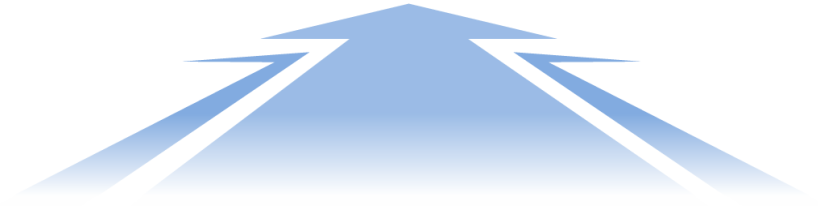
Nvidia Driveworks
&
Deep Neural Networks

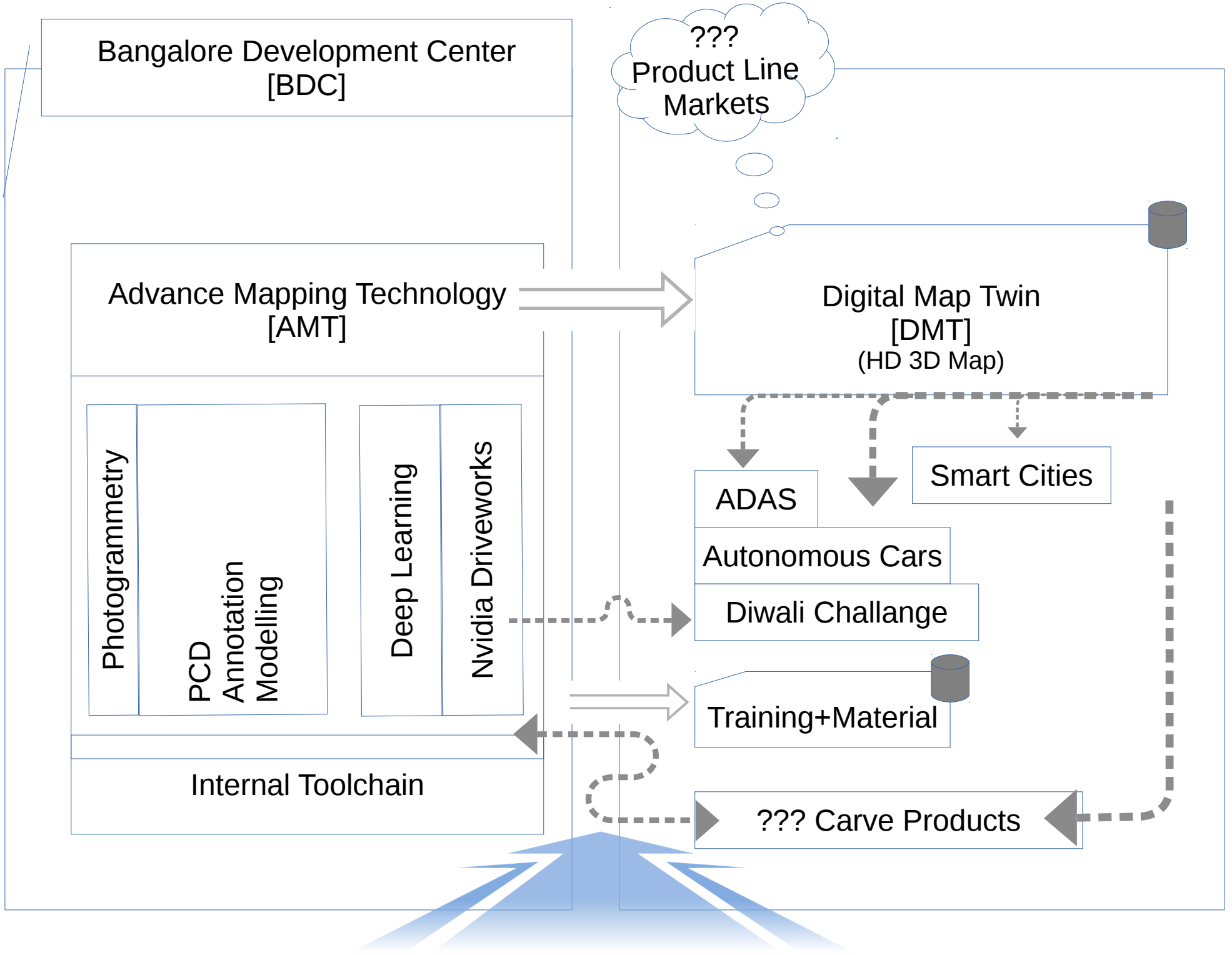
Updates till 7th May 2017

Blog, k-bank, forum

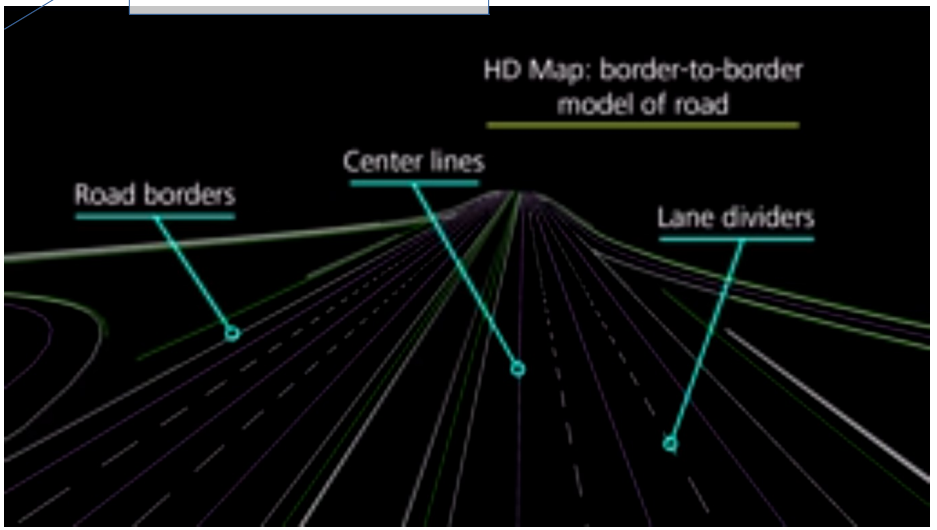
Setup scripts

by Bhaskar Mangal




Bangalore Development Center
[BDC]
???
Product Line
Markets
Advance Mapping Technology
[AMT]
Digital Map Twin
[DMT]
(HD 3D Map)
Photogrammetry
PCD
Annotation
Modelling
Deep Learning
Nvidia Driveworks
ADAS
Smart Cities
Autonomous Cars
Diwali Challange
Training+Material
Internal Toolchain
??? Carve Products

HD Map



??? Product Line Markets

Digital Map Twin
[DMT]
(HD 3D Map)

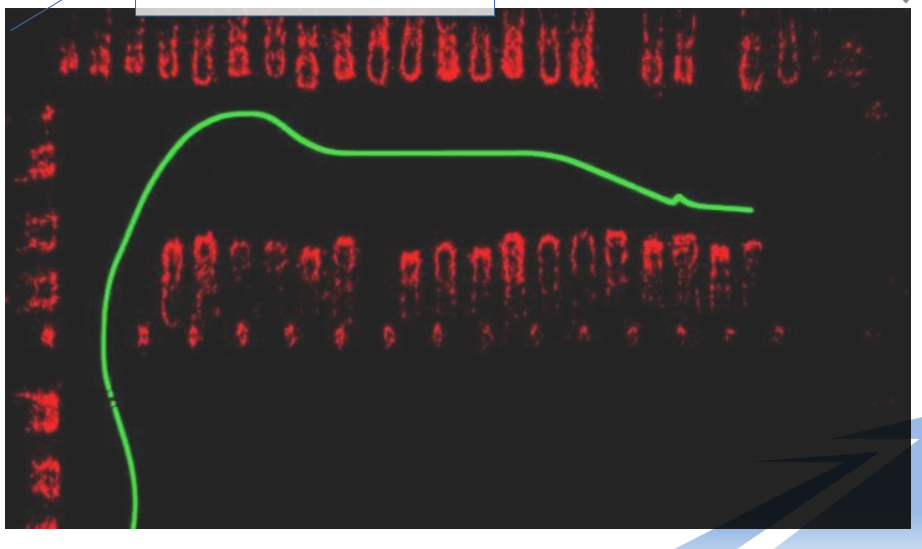
ADAS

Smart Cities

Autonomous Cars

Diwali Challange

Occupancy Map



??? Carve Products

Desktop System:

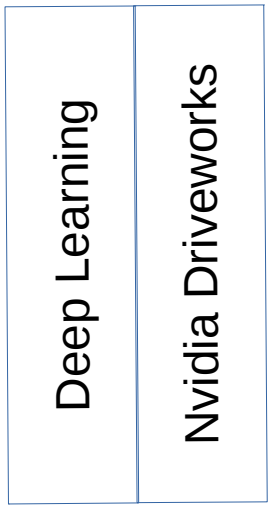
Ubuntu 14.04 64-bit; GeForce GT 730 (CUDA Compute capability 3.5), 8GB RAM

Driveworks:

SDK v0.1.2 for PC
SDK v0.2 for DRIVE PX2
Nvidia graphics driver (nvidia 371)
CUDA 8.0 Toolkit
cuDNN
TensorRT

Couple of options:-

1. Use SDK for PC, interface it with hardware
2. Use DRIVE PX2, supported sensors and Driveworks (refer manual for supported sensors)



Deep Learning:

ConvNetJs
Tensorflow-gpu (desktop)
Tensortflow (laptop, no gpu)

Deep Learning:

1. Trainings & Tutorials
   - Learned concepts of DNN,CNN,RNN, different frameworks, python basics

2. Shortlisted & setup done for:-
   - TensorFlow (Python) - with & without GPU
   - ConvNetJs (Javascript)

3. In next couple of weeks will have following:-
   - Output runs from available neural networks for Hand-written digit identification dataset
   - Identify problems, available neural networks and training datasets

Driveworks:

- Most of the SDK dependencies installed
- Some compiled samples are executed
- Few compiled samples and demo failed – graphics card compatibility issue
- Need discussion times like on hardware interface
- Need workstation with CUDA CC>=5.0

GPUMicroarchitecture

Tesla
Fermi 2010
Kepler 2012
Maxwell 2014
Pascal 2016
Volta 2017-2018

AI Supercomputing

Nvidia

GPUs

Highly parallel
Multi-core systems
Process large blocks of data in parallel

PhysX - game physics engine
Bullet - soft & rigid body dynamics

GPU

SoC
DRIVE PX2, Xavier

CUDA

Parallel computing platform
API for GPU programming

Driveworks v0.1.2 requires CUDA CC >= 5.0
CUDA SDK 8.0, Compute Capability 5.0 – 6.x (Maxwell, Pascal)

Graphics Cards (GPUs)

Brand Name
GeForce, Quadro, NVS, Tesla

Desktop GPUs – GeForce
Entertainment, PC Gaming, general-purpose, cost-sensitive

Mobile GPUs

Workstation GPUs – Quadro
Professional use - CAD, CGI, DCC, DNN/CNN

Mobile Workstation GPUs - Quadro Go (GL) & Quadro FX Go series

SoC – System on a Chip (IC)

Jetson
Parker
Erista

mobile devices

DRIVE (CX, PX, PX2) - 2015-16
Xavier – 2017

Self-driving cars
AI Supercomputer