

Training a Classifier for Object Detection

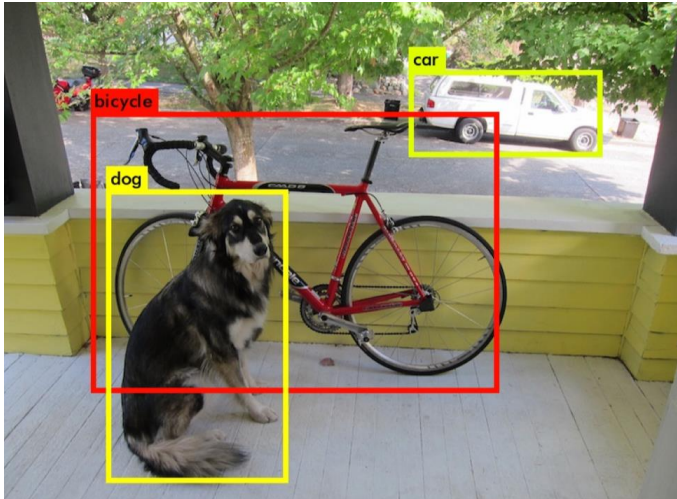
LabRoCoCo Meeting – 28/11/2017

Federico Nardi

Introduction

- **What:** train a classifier to recognize objects in indoor environments (e.g., chairs, tables, etc...).
- **How:** generate a training set

000001.jpg



000001.txt

<object-class>	<x>	<y>	<width>	<height>
21	0.123	0.456	0.476	0.634
08	0.685	0.532	0.823	0.367
14	0.163	0.487	0.539	0.789

Methodology

- We define two type of **environments**:
 - Kitchen
 - Living-room.
- We define a set of **object classes** of interest:
 - Armchair, Bookcase, Burner stove, Cabinet, Chair, Couch, Fridge, Lamp, Plant, Sink, Table, Tv.

Methodology

- We address the generation of the environments as a **Constraint Satisfaction Problem** (CSP), e.g.: “the tv is on a cabinet”, “the couch is in front of the tv”.
- We generate the training examples by moving the robot in the scene and retrieving the **labels** and **bounding boxes** of each object in the camera FOV from the simulator.

News

BAD:

- We ask you to collaborate by choosing a class of objects and providing 10 gazebo models.

GOOD:

- It's a general procedure.
- You will have access to a database of models and environments for your experiments.

Gazebo Model

Physical entity with:

- Dynamic
- Kinematic
- Visual

properties ([Wiki](#)).

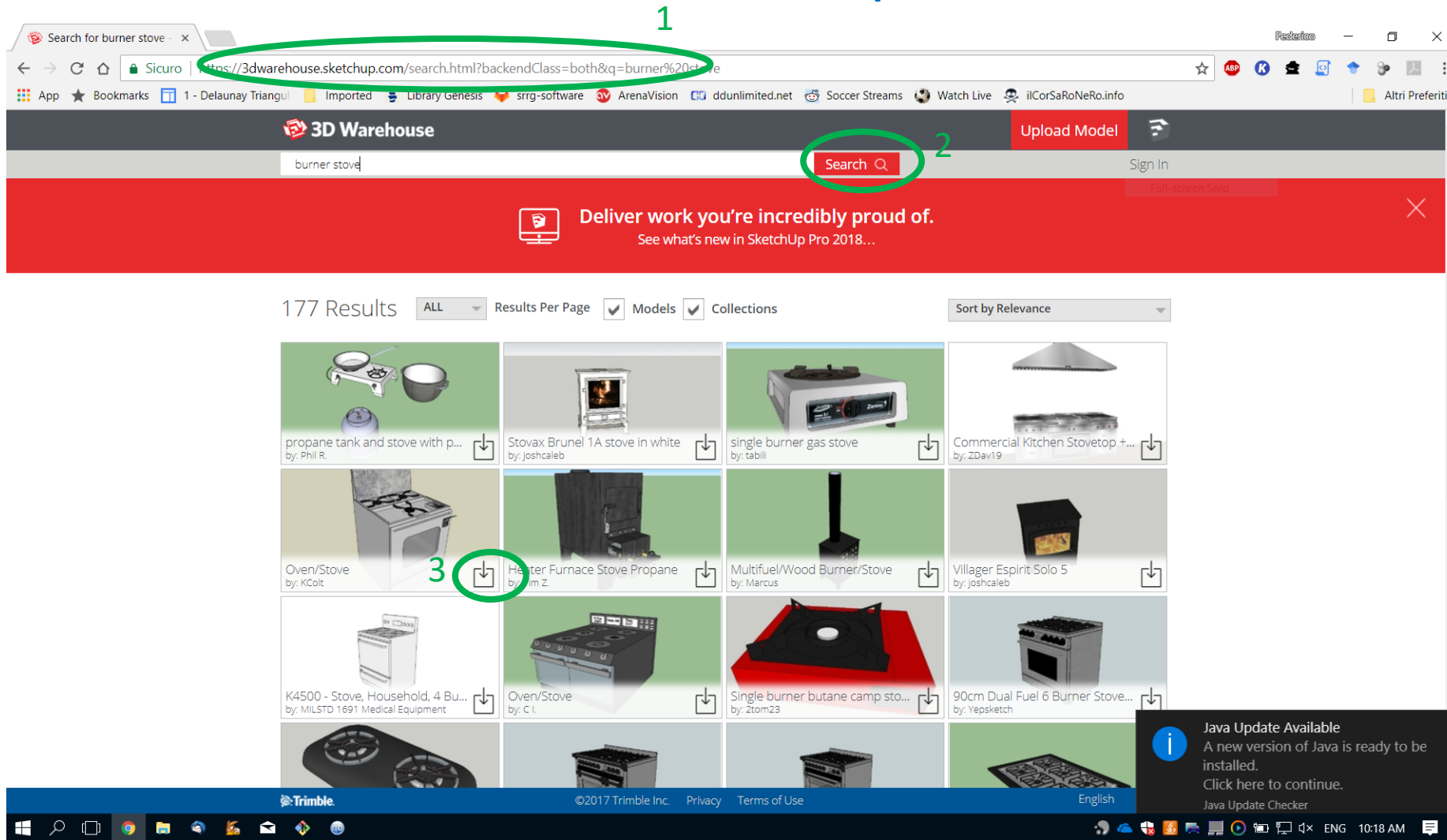
Directory structure:

- model_1
 - model.config
 - model.sdf
 - model.sdf.erb
 - meshes
 - materials
 - textures
 - scripts
 - plugins

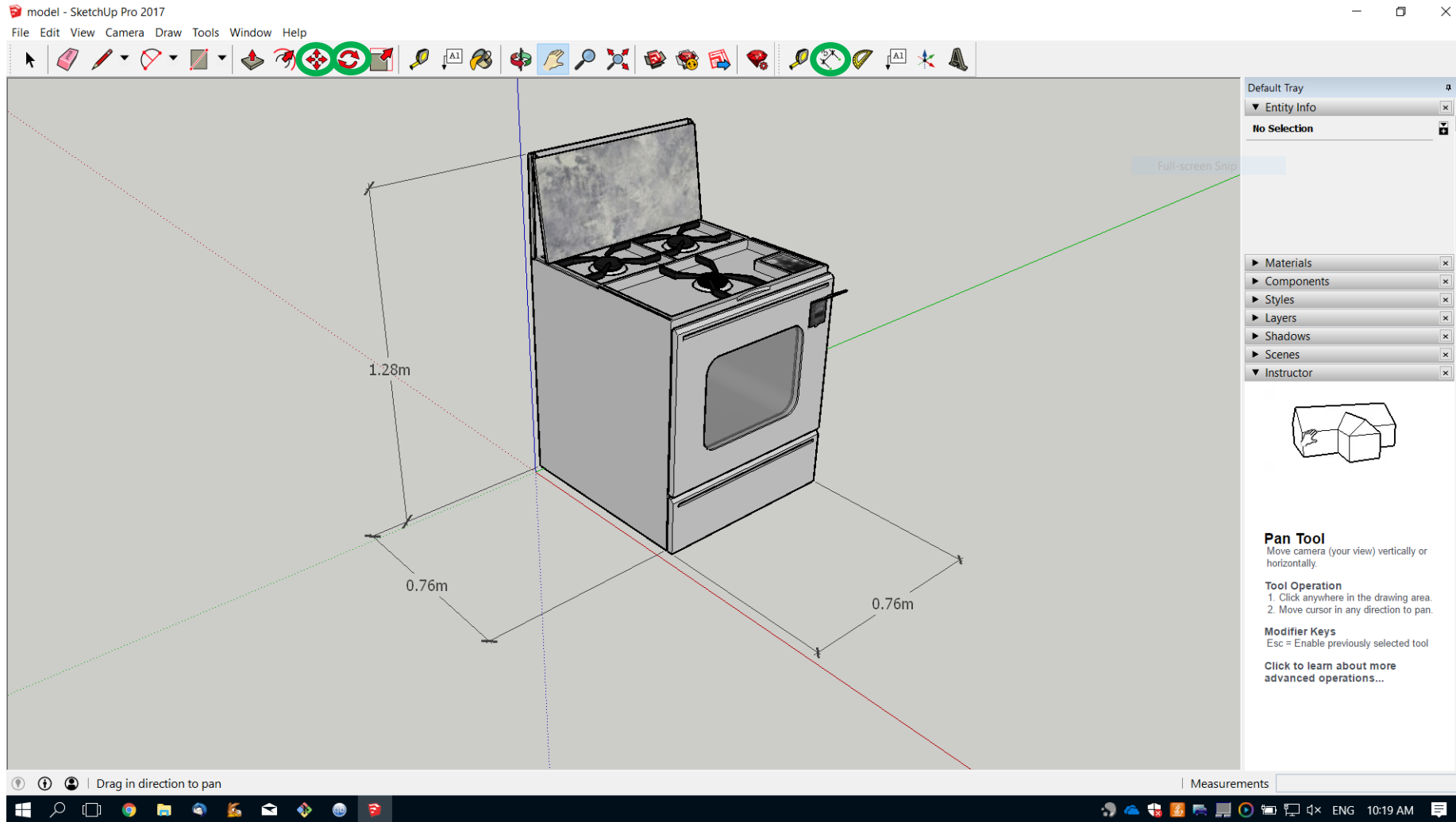
Software Requirements

- [Google Sketchup 2017](#)
- [Blender 2.73](#)
- [Gazebo 7.1](#)

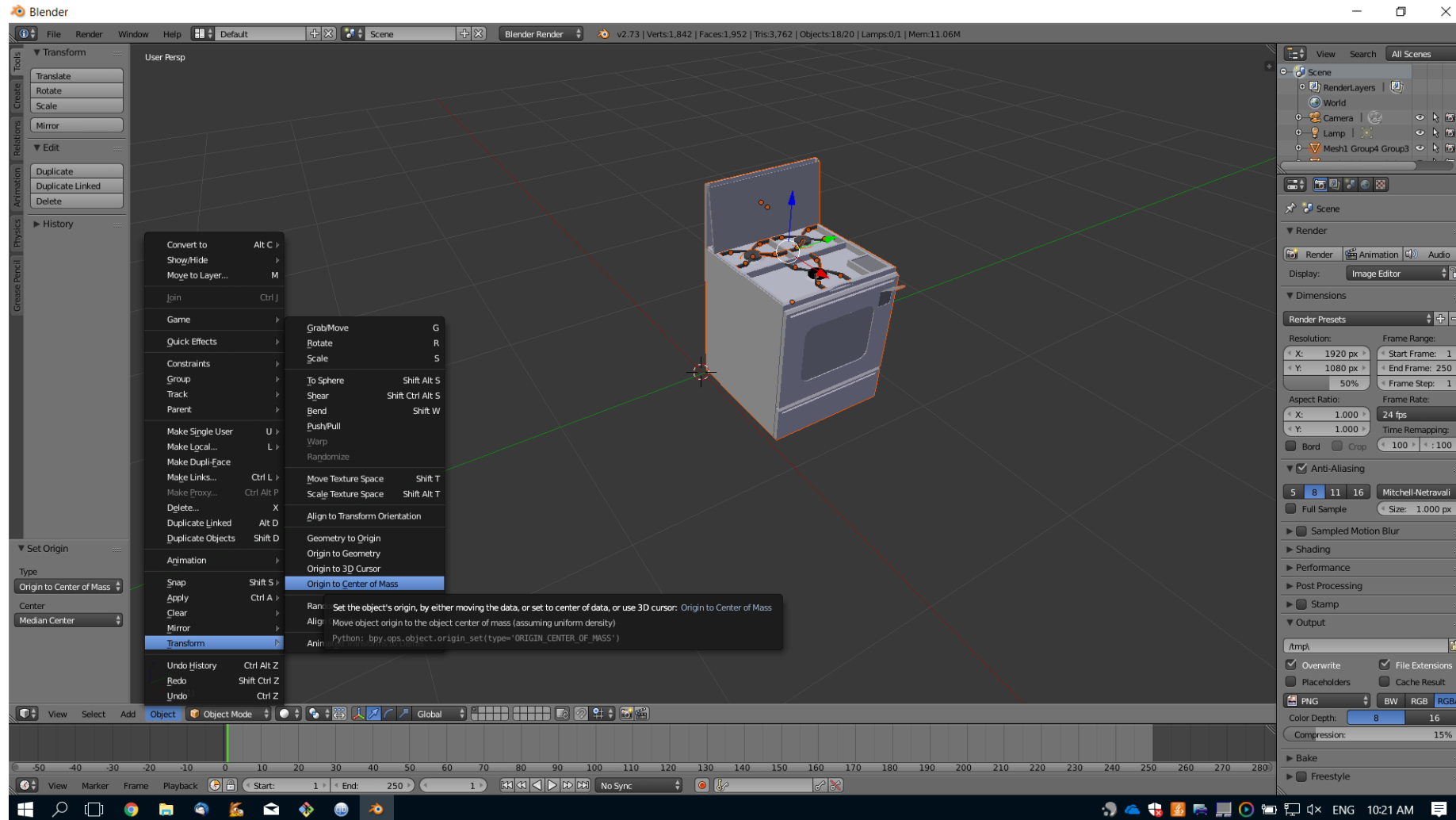
Import model into Sketchup



Define dimensions of the object



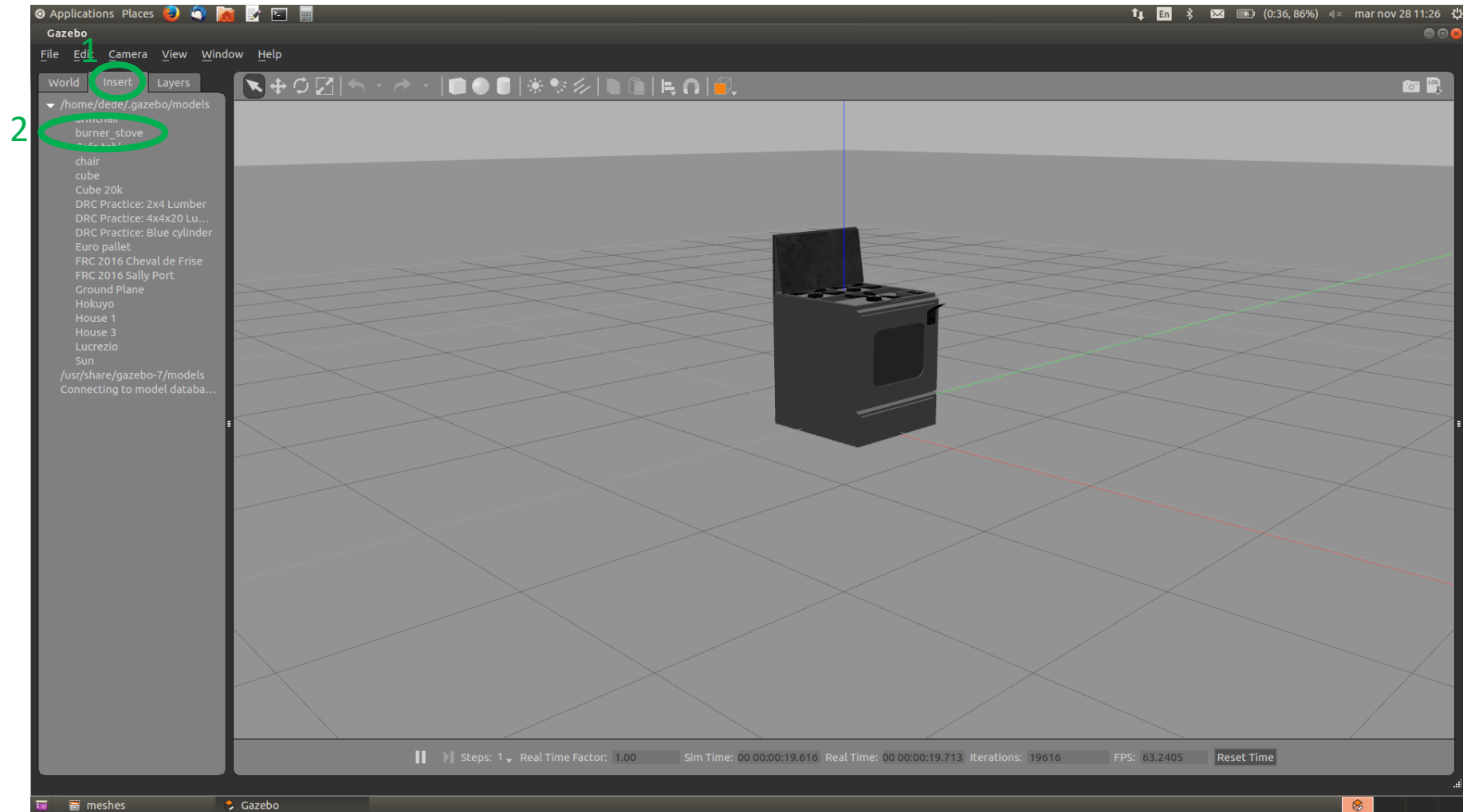
Origin in the center of mass



Create the Gazebo model

- Create a directory in the `~/.gazebo/models` directory with the name of the model, e.g.: `armchair_open` (or `armchair_1`).
- Add and edit ([tutorial](#)):
 - `model.sdf`
 - `model.config`
 - `meshes`
 - `materials`

Test your model



Update the database

- Git clone https://github.com/schizzz8/lucrezio_gazebo_objects.git
- Copy your model in the *models* folder.
- Push the updates