ToyADMOS2 dataset

NTT Communication Science Laboratories

Noboru Harada

ToyADMOS2 dataset

ToyADMOS2 dataset is proposed for anomaly detection in machine operating sounds(ADMOS). As did for our previous ToyADMOS dataset, we collected a large number of operating sounds of miniature machines (toys) under normal and anomaly conditions by deliberately damaging them. Since typical application scenarios of ADMOS often require robust performance under domain-shift conditions, the ToyADMOS2 dataset is designed for evaluating systems under such conditions. The released dataset consists of two sub-datasets for machine-condition inspection: fault diagnosis of machines with geometrically fixed tasks and fault diagnosis of machines with moving tasks. Domain shifts are represented by introducing several differences in operating conditions, such as the use of the same machine type but with different machine models and parts configurations, different operating speeds, microphone arrangements, etc. Each sub-dataset contains over 27 k samples of normal machine-operating sounds and over 8 k samples of anomalous sounds recorded with five to eight microphones at a 48-kHz sampling rate. The dataset is freely available for download at

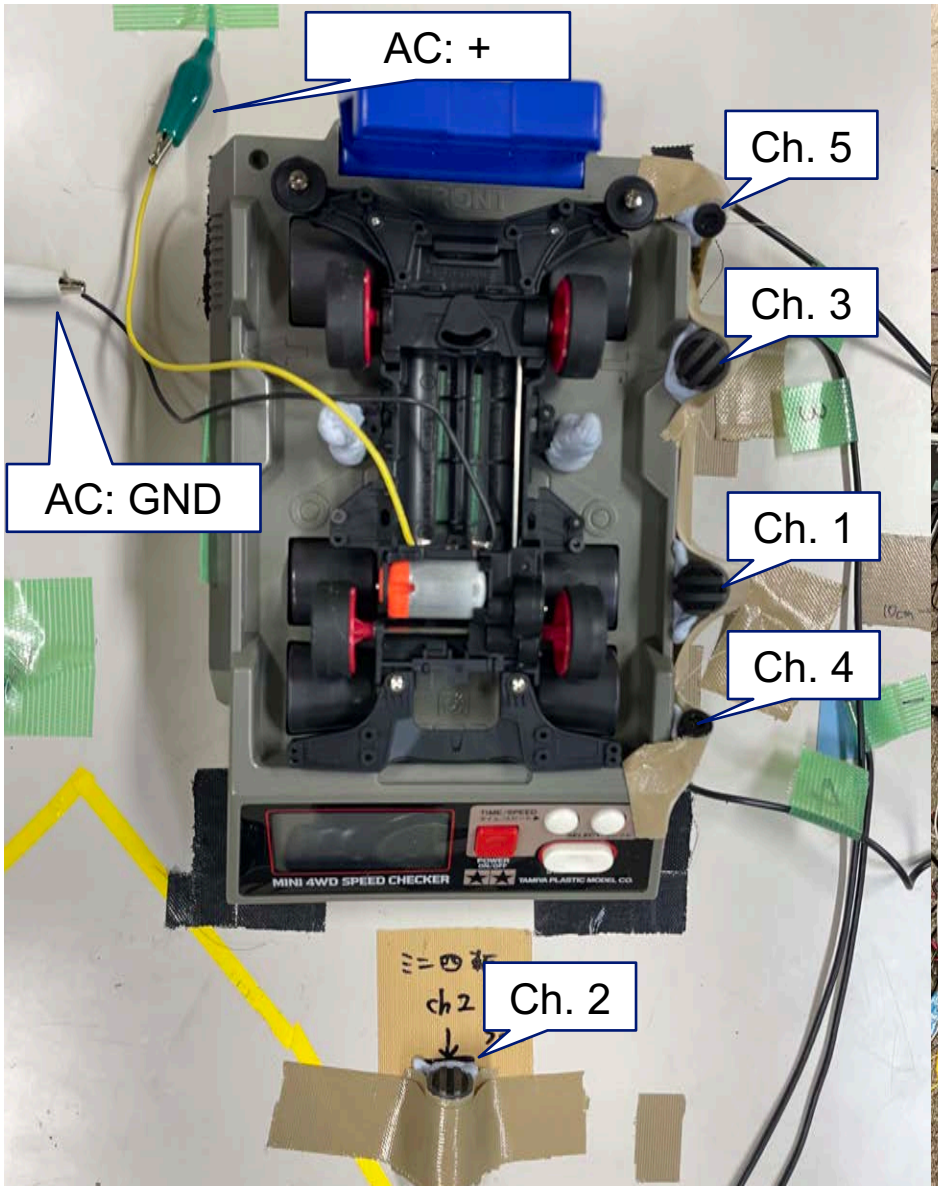
Dataset: https://github.com/nttcslab/ToyADMOS2-dataset

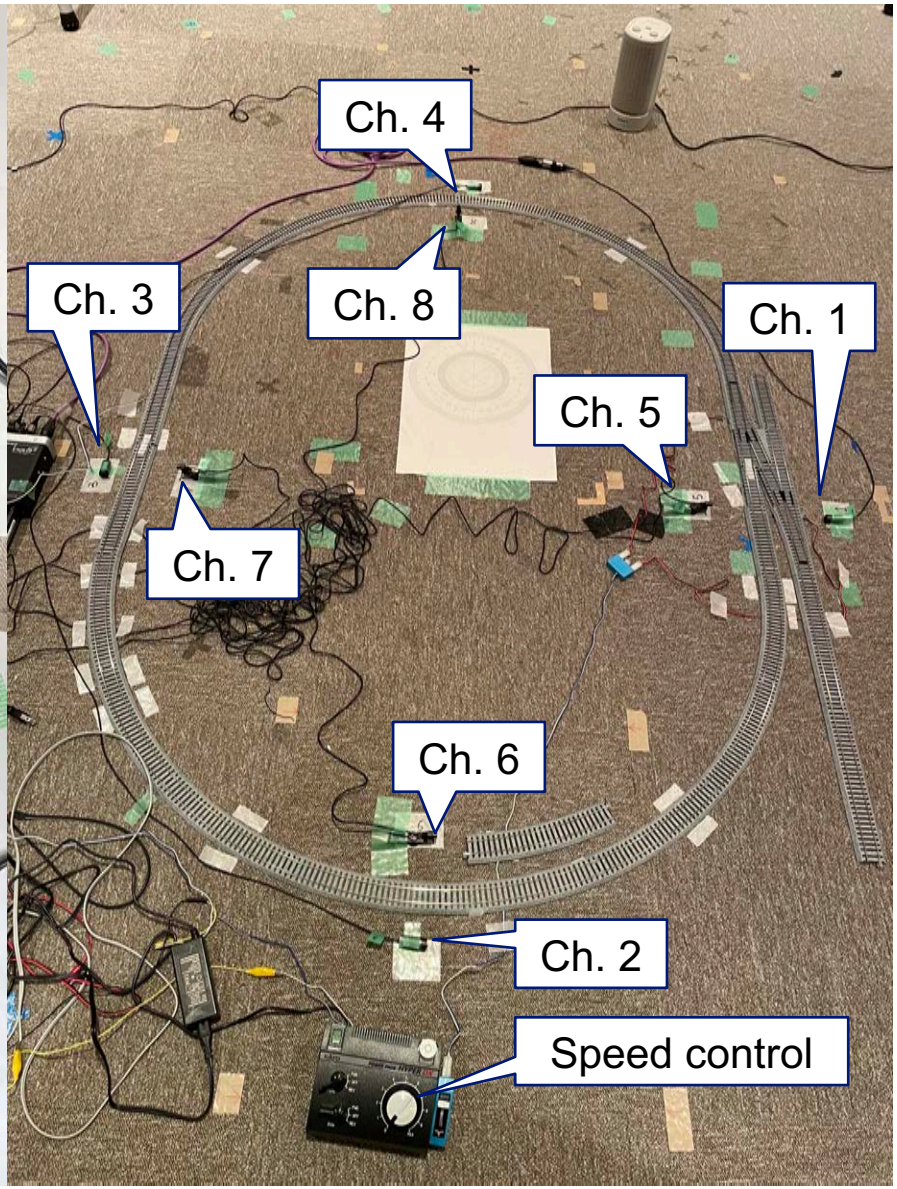
Python code: https://doi.org/10.5281/zenodo.4580270

For more detailed information, see the paper [1]. If you use the ToyADMOS2 dataset in your work, please cite this paper where it was introduced.

[1] Noboru Harada, Daisuke Niizumi, Daiki Takeuchi, Yasunori Ohishi, Masahiro Yasuda and Shoichiro Saito, “ToyADMOS2: Another dataset of miniature-machine operating sounds for anomalous sound detection under domain shift conditions,” in Proc. DCASE Workshop 2021.

Microphone arrangements





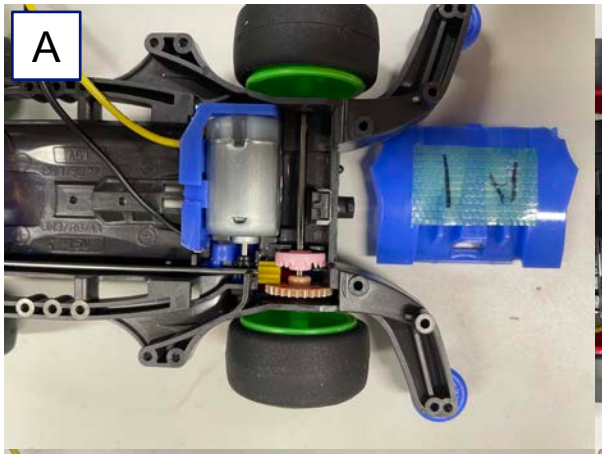
Model variations (A, B, C, D, E)

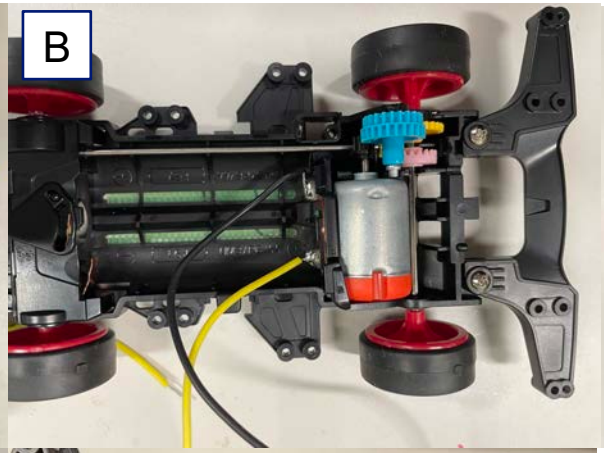
NTT

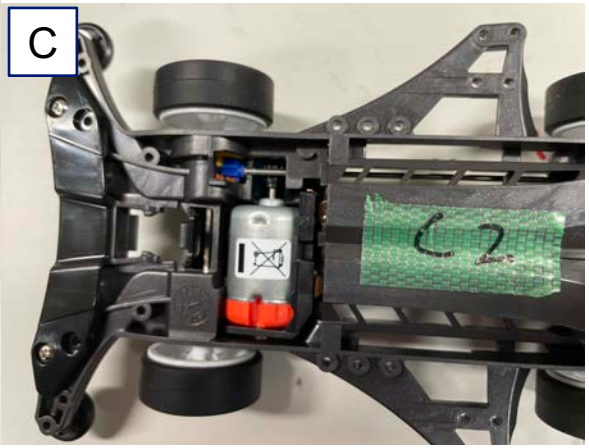
Toy-car models

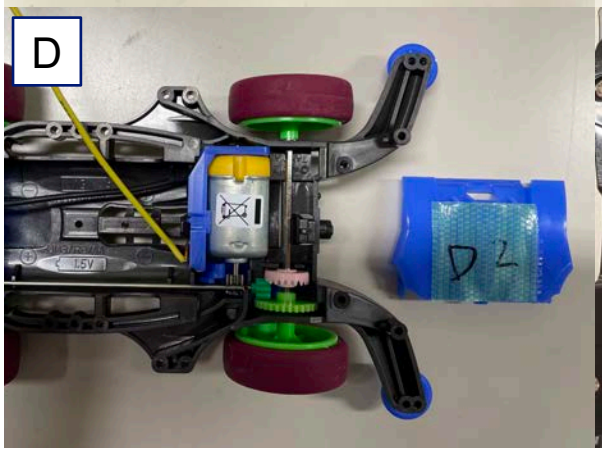
Toy-train models

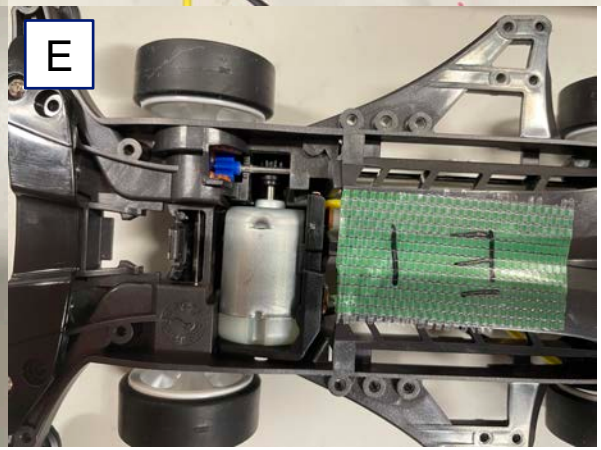
Toy-car model details











Speed levels

Level 1: 2.8 V
Level 2: 3.1 V
Level 3: 3.4 V
Level 4: 3.7 V
Level 5: 4.0 V

Configuration	Chassis	Motor	Pinion gear	Gear ratio	Bearing	Tire
Model A	AR chassis	Kit standard	Plastic	4.2:1 (Light brown + Red)	Plastic bearing	Kit tire 1
Model B	VZ chassis	Torque-Tuned 2	Plastic	3.5:1 (Yellow + Light blue)	Plastic bearing	Kit tire 2
Model C	FM-A chassis	Torque-Tuned 2	Plastic	3.5:1 (Yellow + Light blue)	Plastic bearing	Kit tire 3
Model D	AR chassis	Light-Dash	Metal	5:1 (Yellow green + Blue)	Round hole ball bearing	Low friction tire
Model E	FM-A chassis	Kit standard	Metal	4:1 (Light brown + Black)	Plastic bearing	Kit tire 3

Toy-car model details

Model types and anomaly conditions

		A	B	C	D	E
a	Bent shaft 	Brwon propera shaft  Normal Lo Mid. High	Brwon propera shaft  Normal Lo Mid. High	Blue propera shaft  Normal Lo Mid. High	Green propera shaft  Normal Lo Mid. High	Blue propera shaft  Normal Lo Mid. High
b	Deformed gears	Light brown gear  Normal Lo Mid. High	Yellow gear  Normal Lo Mid. High	Yellow gear  Normal Lo Mid. High	Yellow green gear  Normal Lo Mid. High	Light brown gear  Normal Lo Mid. High
c	Melted gears	Light brown gear  Normal Lo Mid. High	Yellow gear  Normal Lo Mid. High	Yellow gear  Normal Lo Mid. High	Yellow green gear  Normal Lo Mid. High	Light brown gear  Normal Lo Mid. High
d	Damaged wheels	 Normal Lo Mid. High	 Normal Lo Mid. High	 Normal Lo Mid. High	 Normal Lo Mid. High	 Normal Lo Mid. High

Toy-train model details

A

B

C

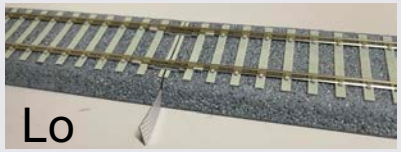
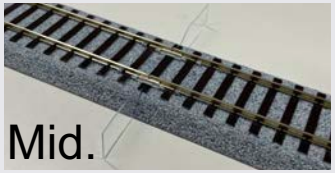
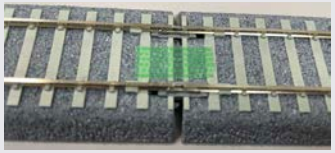
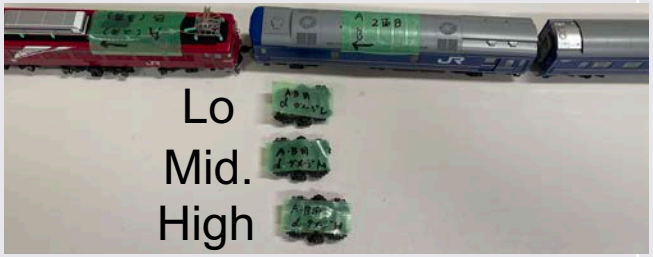
D

E

Configuration	Motor car	Passenger car/Freight car
Model A	Hokuto-sei electric locomotive	One passenger car
Model B	Hokuto-sei electric locomotive	Two passenger cars
Model C	Electric locomotive	One freight car
Model D	Electric locomotive	Two freight cars
Model E	Yamanote-line motor car	Three cargos

Toy-train model details

Model types and anomaly conditions

		A	B	C	D	E
a	Obstructing stone	Lo 	Mid. 	High 		
b	Disjointed railway 	 Lo	 Mid.	High 		
c	Broken shaft 	 Lo Mid. High		Lo  Mid. High		 Lo Mid. High
d	Flat tire	 Lo Mid. High		Lo  Mid. High		 Lo  Mid. High