

csm改动代码

初始化PLicp参数

```
void SetPIICPParams(){
    //设置激光的范围
    icpParam.min_reading = 0.1;
    icpParam.max_reading = 20;

    //设置位姿最大的变化范围
    icpParam.max_angular_correction_deg = 20.0;
    icpParam.max_linear_correction = 1;

    //设置迭代停止的条件
    icpParam.max_iterations = 50;
    icpParam.epsilon_xy = 0.000001;
    icpParam.epsilon_theta = 0.0000001;

    //设置correspondence相关参数
    icpParam.max_correspondence_dist = 1;
    icpParam.sigma = 0.01;
    icpParam.use_corr_tricks = 1;

    //设置restart过程，因为不需要restart所以可以不管
    icpParam.restart = 0;
    icpParam.restart_threshold_mean_error = 0.01;
    icpParam.restart_dt = 1.0;
    icpParam.restart_dtheta = 0.1;

    //设置聚类参数
    icpParam.clustering_threshold = 0.2;

    //用最近的10个点来估计方向
    icpParam.orientation_neighbourhood = 10;

    //设置使用PI-ICP
    icpParam.use_point_to_line_distance = 1;

    //不进行alpha_test
    icpParam.do_alpha_test = 0;
    icpParam.do_alpha_test_thresholdDeg = 5;

    //设置trimmed参数 用来进行outlier remove
    icpParam.outliers_maxPerc = 0.9;
    icpParam.outliers_adaptive_order = 0.7;
    icpParam.outliers_adaptive_mult = 2.0;

    //进行visibility_test 和 remove double
    icpParam.do_visibility_test = 1;
    icpParam.outliers_remove_doubles = 1;
    icpParam.do_compute_covariance = 0;
    icpParam.debug_verify_tricks = 0;
    icpParam.use_ml_weights = 0;
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        icpParam.use_sigma_weights = 0;

    }

```

回调函数修改

```

void championLaserScanCallback(const
champion_nav_msgs::ChampionNavLaserScanConstPtr& msg)
{
    if(m_isFirstFrame == true)
    {
        std::cout <<"First Frame"<<std::endl;
        m_isFirstFrame = false;
        m_prevLaserPose = Eigen::Vector3d(0, 0, 0);
        pubPath(m_prevLaserPose, m_imlsPath, m_imlsPathPub);
        laserScanToLDP(msg,prevLDPScan);
        return ;
    }

    LDP curLDPScan;
    laserScanToLDP(msg,curLDPScan);

    prevLDPScan->odometry[0] = 0.0;
    prevLDPScan->odometry[1] = 0.0;
    prevLDPScan->odometry[2] = 0.0;

    prevLDPScan->estimate[0] = 0.0;
    prevLDPScan->estimate[1] = 0.0;
    prevLDPScan->estimate[2] = 0.0;

    prevLDPScan->true_pose[0] = 0.0;
    prevLDPScan->true_pose[1] = 0.0;
    prevLDPScan->true_pose[2] = 0.0;

    icpParam.laser_ref = prevLDPScan;
    icpParam.laser_sens = curLDPScan;

    icpParam.first_guess[0] = 0;
    icpParam.first_guess[1] = 0;
    icpParam.first_guess[2] = 0;
    icpParam.use_point_to_line_distance = 1;

    out.cov_x_m = 0;
    out.dx_dy1_m = 0;
    out.dx_dy2_m = 0;

    sm_icp(&icpParam,&out);

    if (out.valid)
    {
        std::cout << "transform: (" << out.x[0] << ", " << out.x[1] << ", "
        << out.x[2] * 180 / M_PI << ")" << std::endl;

        Eigen::Matrix3d lastPose;
        lastPose << cos(m_prevLaserPose(2)), -sin(m_prevLaserPose(2)),
m_prevLaserPose(0),

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        sin(m_prevLaserPose(2)), cos(m_prevLaserPose(2)),
m_prevLaserPose(1),
        0, 0, 1;
Eigen::Matrix3d rPose;
rPose << cos(out.x[2]), -sin(out.x[2]), out.x[0],
        sin(out.x[2]), cos(out.x[2]), out.x[1],
        0, 0, 1;
Eigen::Matrix3d nowPose = lastPose * rPose;

m_prevLaserPose << nowPose(0, 2), nowPose(1, 2), atan2(nowPose(1,0),
nowPose(0,0));
pubPath(m_prevLaserPose, m_imlPath, m_imlPathPub);
}
else
{
    std::cout << "not Converged" << std::endl;
}

prevLDPScan = curLDPScan;

}

```

将自定义激光数据转换成csm中所需的LDP数据

```

void laserScanToLDP(const champion_nav_msgs::ChampionNavLaserScanConstPtr&
msg,
                    LDP& out){

    int n = msg->ranges.size();
    out = ld_alloc_new(n);

    for(int i=0;i<n;i++){

        float r = msg->ranges[i];

        if (r > 0.1 && r < 20)
        {
            // 填充雷达数据
            out->valid[i] = 1;
            out->readings[i] = r;

            out->theta[i] = msg->angles[i];
        }
        else
        {
            out->valid[i] = 0;
            out->readings[i] = -1; // for invalid range

            out->theta[i] = msg->angles[i];
        }
    }

    out->min_theta = out->theta[0];
    out->max_theta = out->theta[n-1];

    out->odometry[0] = 0.0;
    out->odometry[1] = 0.0;
}

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out->odometry[2] = 0.0;
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out->true_pose[0] = 0.0;
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```
out->true_pose[1] = 0.0;
```

```
out->true_pose[2] = 0.0;
```

```
}
```