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AI APPLICATIONS FOR AUTOMOTIVE

There are 5 top trends in Automotive industry reported recently by PWC, which are Electrification, Autonomous Vehicles (AV), Shared services, Connectivity, and updates with new mobility services. They are much tighten with Mandatory Safety Features to be enabled by EOMs (original equipment manufacturers) by 2022 under European Commission regulatory compliance. Many of these challenges require highly accurate and performant Computer Vision techniques deployed into automotive development platforms.

Problem.

Out of Hardware, Connectivity, Navigation, and other areas of AV landscape, the Algorithms is the one that emerges new deep learning approaches for object detection, classification and decisioning. The list of the most demanding features of AV are

- Intelligent speed assistance
- Driver drowsiness and attention warning
- Advanced driver distraction warning
- Advanced emergency braking systems
- Emergency lane-keeping systems
- Detecting pedestrians and cyclists

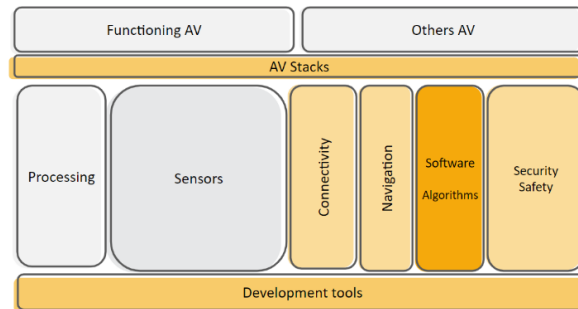


Fig 1 – Autonomous Vehicles landscape

Approaches. The majority of above problems are approached by Deep Learning techniques. The accuracy/performance tradeoff as well as evolution of the architectures is illustrated on fig 2. The most recent EfficientDet architecture introduced late 2019 has demonstrated much better efficiency than prior state-of-art approaches, specifically 55.1 AP on COCO test-dev with 77M parameters and 410B FLOPs, being 4x - 9x smaller and using 13x - 42x fewer FLOPs than previous detectors.

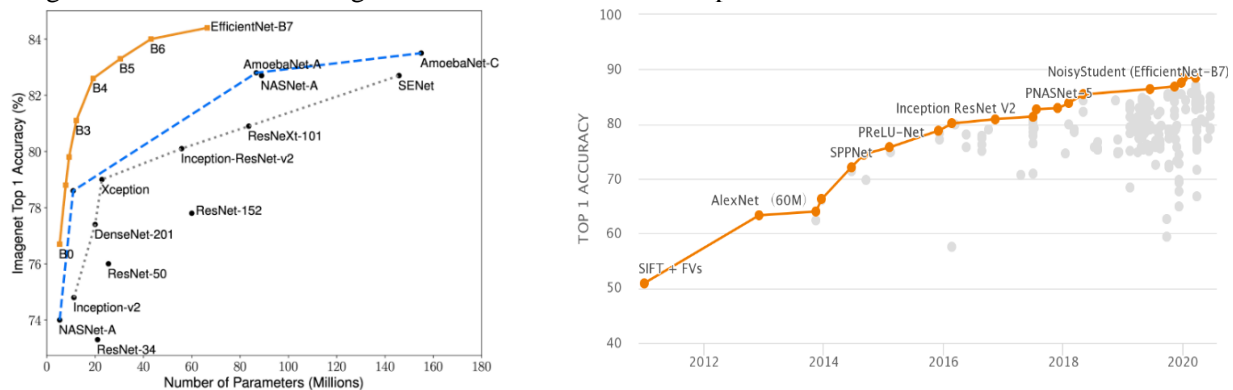


Fig 2 – State of Art DNN architectures

Conclusions. EfficientDet dominance demonstrated on COCO and ImageNet benchmarks should enable soon the new offerings from EOMs by deploying this architecture into automotive development platforms (Nvidia Xavier, NXP iMX, Renesas) to meet the market demand and address regulatory requirements.

References

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