

Contemporary Data Processing Technology (CCOD)

Lab 1 (September 09, 2016)

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Controll two metro cars using Speed, Distance, and Brake

In this work, it was necessary to create a virtual subway system with two cars on the ring line size of 1000 pixels. Metro cars at the start have a speed of 10 points and move in a clockwise direction. At each iteration the speed changes by -1, 0, +1 randomly. Animation stops when trains collide. Cars speed ranges from 0 to 20. It was also necessary to calculate the value of the membership function, depending on the speed at five different points.

The source code:

mc.html

```
<!DOCTYPE html>
<html>
<head>
  <meta charset="UTF-8">
  <title>Lab1MetroCar</title>
</head>
<body>
  <div style="width:500px; margin:2px;">
    <div id="MetroCar1" style="display:inline-block"></div>
    <div id="MetroCar2" style="float:right"></div>
  </div>
  <canvas id="myExersize" width="500" height="500" style="border:3px solid #2ecc71;
background:#34495e">
  </canvas>
  <script src="./.js"></script>
</body>
</html>
```

sourc.js

```
var sdvig1 = Math.PI/2;
var sdvig2 = Math.PI * (1.5);

function ChngCoord(x, y, r, sdvig) {
  return {
    x: Math.round(Math.cos(sdvig)*r+x),
    y: Math.round(Math.sin(sdvig)*r+y)
  }
}

var MetroCar1 = {
  speed: 10,
  brake: 0,
  dist: 500
};
var MetroCar2 = {
  speed: 10,
  brake: 0,
  dist: 500
};

var brake = false;

setInterval(() => {
```

```

    if (brake) {
        return;
    }
    transform_pos();
},
50);

```

```

function paint(sdvig1, sdvig2) {
    var position_1 = ChngCoord(250, 250, 200, sdvig1);
    var position_2 = ChngCoord(250, 250, 200, sdvig2);
    var canvas = document.getElementById("myExersize");
    var izo = canvas.getContext("2d");
    izo.clearRect(0, 0, 500, 500);
    izo.beginPath();
    izo.arc(250, 250, 200, 0, 2 * Math.PI);
    izo.stroke();
    izo.beginPath();
    izo.fillStyle = "#7f8c8d";
    izo.fillRect(position_1.x - 20, position_1.y - 20, 40, 40);
    izo.beginPath();
    izo.fillStyle = "#1abc9c";
    izo.fillRect(position_2.x - 20, position_2.y - 20, 40, 40);
}

```

```

function transform_pos()
{
    paint(sdvig1, sdvig2);
    if (MetroCar1.dist <= 0 || MetroCar2.dist <= 0)
    {
        paint(sdvig1, sdvig1);
        MetroCar1.dist = MetroCar1.dist <= 0 ? 0 : 1000;
        MetroCar2.dist = MetroCar2.dist <= 0 ? 0 : 1000;
        brake = true;
    }
    var MC1 = document.getElementById("MetroCar1");
    var MC2 = document.getElementById("MetroCar2");
    MC1.innerHTML = 'MetroCar1 \nDistance: ' + MetroCar1.dist + '\nSpeed: ' + MetroCar1.speed + '\nBrake:' + 0;
    MC2.innerHTML = 'MetroCar2 \nDistance: ' + MetroCar2.dist + '\nSpeed: ' + MetroCar2.speed + '\nBrake:' + 0;
    MetroCar1.speed += Math.floor(3 * Math.random()) - 1;
    if (MetroCar1.speed > 20)
    {
        MetroCar1.speed = 20;
    }
    if (MetroCar1.speed < 0)
    {
        MetroCar1.speed = 0;
    }
    MetroCar1.dist -= MetroCar1.speed;
    MetroCar2.dist += MetroCar1.speed;
    MetroCar2.speed += Math.floor(3 * Math.random()) - 1;

    if (MetroCar2.speed > 20)
    {
        MetroCar2.speed = 20;
    }
    if (MetroCar2.speed < 0)
    {
        MetroCar2.speed = 0;
    }

    MetroCar1.dist += MetroCar2.speed;
}

```

```

MetroCar2.dist -= MetroCar2.speed;

sdvig1 += MetroCar1.speed * Math.PI / 500;
sdvig2 += MetroCar2.speed * Math.PI / 500;
}

```

membership function

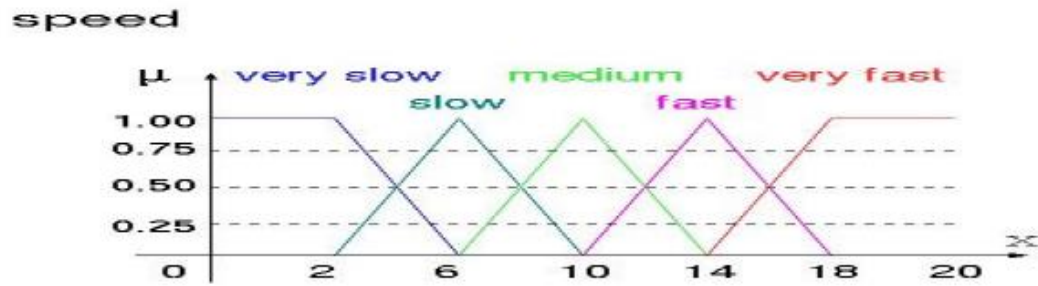
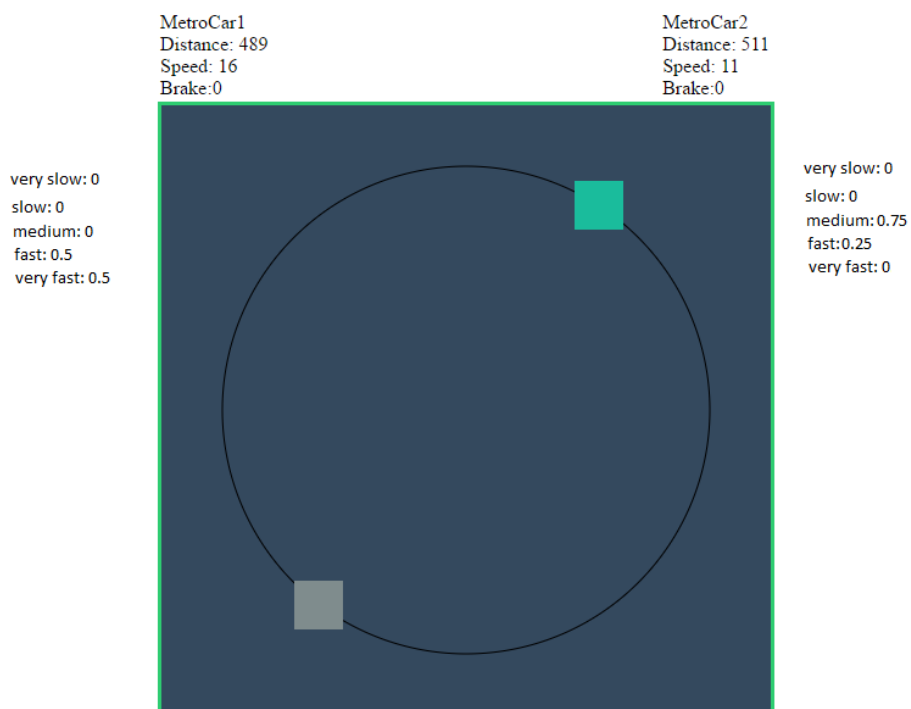


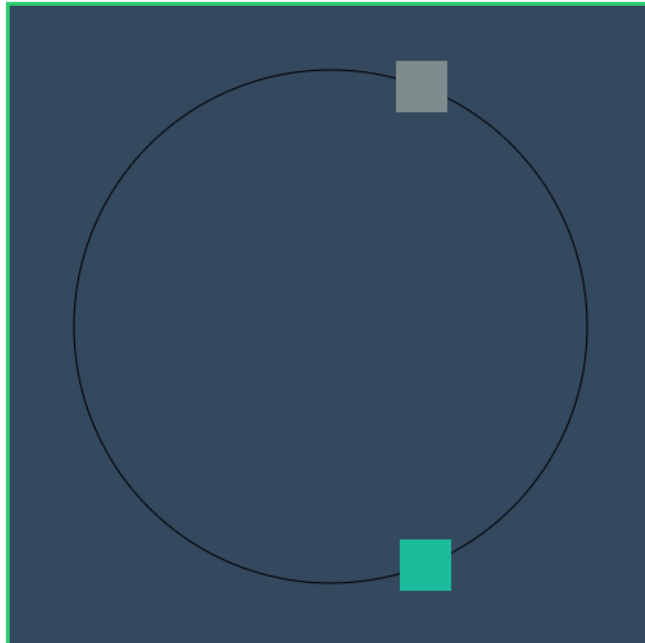
Figure 7: An example of 5 membership function for speed.



MetroCar1
Distance: 382
Speed: 14
Brake:0

MetroCar2
Distance: 618
Speed: 11
Brake:0

very slow: 0
slow: 0
medium: 0
fast: 1
very fast: 0

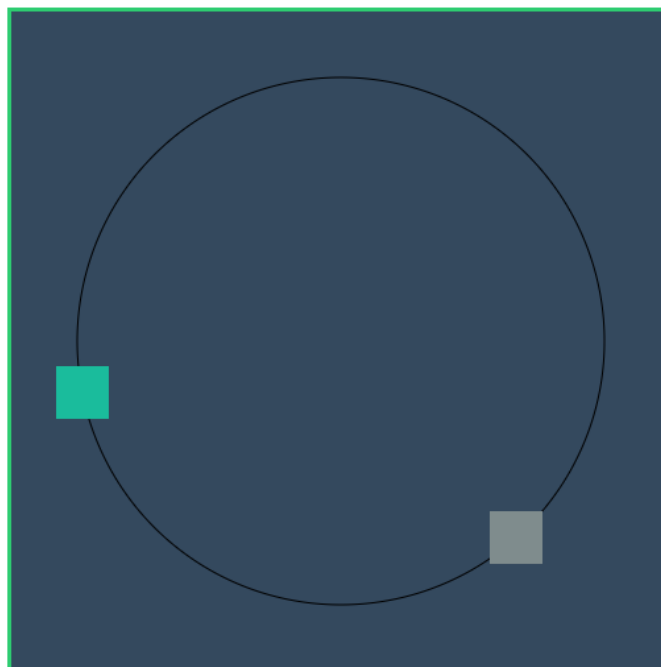


very slow: 0
slow: 0
medium: 0.75
fast: 0.25
very fast: 0

MetroCar1
Distance: 335
Speed: 13
Brake:0

MetroCar2
Distance: 665
Speed: 12
Brake:0

very slow: 0
slow: 0
medium: 0.25
fast: 0.75
very fast: 0

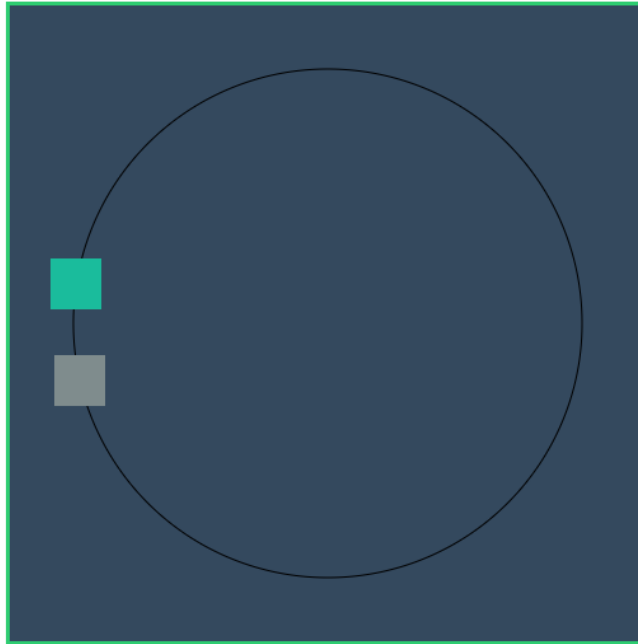


very slow: 0
slow: 0
medium: 0.5
fast: 0.5
very fast: 0

MetroCar1
Distance: 61
Speed: 16
Brake:0

MetroCar2
Distance: 939
Speed: 7
Brake:0

very slow: 0
slow: 0
medium: 0
fast: 0.5
very fast: 0.5

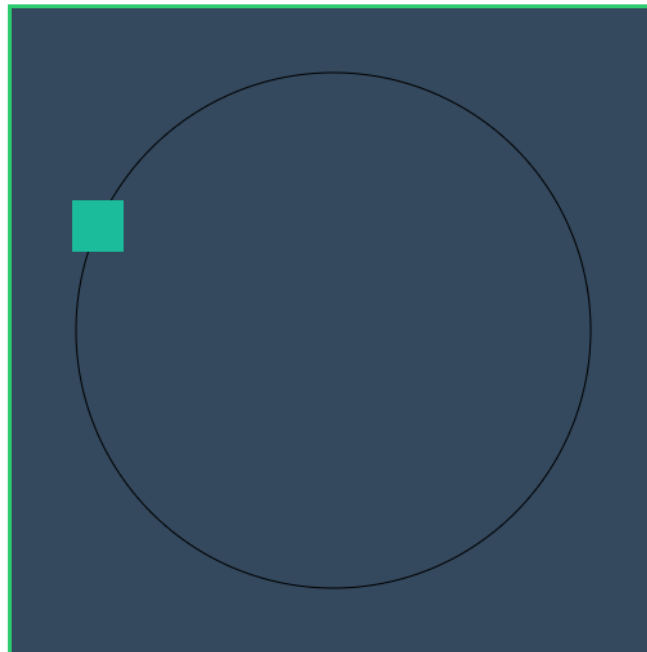


very slow: 0
slow: 0.75
medium: 0.25
fast: 0
very fast: 0

MetroCar1
Distance: 0
Speed: 16
Brake:0

MetroCar2
Distance: 1000
Speed: 6
Brake:0

very slow: 0
slow: 0
medium: 0
fast: 0.5
very fast: 0.5



very slow: 0
slow: 1
medium: 0
fast: 0
very fast: 0