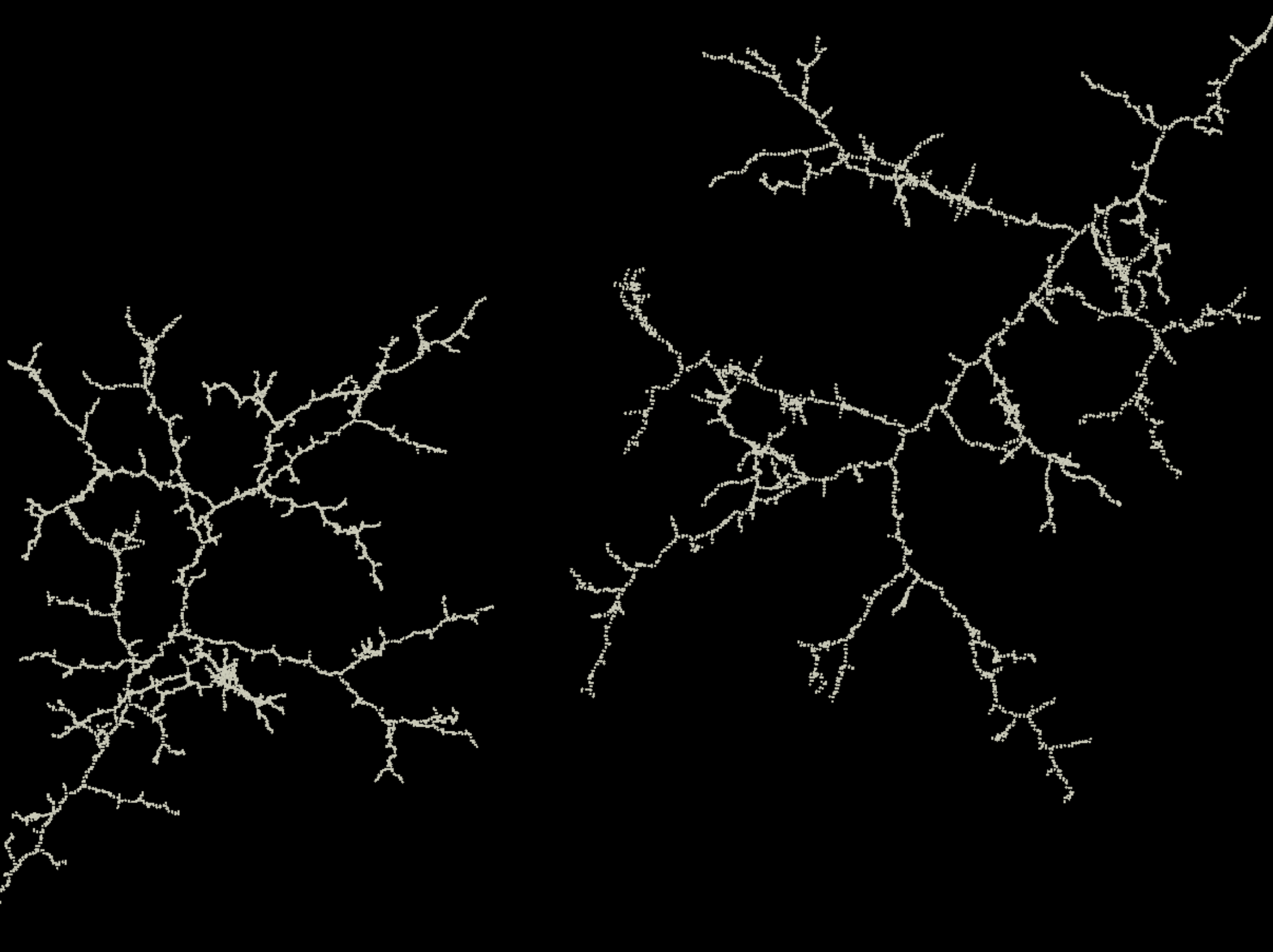
Oriol Manzano
@oriolmanzano.com

How to perform Rapidly exploring random tree(RRT) algorithm



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1-Start

Our journey begins with an initial node placed in an open space. This node, marked 'Start,' represents the beginning of our exploration in the vast field of possibilities. Imagine this as setting down a marker in an uncharted territory, ready to explore the unknown.

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```python
class Node:
    """A node class for A* Pathfinding"""
    def __init__(self, x, y, z):
        self.x = x
        self.y = y
        self.z = z
        self.parent = None

start = (0, 0, 0)
node_start = [Node(start[0], start[1], start[2])]
```

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2-Random Sample

At each step, we cast a random point in the space, akin to throwing a dart on the map. This 'Random Sample' represents the endless possibilities ahead. It's from these points we begin to explore potential paths, connecting the known to the unknown.

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```python
for i in range(num_iterations):
    random_point = np.random.rand(3) * 200
```

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3-Nearest Node

Among our growing network of nodes, we find the 'Nearest Node' to our random point. This is like finding the closest friend in a crowd, a point of familiarity in the vast unknown. We highlight this node, ready to extend our reach towards new horizons.

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```python
def nearest_node(nodes, random_point):
distances = [distance(node, Node(random_point[0],
    random_point[1], random_point[2])) for node in nodes]
min_index = distances.index(min(distances))
return nodes[min_index]
```

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4-Building Bridges

From the nearest node, we 'Steer' towards the new opportunity, the random sample. Yet, we only move a fixed distance, respecting our limitations and the constraints of our environment. This step symbolizes cautious yet determined advancement, creating a 'New Node' on our map of exploration.

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```python
def steer(from_node, to_point, step_size):
    dist = distance(from_node, Node(to_point[0], to_point[1], to_point[2]))
    theta = np.arctan2(to_point[1] - from_node.y, to_point[0] - from_node.x)
    phi = np.arccos((to_point[2] - from_node.z) / dist)
    return Node(from_node.x + step_size *      np.cos(theta) * np.sin(phi),
from_node.y + step_size * np.sin(theta) * np.sin(phi),
from_node.z + step_size * np.cos(phi))
```

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5-Expanding Our Reach

With each new node, we 'Connect & Expand' our tree, drawing solid lines that represent our paths through the space. Each connection is a step closer to our goal, represented by a flag. This growth symbolizes progress and the relentless pursuit of our objectives, expanding our knowledge and reaching towards our destination.

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```python
def plot(nodes, start, goal):
geo = hou.pwd().geometry()
for node in nodes:
    if node.parent:
        points = geo.createPoints([[node.x, node.y,
            node.z], [node.parent.x, node.parent.y, node.z]])
        line = geo.createPolygon()
        line.addVertex(points[0])
        line.addVertex(points[1])
```