IRIS ITS Team Description

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Abstract. The abstract should briefly summarize the contents of the paper in 150–250 words. Nulla ac nisl. Nullam urna nulla, ullamcorper in, interdum sit amet, gravida ut, risus. Aenean ac enim. In luctus. Phasellus eu quam vitae turpis viverra pellentesque. Duis feugiat felis ut enim. Phasellus pharetra, sem id porttitor sodales, magna nunc aliquet nibh, nec blandit nisl mauris at pede. Suspendisse risus risus, lobortis eget, semper at, imperdiet sit amet, quam. Quisque scelerisque dapibus nibh. Nam enim. Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Nunc ut metus. Ut metus justo, auctor at, ultrices eu, sagittis ut, purus. Aliquam aliquam.

Keywords: First keyword · Second keyword · Another keyword.

1 Introduction

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2 Mechanical Design

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3   Electrical Design

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4   Software Design

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4.1   Software Architecture

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5   Example

Example of using table

Table 1. Table captions should be placed above the tables.

Heading level	Example	Font size and style
Title (centered)	**Lecture Notes**	14 point, bold
1st-level heading	**1 Introduction**	12 point, bold
2nd-level heading	**2.1 Printing Area**	10 point, bold
3rd-level heading	**Run-in Heading in Bold.** Text follows	10 point, bold
4th-level heading	*Lowest Level Heading.* Text follows	10 point, italic

Table 2. Comparison between old and new Robot.

Parameter	Old Robot	New Robot
Dimension	52x52x80 cm	50x50x80 cm
Weight	40 kg	38 kg
Robot's Speed	2.2 m/s	3 m/s
Kicking Speed	6 m/s	10 m/s
Dribble's Speed	1.8 m/s	2.5 m/s
Camera	Omnidirectional Camera	Omnidirectional Camera, Depth Camera and Thermal Camera
MCU	Mini PC and STM32	PLC, Mini PC, and STM32
Supply	36 Vdc Li-Ion Battery	2 x 9 Ah Cordless Battery 20 VDC

Example of using figure

Fig. 1. A figure caption is always placed below the illustration. Please note that short captions are centered, while long ones are justified by the macro package automatically.

Example of using figure 2

Fig. 2. A figure caption is always placed below the illustration. Please note that short captions are centered, while long ones are justified by the macro package automatically.

Example of using equation

$$x + y = z \tag{1}$$

Example of using theorem

Theorem 1. *Theorem content, for example: $x + y = z$*

Example of using proof

Proof. Proof content, for example: $x + y = z$

Example of using algorithm

Algorithm 1 Process Lines on Frame

1: **procedure** ProcessLinesOnFrame
2:     Initialize lines_on_frame as an empty vector
3:     **for** angle from 0 to 360 with step size 2.5 **do**
4:         Initialize dist to 0
5:         **for** index from 0 to 320 **do**
6:             $x \leftarrow \text{dist} \times \cos(\text{angle}) + \text{center\_cam\_x}$
7:             $y \leftarrow \text{center\_cam\_y} - \text{dist} \times \sin(\text{angle})$
8:             **if** frame[y][x] == 255 **then**
9:                 Push (x, y) to lines_on_frame
10:             **end if**
11:             $dist \leftarrow \text{dist} + 1$
12:         **end for**
13:     **end for**
14: **end procedure**

Example of include program

Listing 1.1. Program test waktu.

```cpp
#include "bits/stdc++.h"
#include "math.h"
#include "stdio.h"
#include "time.h"
#include "fstream"
#include "sys/time.h"
#include "chrono"

char lut_buffer[360 * 3200 * 2];
int16_t LUT_fr2lap[1152000];
int LUT_arr[1152000];

float regress(double x)
{
    static const double terms[] = {
        6.9160619726989942e+005,
        -2.4702944302228745e+004,
        3.3769239273207108e+002,
        -2.0811507184528475e+000,
        5.2850430392945100e-003,
        -1.8747325853441007e-005,
        2.3197729279585872e-007,
        -8.1432403093594152e-010,
        -1.0497470630476182e-012,
        -9.5365340464564735e-015,
        1.8690669332287895e-016,
        -7.1692564354856969e-019,
        8.8479542465521107e-022};
```

```
30
31      size_t csz = sizeof terms / sizeof *terms;
32
33      double t = 1;
34      float r = 0;
35      for (int i = 0; i < csz; i++)
36      {
37          r += terms[i] * t;
38          t *= x;
39      }
40      return r;
41 }
42
43 float nn_v2(float dist_px, float angle_px)
44 {
45      if (dist_px < 75)
46          dist_px = 75;
47      else if (dist_px > 319)
48          dist_px = 319;
49
50      if (angle_px >= 360)
51          angle_px -= 360;
52      else if (angle_px < 0)
53          angle_px += 360;
54
55      /* This is coordinate that just based on robot */
56      float ret_buffer = LUT_fr2lap[(int)(angle_px) * 3200 + ↩
             (int)(dist_px * 10)];
57
58      return ret_buffer;
59 }
60
61 int main()
62 {
63      std::ifstream lut_px2cm_fs("lut_px2cm.bin", std::ios::↩
             binary | std::ios::in);
64      lut_px2cm_fs.read((char *)lut_buffer, 360 * 3200 * 2);
65      lut_px2cm_fs.close();
66      memcpy(LUT_fr2lap, lut_buffer, sizeof(lut_buffer));
67
68      float dist_px_test = 120;
69      float angle_px_test = 90;
70
71      while (1)
72      {
73          auto start = std::chrono::high_resolution_clock::↩
                 now();
74          float dist_fld_flt = nn_v2(dist_px_test, ↩
                 angle_px_test);
```

```
75        auto finish = std::chrono::high_resolution_clock::↩
             now();
76        std::chrono::duration<double> elapsed = finish - ↩
             start;
77        std::cout << "Very New method Elapsed time: " << ↩
             elapsed.count() * 1000000000 << " ns\n";
78
79        auto start_2 = std::chrono::high_resolution_clock::↩
             now();
80        float dist_fld_test_regress = regress(dist_px_test)↩
             ;
81        auto finish_2 = std::chrono::high_resolution_clock↩
             ::now();
82        std::chrono::duration<double> elapsed_2 = finish_2 ↩
             - start_2;
83        std::cout << "Old method Elapsed time: " << ↩
             elapsed_2.count() * 1000000000 << " ns\n";
84
85        printf("====================================\n");
86     }
87   return 0;
88 }
```

Example of include program 2

Listing 1.2. Program JavaScript.

```
1  // Subscribe to frame
2  $scope.frame_field =
3    "http://" +
4    window.location.hostname +
5    ":9901" +
6    "/stream?topic=" +
7    $scope.ns +
8    "/vision_field_thresh_main&type=ros_compressed";
9
10 // Get cam offset
11 $scope.req_cam_offset = new ROSLIB.ServiceRequest({});
12
13 $scope.ser_cam_offset = new ROSLIB.Service({
14   ros: $scope.ros,
15   name: "cam_offset",
16   serviceType: "iris_msgs/cam_offset",
17 });
18
19 $scope.ser_cam_offset.callService($scope.req_cam_offset, (↩
      result) => {
20   x_offset_frame = result.data[0];
21   y_offset_frame = result.data[1];
22 });
23
```

```
24  $scope.get_x_y_data = function () {
25    if (1) {
26      $(document).ready(function () {
27        $("#get_x_y").on("click", function (event) {
28          var offset = findPos(document.getElementById("↩
              get_x_y"));
29          //↩
                ===========================================================↩

30          var x = event.clientX - offset.X + window.↩
              pageXOffset;
31          var y = event.clientY - offset.Y + window.↩
              pageYOffset;
32
33          var $img = $(this);
34          var x_frame = ((this.naturalWidth / $img.width()) *↩
               x).toFixed(0);
35          var y_frame = ((this.naturalHeight / $img.height())↩
               * y).toFixed(0);
36
37          var x_center_frame = this.naturalWidth / 2 + ↩
              x_offset_frame;
38          var y_center_frame = this.naturalHeight / 2 + ↩
              y_offset_frame;
39
40          var x_frame_final = x_frame - x_center_frame;
41          var y_frame_final = y_center_frame - y_frame;
42
43          // Get polar coordinates
44          var angle_frame =
45            (Math.atan2(y_frame_final, x_frame_final) * 180) ↩
                / Math.PI;
46          var dist_frame = Math.sqrt(
47            x_frame_final * x_frame_final + y_frame_final * ↩
                y_frame_final
48          );
49
50          console.log(dist_frame.toFixed(3) + " " + ↩
              angle_frame.toFixed(3));
51
52          // copy to clipboard
53          var dummy = document.createElement("textarea");
54          document.body.appendChild(dummy);
55          dummy.value = dist_frame.toFixed(3) + " " + ↩
              angle_frame.toFixed(3);
56          dummy.select();
57          document.execCommand("copy");
58          document.body.removeChild(dummy);
59
```

```
60            //←↩
                   =================================================================←↩

61
62          prev_cur_x = x_frame_final;
63          prev_cur_y = y_frame_final;
64        });
65      });
66    }
67 };
```

Example of using citation [1].

References

1. Homepage, L.: Lecture notes in computer science. http://www.springer.com/lncs, last accessed: 2023/10/25