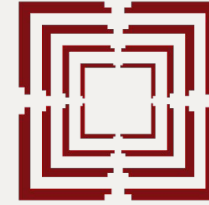


CSE523

Machine learning



**Ahmedabad
University**

Fuzzy Logic for Vehicle Motion Direction Detection

Group: The learner's squad

AU2140023 - Rohit Rathi

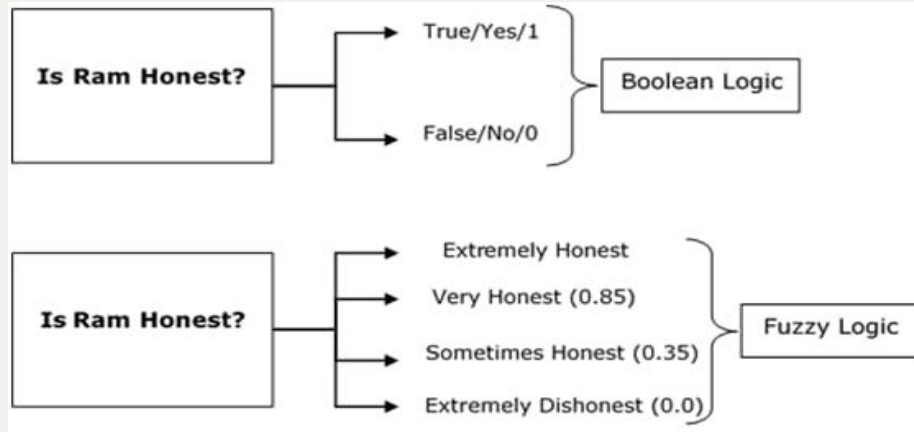
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What is fuzzy logic?

- Approximate
- Fuzzy sets
- Membership function



Data Set Explanation

There are seven entities:

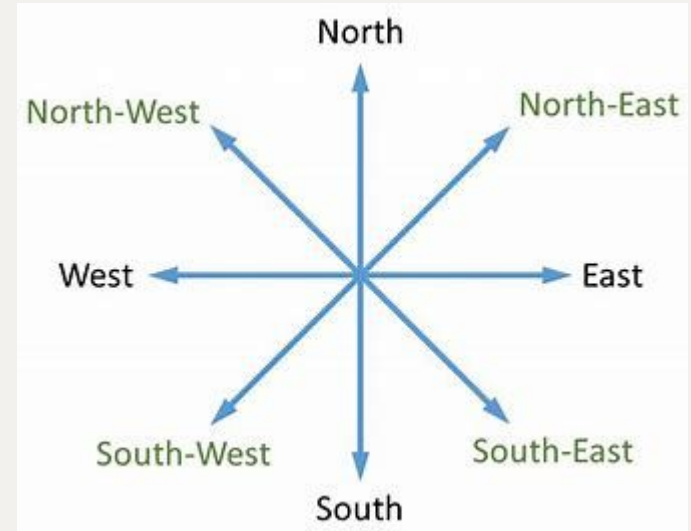
1. Frm
2. Track
3. Xc
4. Yc
5. W
6. H
7. Velocity

Frm	Track	xc	yc	w	h	Velocity(kmph)
1	1	2373	1324	95	128	0
2	1	2376	1331	94	128	22.12735165
3	1	2378	1338	96	127	21.32106834
4	1	2381	1347	96	129	26.45146189
5	1	2384	1356	97	129	28.12338374
6	1	2387	1363	96	128	25.49540046
7	1	2390	1371	95	130	25.49809004
8	1	2393	1379	94	130	25.47731044
9	1	2395	1387	94	128	25.08667118
10	1	2398	1395	94	128	25.14730526
11	1	2402	1403	94	130	25.58595195
12	1	2405	1412	96	130	26.39773612
13	1	2408	1420	97	130	26.16989314
14	1	2411	1428	94	130	25.98810281
15	1	2413	1437	94	130	26.35463835
16	1	2416	1445	94	130	26.15008535
17	1	2419	1453	94	130	25.97926713
18	1	2422	1462	95	129	26.44989327
19	1	2425	1469	95	130	25.66228096
20	1	2427	1477	95	130	25.37886817

Table 1: Given dataset

METHODOLOGY

1. Data Analysis and Loading
2. Calculate Motion Vectors (Centroid Difference)
3. Angle Calculation
4. Applying Fuzzy Logic
5. Direction Categorization
6. Visualization



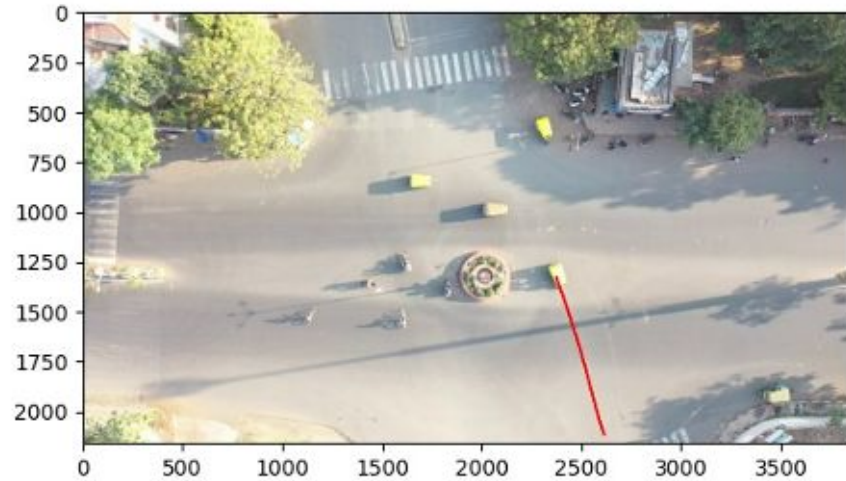
Results

Frm	angle	S	SW	direction
1				
2	1.1659045	0.5155242	0.4844757	S
3	1.2924966	0.3543421	0.6456578	SW
4	1.2490457	0.4096655	0.5903344	SW
5	1.2490457	0.4096655	0.5903344	SW
6	1.1659045	0.5155242	0.4844757	S
7	1.2120256	0.4568010	0.5431989	SW
8	1.2120256	0.4568010	0.5431989	SW
9	1.3258176	0.3119165	0.6880834	SW
10	1.2120256	0.4568010	0.5431989	SW
11	1.1071487	0.5903344	0.4096655	S
12	1.2490457	0.4096655	0.5903344	SW
13	1.2120256	0.4568010	0.5431989	SW
14	1.2120256	0.4568010	0.5431989	SW
15	1.3521273	0.2784179	0.7215820	SW
16	1.2120256	0.4568010	0.5431989	SW
17	1.2120256	0.4568010	0.5431989	SW
18	1.2490457	0.4096655	0.5903344	SW
19	1.1659045	0.5155242	0.4844757	S
20	1.3258176	0.3119165	0.6880834	SW

Table 2: Prediction



Results



Summary, conclusion and future work

- Fuzzy logic helps to figure out the direction of vehicle accurately.
- Applying the approach would make traffic control and self driving cars better.
- The property of fuzzy logic to be flexible helps to easily apply it on real time scenario more efficiently.
- Hence it would make transportation systems more efficient and safer.
- We will depict the path for a vehicle from initial frames and annotate on image.
- We will also try to implement machine learning algorithm with fuzzy logic so that performance can be improved.

References

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Behavior recognition of moving objects using deep neural networks. (2018, October 1). IEEE Conference Publication — IEEE Xplore.

Yagiz, N., Sakman, E., Guclu, R. (2008, February). Different control applications on a vehicle using fuzzy logic control

Thank you