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1 <?xml version='1.0'?>
2
3 <robot name="atom" xmlns:xacro="http://www.ros.org/wiki/xacro">
4   <xacro:property name="robot_name" value="atom" />
5   <xacro:property name="robot_chassis_mass" value="15"/>
6   <xacro:property name="robot_chassis_length" value="0.2"/>
7   <xacro:property name="robot_chassis_radius" value="0.25"/>
8   <xacro:property name="robot_caster_wheel_radius" value="0.05"/>
9   <xacro:property name="robot_caster_wheel_radius_collision" value="0.0499"/>
10
11   <xacro:property name="robot_wheel_mass" value="5"/>
12   <xacro:property name="robot_wheel_length" value="0.05"/>
13   <xacro:property name="robot_wheel_radius" value="0.1"/>
14
15   <xacro:property name="camera_mass" value="0.1"/>
16   <xacro:property name="hokoyu_mass" value="1e-5"/>
17
18   <!-- Make Chassis of Bot -->
19   <link name="chassis">
20     <pose>0 0 0.1 0 0 0</pose>
21
22     <inertial>
23       <mass value="${robot_chassis_mass}"/>
24       <origin xyz="0.0 0 0" rpy=" 0 0 0"/>
25
26       <inertia
27         ixx="0.147116667" ixy="0" ixz="0"
28         iyy="0.334951167" iyz="0"
29         izz="0.3978345"
30       />
31     </inertial>
32
33     <collision name="collision">
34       <origin xyz="0 0 0.05" rpy=" 0 0 0"/>
35       <geometry>
36         <box size="1 0.5 0.2"/>
37       </geometry>
38     </collision>
39
40     <visual name="chassis_visual">
41       <origin xyz="0 0 0.05" rpy=" 0 0 0"/>
42       <geometry>
43         <box size="1 0.5 0.2"/>
44       </geometry>
45     </visual>
46
47   </link>
48
49
50
51   <!-- Right Wheel Back -->
52   <link name="right_wheel_back">
53     <inertial>
54       <mass value="${robot_wheel_mass}"/>
55       <origin xyz="0 0 0" rpy="0 1.5707 1.5707"/>
56       <inertia
57         ixx="0.1" ixy="0.0" ixz="0.0"
58         iyy="0.1" iyz="0.0"
59         izz="0.1"
60       />
61     </inertial>

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62
63     <visual>
64         <origin xyz="0 0 0" rpy="0 1.5707 1.5707"/>
65         <geometry>
66             <cylinder radius="${robot_wheel_radius}"
length="${robot_wheel_length}"/>
67         </geometry>
68     </visual>
69
70     <collision>
71         <origin xyz="0 0 0" rpy="0 1.5707 1.5707"/>
72         <geometry>
73             <cylinder radius="${robot_wheel_radius}"
length="${robot_wheel_length}"/>
74         </geometry>
75     </collision>
76
77 </link>
78
79 <!-- Right Wheel Front-->
80 <link name="right_wheel_front">
81     <inertial>
82         <mass value="${robot_wheel_mass}"/>
83         <origin xyz="0 0 0" rpy="0 1.5707 1.5707"/>
84         <inertia
85             ixx="0.1" ixy="0.0" ixz="0.0"
86             iyy="0.1" iyz="0.0"
87             izz="0.1"
88         />
89     </inertial>
90
91     <visual>
92         <origin xyz="0 0 0" rpy="0 1.5707 1.5707"/>
93         <geometry>
94             <cylinder radius="${robot_wheel_radius}"
length="${robot_wheel_length}"/>
95         </geometry>
96     </visual>
97
98     <collision>
99         <origin xyz="0 0 0" rpy="0 1.5707 1.5707"/>
100        <geometry>
101            <cylinder radius="${robot_wheel_radius}"
length="${robot_wheel_length}"/>
102        </geometry>
103    </collision>
104
105 </link>
106
107
108 <!-- Left wheel Back-->
109 <link name="left_wheel_back">
110     <inertial>
111         <mass value="${robot_wheel_mass}"/>
112         <origin xyz="0 0 0" rpy="0 1.5707 1.5707"/>
113         <inertia
114             ixx="0.1" ixy="0.0" ixz="0.0"
115             iyy="0.1" iyz="0.0"
116             izz="0.1"
117         />
118     </inertial>
119

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120
121     <visual>
122         <origin xyz="0 0 0" rpy="0 1.5707 1.5707"/>
123         <geometry>
124             <cylinder radius="${robot_wheel_radius}"
length="${robot_wheel_length}"/>
125         </geometry>
126     </visual>
127
128     <collision>
129         <origin xyz="0 0 0" rpy="0 1.5707 1.5707"/>
130         <geometry>
131             <cylinder radius="${robot_wheel_radius}"
length="${robot_wheel_length}"/>
132         </geometry>
133     </collision>
134
135 </link>
136
137 <!-- Left wheel Front-->
138 <link name="left_wheel_front">
139     <inertial>
140         <mass value="${robot_wheel_mass}"/>
141         <origin xyz="0 0 0" rpy="0 1.5707 1.5707"/>
142         <inertia
143             ixx="0.1" ixy="0.0" ixz="0.0"
144             iyy="0.1" iyz="0.0"
145             izz="0.1"
146         />
147     </inertial>
148
149     <visual>
150         <origin xyz="0 0 0" rpy="0 1.5707 1.5707"/>
151         <geometry>
152             <cylinder radius="${robot_wheel_radius}"
length="${robot_wheel_length}"/>
153         </geometry>
154     </visual>
155
156     <collision>
157         <origin xyz="0 0 0" rpy="0 1.5707 1.5707"/>
158         <geometry>
159             <cylinder radius="${robot_wheel_radius}"
length="${robot_wheel_length}"/>
160         </geometry>
161     </collision>
162
163 </link>
164
165 <!-- Camera -->
166 <link name="camera">
167     <inertial>
168         <mass value="${camera_mass}"/>
169         <origin xyz="0 0 1" rpy="0 0 0"/>
170         <inertia
171             ixx="1e-6" ixy="0.0" ixz="0.0"
172             iyy="1e-6" iyz="0.0"
173             izz="1e-6"
174         />
175     </inertial>
176
177     <visual>

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178         <origin xyz="0 0 1" rpy="0 0 0"/>
179         <geometry>
180             <box size="0.05 0.05 0.05"/>
181         </geometry>
182     </visual>
183
184     <collision>
185         <origin xyz="0 0 1" rpy="0 0 0"/>
186         <geometry>
187             <box size="0.05 0.05 0.05"/>
188         </geometry>
189     </collision>
190 </link>
191
192 <!-- Hokuyo Lidar -->
193 <link name="hokuyo">
194     <inertial>
195         <mass value="${hokoyu_mass}"/>
196         <origin xyz="0 0 0" rpy="0 0 0"/>
197
198         <inertia
199             ixx="1e-6" ixy="0.0" ixz="0.0"
200             iyy="1e-6" iyz="0.0"
201             izz="1e-6"
202         />
203     </inertial>
204
205     <visual>
206         <origin xyz="0 0 0" rpy="0 0 0"/>
207         <geometry>
208             <mesh filename="package://atom/meshes/hokuyo.dae"/>
209         </geometry>
210     </visual>
211
212     <collision>
213         <origin xyz="0 0 0" rpy="0 0 0"/>
214         <geometry>
215             <box size="0.1 0.1 0.1"/>
216         </geometry>
217     </collision>
218 </link>
219
220 <!-- Project center to the ground -->
221 <link name="robot_footprint"></link>
222
223
224
225 <!-- Define Joints -->
226
227 <!-- Right Wheel Joint Back-->
228 <joint type="continuous" name="right_wheel_hinge_back">
229     <origin xyz="-0.2 -0.30 0" rpy="0 0 0" />
230     <parent link="chassis"/>
231     <child link="right_wheel_back" />
232     <axis xyz="0 1 0" rpy="0 0 0" />
233     <limit effort="10000" velocity="1000" />
234     <dynamics damping="1.0" friction="1.0" />
235 </joint>
236
237 <!-- Right Wheel Joint Front-->
238 <joint type="continuous" name="right_wheel_hinge_front">

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239     <origin xyz="0.2 -0.30 0" rpy="0 0 0" />
240     <parent link="chassis"/>
241     <child link="right_wheel_front" />
242     <axis xyz="0 1 0" rpy="0 0 0" />
243     <limit effort="10000" velocity="1000" />
244     <dynamics damping="1.0" friction="1.0" />
245 </joint>
246
247
248 <!-- Left Wheel Joint Back-->
249 <joint type="continuous" name="left_wheel_hinge_back">
250     <origin xyz="-0.2 0.30 0" rpy="0 0 0" />
251     <parent link="chassis"/>
252     <child link="left_wheel_back" />
253     <axis xyz="0 1 0" rpy="0 0 0" />
254     <limit effort="10000" velocity="1000" />
255     <dynamics damping="1.0" friction="1.0" />
256 </joint>
257
258 <!-- Left Wheel Joint Front-->
259 <joint type="continuous" name="left_wheel_hinge_front">
260     <origin xyz="0.2 0.30 0" rpy="0 0 0" />
261     <parent link="chassis"/>
262     <child link="left_wheel_front" />
263     <axis xyz="0 1 0" rpy="0 0 0" />
264     <limit effort="10000" velocity="1000" />
265     <dynamics damping="1.0" friction="1.0" />
266 </joint>
267
268 <!-- Camera Joint -->
269 <joint name="camera_joint" type="fixed">
270     <origin xyz="0.26 0 0" rpy="0 0 0" />
271     <parent link="chassis"/>
272     <child link="camera" />
273     <axis xyz="0 1 0"/>
274 </joint>
275
276 <!-- Hokoyu Joint -->
277 <joint name="hokuyo_joint" type="fixed">
278     <origin xyz="0.2 0 0.2" rpy="0 0 0" />
279     <parent link="chassis"/>
280     <child link="hokuyo" />
281     <axis xyz="0 1 0"/>
282 </joint>
283
284 <joint name="robot_footprint_joint" type="fixed">
285     <origin xyz="0 0 0" rpy="0 0 0" />
286     <parent link="robot_footprint"/>
287     <child link="chassis" />
288 </joint>
289
290
291 <!-- Color of bot -->
292 <gazebo reference="left_wheel_front">
293     <material>Gazebo/Green</material>
294     <kp>10000000.0</kp> <!-- kp and kd for rubber -->
295     <kd>100.0</kd>
296     <mu1>1.0</mu1>
297     <mu2>1.0</mu2>
298     <maxVel>1.0</maxVel>
299     <minDepth>0.00</minDepth>

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300 </gazebo>
301
302 <gazebo reference="left_wheel_back">
303   <material>Gazebo/Green</material>
304   <kp>1000000.0</kp> <!-- kp and kd for rubber -->
305   <kd>100.0</kd>
306   <mu1>1.0</mu1>
307   <mu2>1.0</mu2>
308   <maxVel>1.0</maxVel>
309   <minDepth>0.00</minDepth>
310 </gazebo>
311
312 <gazebo reference="right_wheel_front">
313   <material>Gazebo/Green</material>
314   <kp>1000000.0</kp> <!-- kp and kd for rubber -->
315   <kd>100.0</kd>
316   <mu1>1.0</mu1>
317   <mu2>1.0</mu2>
318   <maxVel>1.0</maxVel>
319   <minDepth>0.00</minDepth>
320 </gazebo>
321 <gazebo reference="right_wheel_back">
322   <material>Gazebo/Green</material>
323   <kp>1000000.0</kp> <!-- kp and kd for rubber -->
324   <kd>100.0</kd>
325   <mu1>1.0</mu1>
326   <mu2>1.0</mu2>
327   <maxVel>1.0</maxVel>
328   <minDepth>0.00</minDepth>
329 </gazebo>
330 <!--<gazebo reference="right_wheel">
331   <material>Gazebo/Green</material>
332 </gazebo>-->
333
334 <gazebo reference="camera">
335   <material>Gazebo/Red</material>
336 </gazebo>
337
338 <gazebo reference="chassis">
339   <material>Gazebo/Blue</material>
340 </gazebo>
341
342 <!-- Motor, Camera and Lidar Simulation -->
343 <xacro:include filename="$(find atom)/urdf/atom.gazebo" />
344
345 </robot>
```