Predicting Changes in Sewer Pipeline Size from Inspection Videos Using Time Series Models
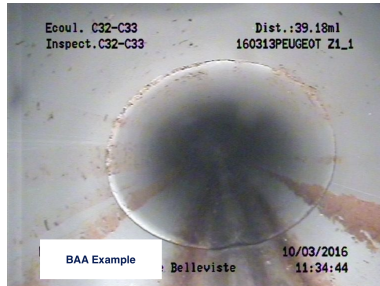
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Database

Inspection dataset provided by Montpellier Metropolis (3M). The whole dataset (43Go) contains 6597 files and 171 folders, including:

- **897 videos** (.MPG), 352×288, ≈ 4 million frames;
- **4140 images** (.JPG), 768 x 576, = robot stopping points;
- **64 PDF** report documents;
- Other files in text, xml, shp, .exe, TRR, SmartDraw...

35 anomalies codes:

No.	Code	Meaning of Code (translated from French)
1	AEC	Change in cross section
2	AED	Material change
3	BAA	Reduction of pipe height
4	BAB	Longitudinal open crack
⋮	⋮	⋮
35	DDD	Water level in weir

BAA Dataset built from similarity between BAA labelled images and video.

Multi-Attention based classification

▷ Transpose Large Language Models to Video

▷ Token = Tubelet
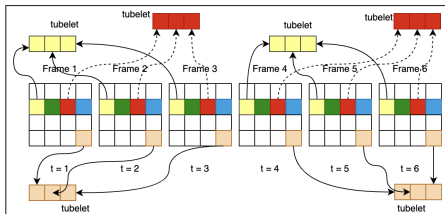
▷ Comparison of Timesformer (TF) and ViVit on 4 experiments (2 presented):

Model	Accuracy	Precision	Recal	F_1
Trained/tested on BAA-1 (standard test)				
TF	97.30	92.54	99.47	95.88
ViViT	96.45	91.09	98.40	94.06
Trained on BAA-1/ Tested on T-1[1]				
TF	95.25	76.26	60.73	67.61
ViViT	93.44	56.55	84.73	67.83

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[1]T1 = manually labelled images transformed into videos