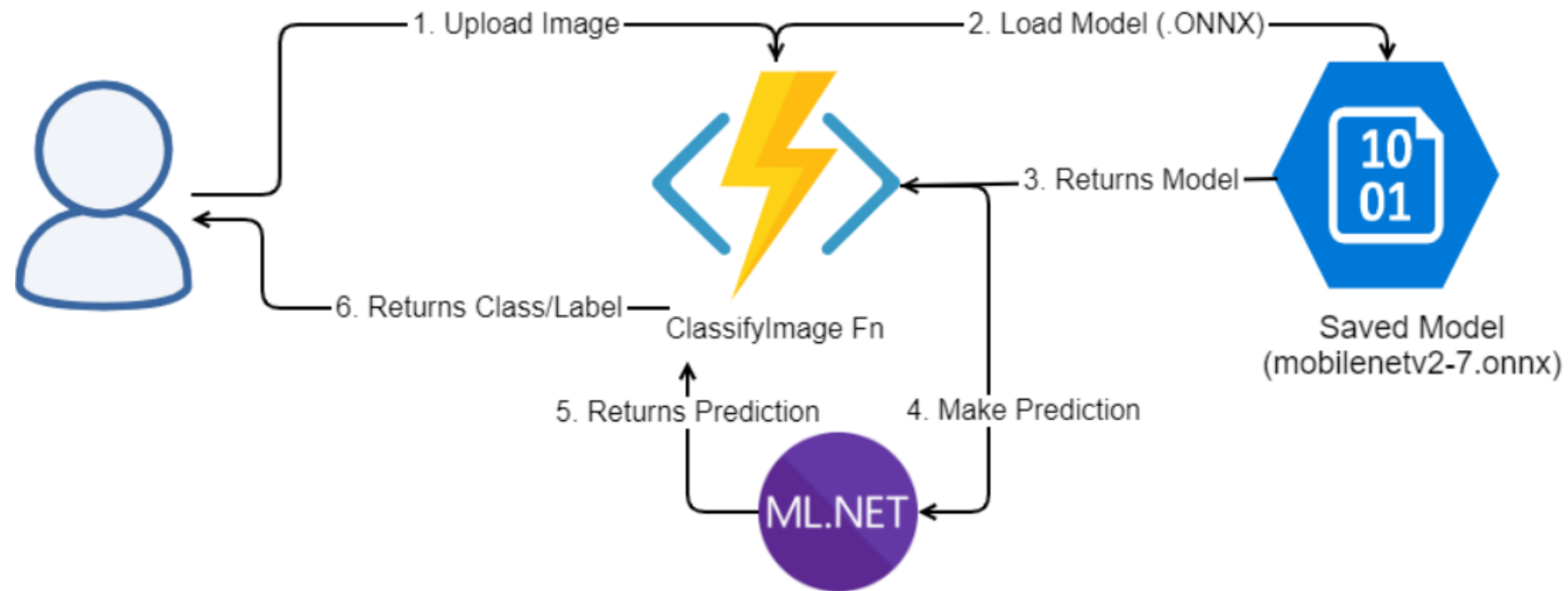


**Open source and Cross-platform**







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

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

# Cloud Architecture



# Customer Success Stories – ML.Net

 <p><b>Asgard Systems</b></p> <p>Asgard Systems uses demand forecasting in grocery stores to reduce food waste and gas house emissions.</p> <p><a href="#">Learn more &gt;</a></p>	 <p><b>Scancam</b></p> <p>Scancam uses ML.NET to detect vehicles at fuel station pumps and provides alerts for known offenders who previously drove off without paying for their fuel.</p> <p><a href="#">Learn more &gt;</a></p>	 <p><b>SigParser</b></p> <p>SigParser converts e-mail signatures to contacts and eliminates manual data entry; it uses ML.NET to predict if an e-mail sender is human or an automated system.</p> <p><a href="#">Learn more &gt;</a></p>
 <p><b>endjin</b></p> <p>endjin uses ML.NET with AutoML to improve the process of classifying articles for their Azure newsletter and to revolutionize simple, everyday tasks.</p> <p><a href="#">Learn more &gt;</a></p>	 <p><b>Microsoft Real Estate &amp; Security</b></p> <p>Microsoft Real Estate &amp; Security uses ML.NET to detect and classify HVAC system faults on Microsoft's campus and convert them to work orders.</p> <p><a href="#">Learn more &gt;</a></p>	 <p><b>Power BI</b></p> <p>Power BI uses ML.NET to help users identify key influencers and customer segments so that they can understand the factors that drive their business metrics.</p> <p><a href="#">Learn more &gt;</a></p>

<https://dotnet.microsoft.com/apps/machinelearning-ai/ml-dotnet/customers>

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# Demo

# Resources

Github: <https://github.com/praveenraghuvanshi/tech-sessions/tree/master/27102021-AI-Dev-World-2021>

# References

- <https://docs.microsoft.com/en-us/azure/azure-functions/functions-develop-vs>
- <https://blog.rasmustc.com/multipart-data-with-azure-functions-httptriggers/>
- <https://docs.microsoft.com/en-us/dotnet/machine-learning/tutorials/image-classification>
- <https://docs.microsoft.com/en-us/samples/dotnet/machinelearning-samples/mlnet-image-classification-transfer-learning/>
- <https://docs.microsoft.com/en-us/dotnet/machine-learning/tutorials/object-detection-onnx>



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<https://github.com/praveenraghuvanshi>



[@praveenraghuvan](https://twitter.com/praveenraghuvan)



[https://t.me/joinchat/lifUJQ\\_PuYT757Turx-nLg](https://t.me/joinchat/lifUJQ_PuYT757Turx-nLg)

Thank you

Q & A