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1. OpenMV

The OpenMV camera is used for AprilTag scanning. When a AprilTag is scanned, Willy knows where he is on the map.

1.1. Repository

Windesheim-Willy/openmv_apriltag

1.2. How to run?

The OpenMV will start automatic when the PI is running. The openMV node can be started manually by going into the root of the openMV repo:

```
./START start
```

1.3. Prerequisites

The OpenMV camera must be connected to the Sonar PI.

1.4. Background

The openMV M7 cam can be used for several purposes. For Willy we use the cam for AprilTag Scanning.

If you look above on T5 you could see AprilTags of the type: TAG36H11. This tag type has a high resolution and is usable for scanning while driving.

1.5. Zones

There are three zones:

Zone	Tag ID
T5 Yellow	1 - 21

Zone	Tag ID
T5 Bridge	30 - 36
T5 Red	50 - 69

For every AprilTag, we know the x-y coordinates:

```
# Build tag location dictionary
tagLocations = {1:(13.489720850756148, 60.59727947971955, 0.0),
2:(15.934169265195797, 60.933202561559746, 0.0),
3:(20.810319786490506, 60.41751882276302, 0.0),
4:(24.50055443446291, 60.43755116603776, 0.0),
5:(28.07578804452108, 60.138835332979674, 0.0),
6:(31.72803700360133, 60.21433696281538, 0.0),
7:(35.079547458633726, 60.144928942058925, 0.0),
8:(38.86555094259316, 60.061022359125516, 0.0),
9:(42.76742784387715, 60.18446581588793, 0.0),
10:(46.17944236172726, 59.43959194286109, 0.0),
11:(44.86658591585901, 54.932326361019605, 0.0),
12:(41.56825528354129, 55.081602467414015, 0.0),
13:(37.76570212962082, 55.165675939740616, 0.0),
14:(34.22908972386625, 55.347169977516856, 0.0),
15:(30.58898019154235, 55.07027803761846, 0.0),
16:(26.932984917133314, 55.11965596266801, 0.0),
17:(23.205978661221213, 55.18059190272544, 0.0),
18:(19.743041561789195, 55.347504401255364, 0.0),
19:(16.299067248414662, 55.46434990288788, 0.0),
20:(12.100164063844309, 55.42996574075256, 0.0),
21:(9.65735918277374, 55.445542959329764, 0.0),
24:(6.65735918277374, 55.445542959329764, 0.0),
30:(32.8987473161705, 46.41308688279322, 0.0),
31:(33.121147889528785, 43.20021335735613, 0.0),
32:(32.49671958337161, 39.21247637139029, 0.0),
33:(32.599678125770374, 36.425429080274895, 0.0),
34:(32.55513317780795, 32.79463316478886, 0.0),
35:(32.50853311136147, 27.368573944379868, 0.0),
36:(32.409127602788864, 22.26660430671845, 0.0),
50:(13.523372347566175, 17.066372999587333, 0.0),
51:(16.06199102201768, 16.56837403740275, 0.0),
52:(19.256179603045823, 16.34236774262965, 0.0),
53:(24.36634090774053, 16.67868658773296, 0.0),
54:(29.377547116503376, 16.51949373917632, 0.0),
55:(30.2662528686185, 16.515290877639845, 0.0),
56:(35.96912522489601, 16.546644310410148, 0.0),
57:(36.951119660425995, 16.68705958913906, 0.0),
60:(45.33510084675059, 11.802420096806053, 0.0),
61:(25.04931102220155, 11.888528907096841, 0.0),
62:(29.844263537020343, 11.897989352815346, 0.0),
63:(34.33241676941428, 12.018177159286664, 0.0),
64:(38.0079833762018, 12.007359945644666, 0.0),
66:(22.139618917845695, 11.986272812183511, 0.0),
67:(19.678538554314194, 11.909650528877101, 0.0),
68:(15.507593016208999, 11.883949899592288, 0.0),
69:(13.329357525172874, 12.035189725452817, 0.0)
}
```

1.6. tag scanning

Whe a AprilTag is scanned, the Tag-number, degrees and wind direction (N, E, S, W) are published on the topic. The **Brain** and **Move Base** uses this information that is published on the topic.