PAVEMENTSENSE

Revamping the Road Survey System

Current Scenario in Road Survey

- 15777 Million BDT will be needed in FY 2022-2023 for repair and maintenance [1]

- The biggest portion of GDP goes in this sector [2]

- Almost 42% of the yearly time spent on survey annually [3]

- All the surveys needs manual work and high-level of manpower

- Input to output processing time is much longer

1. Projected Cost. Maintenance and Rehabilitation Needs Report, 2018-2019, ROADS AND HIGHWAYS DEPARTMENT, MINISTRY OF ROAD TRANSPORT AND BRIDGES
2. https://www.dhakatribune.com/business/economy/2018/06/07/budget-fy19-transport-sector-gets-biggest-share-of-development-budget
3. For 19,500 KM of roads, it takes currently 5 months to complete the survey and generate report.
https://rhd.portal.gov.bd/site/page/7ba74ee2-a166-42f0-a974-8ad0b64db97f

19,500 KM road surveyed each year

21,120

Total working hours

24

Total manpower

45.2

Million BDT spent

Lack of

In-depth analysis

Scenario with PavementSense

82%
Less time

35%
Less cost

90%
Accuracy

Automation

In-depth reporting

Real-time visibility
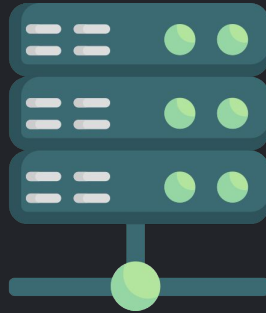
PavementSense Technology

Collect data with smartphone app → Analyze on the cloud → Reporting in the web app

Smartphone application

GPU server for AI computation

Web app for data reporting

Prototype

- Machine Learning algorithm – Deep Neural Network

- Architecture of DNN – Single Shot Multibox Detector

- Framework – TensorFlow

- Application Programming Interface (API) – TensorFlow object detection API
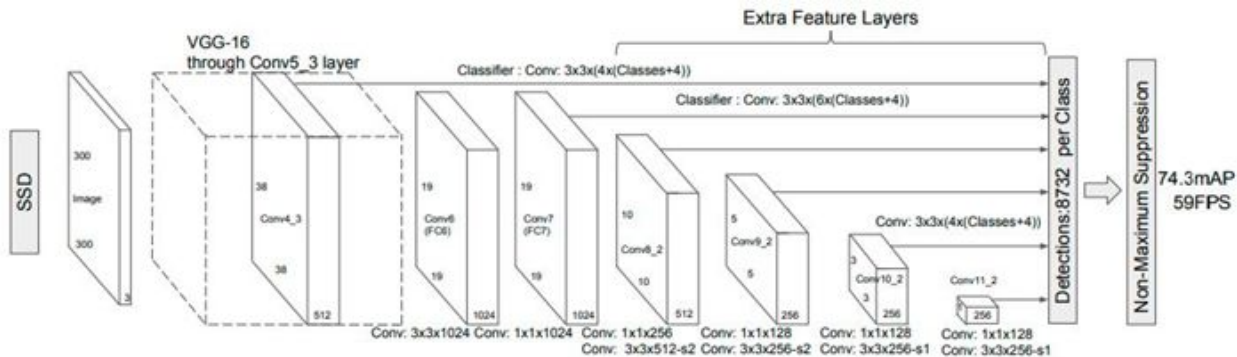

Figure: Architecture of Single Shot Multibox Detector (SSD)
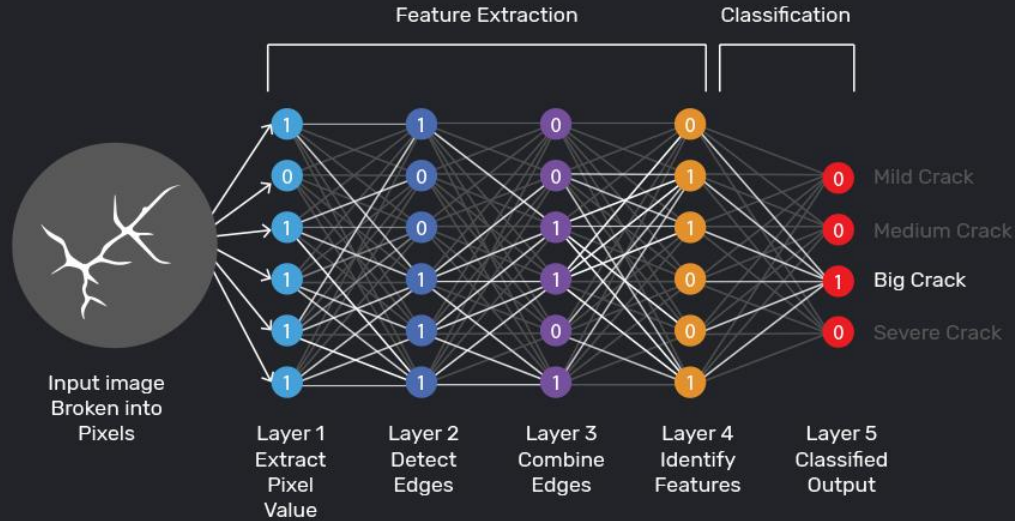
Going deep into the Neural Network

Figure: Structure of the Deep Neural Network

Way to higher accuracy

- Prediction accuracy of the prototype is 90% on the model trained over 11 KM (3509 Images - 10 feet per Image).

- The accuracy level increase with the amount of Data (Images) we feed to train the model.


Figure: Minimizing localization loss

Business Overview

The nature of our business is SAAS – Software As A Service for Road and Transportation Industry.

- Digitalization of road survey system aligning with the vision of "Digital Bangladesh"
- Extracting variety range of insights and results from a single survey visit
- Minimizing the survey time
- Minimizing manual works and interventions
- Increasing the process efficiency and accuracy

Target market

Bangladesh Road Transport and Highways Division will be the main Target Market while other Government organizations in South Asia will be the secondary target for road/ pavement condition survey.
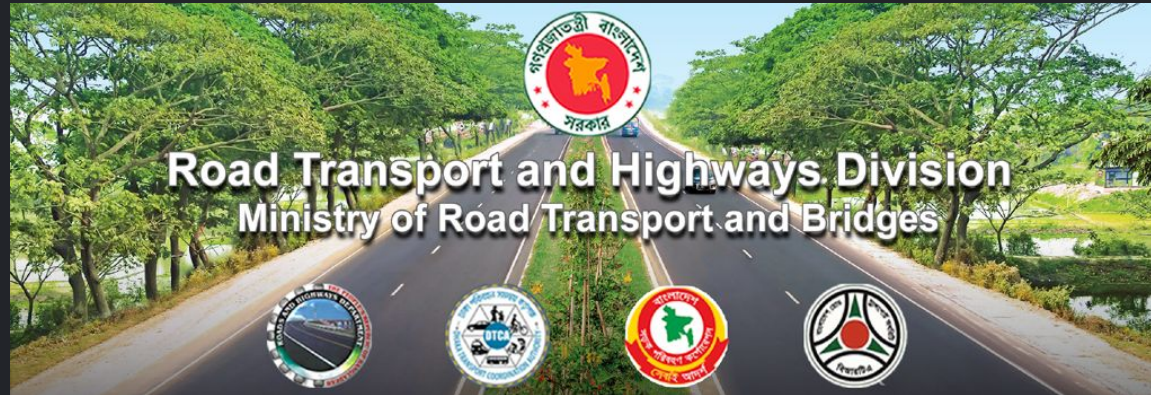
Cost and Budget

Projected Income Statement for 3 Years

Per KM Survey Price/Service Charge will be:

Year 1 – BDT. 1100; Year 2 – BDT. 990; Year 3 – BDT. 891.

10% Reduction in price is projected while 37% Profit margin will be maintained for first 3 years.

Income	Year 1	Year 2	Year 3
Service Charge (Y1-30,000 KM, Y-50,000 KM, Y3-80,000 KM)	33,000,000	49,500,000	71,280,000
Total Income	**33,000,000**	**49,500,000**	**71,280,000**

Operation Cost	Year 1	Year 2	Year 3
Cloud Storage Subscription	2,322,540	4,645,080	9,290,160
Data Collection Cost (Y1-30,000, Y2-50,000, Y3-80,000)	1,625,000	2,708,333	3,033,333
Electricity	135,000	236,250	248,063
Salary	12,900,000	15,720,000	17,292,000
Rent & Others	1,200,000	1,200,000	1,200,000
Total Operating Cost	**18,182,540**	**24,509,663**	**31,063,556**
Operating Income	**14,817,460**	**24,990,337**	**40,216,444**

Non-Operating Cost	Year 1	Year 2	Year 3
Depreciation			
• Machine (CPU, GPU etc.)	250,000	500,000	500,000
• Mobile Devices (6 Devices)	90,000	90,000	90,000
• Vehicle	150,000	300,000	300,000
• Office Setup	20,000	20,000	20,000
R&D - Training Model		2,500,000	2,500,000
Total Non-operating Cost	510,000	3,410,000	3,410,000
Total Cost (Operating + Non-operating)	**18,692,540**	**27,919,663**	**34,473,556**
EBT	14,307,460	21,580,337	36,806,444
VAT	2,146,119	3,237,051	5,520,967
Net Profit	**12,161,341**	**18,343,286**	**31,285,478**

Cost and Budget

Projected Fixed Cost and Financing for 3 years

Funding needed for the first year or for the initial set up. Then the following years will be covered by yielded Profit from last years.

Particulars	Amount		
Asset	**Year 1**	**Year 2**	**Year 3**
Machine (CPU, GPU etc.)	750,000	750,000	-
Mobile Devices (6 Devices)	180,000	-	180,000
Vehicle	1,500,000	1,500,000	-
Office Setup	200,000	-	-
Mobile App Development for Data Collection	500,000	-	-
AI Training Model Development	1,500,000	1,000,000	1,000,000
Total Asset	**4,630,000**	**3,250,000**	**1,180,000**

Equity	Year 1
From Management (App Development, Model Training)	2,000,000
Funding Needed for Asset	**2,630,000**

SWOT Analysis

Strengths

- Unique idea utilizing Frontier Technology, where Bangladesh lags behind.
- Our team has professional research and industry experience and able to build world class infrastructure.
- We already have a proof of concept of this idea.

Weaknesses

- Machine Learning and Image Processing are very resource intensive. Need access to a GPU server development environment.

SWOT Analysis

Opportunities

- The market for Frontier Technology is projected to grow to 3 Trillion USD by 2025.
- Only competitor currently covers only 11 countries. There is a huge international market for AI driven road condition survey.
- Our R&D efforts will kickstart local university wide research in Bangladesh where talent is abundant.

Threats

- Only customer is the government. Lack of support can be a threat.

Thank you

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