AR Sandbox for Construction Planning

1.0

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Chapter 1

Hierarchical Index

1.1 Class Hierarchy

This inheritance list is sorted roughly, but not completely, alphabetically:

Chapter 2

Class Index

2.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

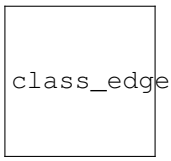
Chapter 3

Class Documentation

3.1 Edge Class Reference

The Edge class stores Network Road and Lane information and builds roads (Edges) for SUMO networks.

Inheritance diagram for Edge:



Public Member Functions

- void ClearData ()

  Clear all saved Network Road Data.
- void BuildEdges ()

  Parses the Road list and builds all valid Roads

Public Attributes

- List< Road > RoadList

  The list of the Networks roads.
- Shader **Road_Shader**
- Shader **Concrete_Shader**
- float LANEWIDTH = 3.4f

  The width to make lanes in meters.

3.1.1 Detailed Description

The Edge class stores Network Road and Lane information and builds roads (Edges) for SUMO networks.

3.1.2 Member Function Documentation

3.1.2.1 BuildEdges()

```
void Edge.BuildEdges ( )
```

Parses the Road list and builds all valid Roads

3.1.2.2 ClearData()

```
void Edge.ClearData ( )
```

Clear all saved Network Road Data.

3.1.3 Member Data Documentation

3.1.3.1 LANEWIDTH

```
float Edge.LANEWIDTH = 3.4f
```

The width to make lanes in meters.

3.1.3.2 RoadList

```
List<Road> Edge.RoadList
```

The list of the Networks roads.

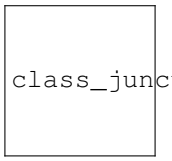
The documentation for this class was generated from the following file:

- src/AR_Sumobox/Assets/Scripts/Edge.cs

3.2 Junction Class Reference

Junction class represents road network intersection.

Inheritance diagram for Junction:



Public Member Functions

- void ClearData ()

  Clear all current simulation data.
- void BuildJunction ()

  Build an Intersection.

Public Attributes

- Shader **Road_Shader**
- string **Id**
- string **Name**
- string **Type**
- string **X**
- string **Y**
- string **IncomingLanes**
- string **InternalLanes**
- string **Shape**

3.2.1 Detailed Description

Junction class represents road network intersection.

3.2.2 Member Function Documentation

3.2.2.1 BuildJunction()

```
void Junction.BuildJunction ( )
```

Build an Intersection.

3.2.2.2 ClearData()

```
void Junction.ClearData ( )
```

Clear all current simulation data.

The documentation for this class was generated from the following file:

- src/AR_Sumobox/Assets/Scripts/Junction.cs

3.3 Lane Struct Reference

A struct representing a Sumo Network Lane.

Properties

- string **Id** `[get, set]`
- string **Index** `[get, set]`
- string **Speed** `[get, set]`
- string **Length** `[get, set]`
- string **Width** `[get, set]`
- string **Allow** `[get, set]`
- string **Disallow** `[get, set]`
- string **Shape** `[get, set]`
- bool **Built** `[get, set]`
- string **DefaultSpeed** `[get, set]`
- bool **ConstructionZone** `[get, set]`

3.3.1 Detailed Description

A struct representing a Sumo Network Lane.

The documentation for this struct was generated from the following file:

- src/AR_Sumobox/Assets/Scripts/Edge.cs

3.4 Poly Struct Reference

Poly struct holds polygon data that represents arbitrary network shapes.

Properties

- string **Id** `[get, set]`
- string **Type** `[get, set]`
- string **Color** `[get, set]`
- string **Shape** `[get, set]`

3.4.1 Detailed Description

Poly struct holds polygon data that represents arbitrary network shapes.

The documentation for this struct was generated from the following file:

- src/AR_Sumobox/Assets/Scripts/Structure.cs

3.5 ProjectionData Class Reference

Projection Data class stores and creates a simulation networks terrain.

Inheritance diagram for ProjectionData:

Public Member Functions

- void SetProjectionData (XmlDocument xml)

  Get the bounds of the current network as a pair of points in 2-Space
- List< float > ShapeStringToFloatList (string shape)

  Sumo shape sting to List of floats point order is x1, y1, x2, y2, ...
- void BuildTerrain ()

  Adds a Terrain_Plane to the scene the size of the network and sets the camera to the center of the plane.

Public Attributes

- Shader Terrain_Shader

  The Projection Data Terrain Shader.
- Camera Main_Camera

  A handle to the main camera.
- string offset

  The offset for network projections.
- string originalBounds

  The networks original bounds Lat/Lon
- string projectedBounds

  The networks projected bound. Cartesian

3.5.1 Detailed Description

Projection Data class stores and creates a simulation networks terrain.

3.5.2 Member Function Documentation

3.5.2.1 BuildTerrain()

```
void ProjectionData.BuildTerrain ( )
```

Adds a Terrain_Plane to the scene the size of the network and sets the camera to the center of the plane.

3.5.2.2 SetProjectionData()

```
void ProjectionData.SetProjectionData (
            XmlDocument xml )
```

Get the bounds of the current network as a pair of points in 2-Space

Parameters

xml	The xml file with the projection data.

3.5.2.3 ShapeStringToFloatList()

```
List<float> ProjectionData.ShapeStringToFloatList (
            string shape )
```

Sumo shape sting to List of floats point order is x1, y1, x2, y2, ...

Parameters

shape	A Sumo formatted shape string.

Returns

3.5.3 Member Data Documentation

3.5.3.1 Main_Camera

```
Camera ProjectionData.Main_Camera
```

A handle to the main camera.

3.5.3.2 offset

```
string ProjectionData.offset
```

The offset for network projections.

3.5.3.3 originalBounds

```
string ProjectionData.originalBounds
```

The networks original bounds Lat/Lon

3.5.3.4 projectedBounds

```
string ProjectionData.projectedBounds
```

The networks projected bound. Cartesian

3.5.3.5 Terrain_Shader

```
Shader ProjectionData.Terrain_Shader
```

The Projection Data Terrain Shader.

The documentation for this class was generated from the following file:

- src/AR_Sumobox/Assets/Scripts/ProjectionData.cs

3.6 Road Struct Reference

A struct representing a Sumo Network Edge.

Properties

- string **Id** `[get, set]`
- string **From** `[get, set]`
- string **To** `[get, set]`
- string **Name** `[get, set]`
- string **Shape** `[get, set]`
- bool **Built** `[get, set]`
- string **Type** `[get, set]`
- string **Function** `[get, set]`
- List< Lane > **Lanes** `[get, set]`

3.6.1 Detailed Description

A struct representing a Sumo Network Edge.

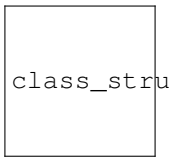
The documentation for this struct was generated from the following file:

- src/AR_Sumobox/Assets/Scripts/Edge.cs

3.7 Structure Class Reference

Structure class stores and builds all simulation network buildings and Points of Interest.

Inheritance diagram for Structure:



Public Member Functions

- void ClearData ()

  Clear all current simulation polygon data.
- void Build ()

  Build all stored polygon data.

Public Attributes

- List< Poly > Polys

  The list of polygon data.
- Shader Concrete_Shader

  The parking lot shader.
- Shader Building_Shader

  The building extrusion shader.

3.7.1 Detailed Description

Structure class stores and builds all simulation network buildings and Points of Interest.

3.7.2 Member Function Documentation

3.7.2.1 Build()

```
void Structure.Build ( )
```

Build all stored polygon data.

3.7.2.2 ClearData()

```
void Structure.ClearData ( )
```

Clear all current simulation polygon data.

3.7.3 Member Data Documentation

3.7.3.1 Building_Shader

```
Shader Structure.Building_Shader
```

The building extrusion shader.

3.7.3.2 Concrete_Shader

```
Shader Structure.Concrete_Shader
```

The parking lot shader.

3.7.3.3 Polys

```
List<Poly> Structure.Polys
```

The list of polygon data.

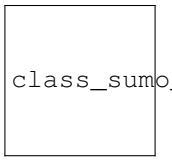
The documentation for this class was generated from the following file:

- src/AR_Sumobox/Assets/Scripts/Structure.cs

3.8 SumoCreator Class Reference

SumoCreator class is used for creating Open Street Map networks with SUMO's OSM Web Wizard and reading SUMO generated files that describe a networks logic and layout.

Inheritance diagram for SumoCreator:



Public Member Functions

- void GenerateOsmNetwork ()

  Open the OSMWebWizard to build a real world road network. The user will save the new network to a zipfile when done. The processes remain open so the user can build multiple network at once.
- void LoadNetwork ()

  Go through all network description files and build the network into Unity. Most files will be passed over but there are some handles left for upgrades.

3.8.1 Detailed Description

SumoCreator class is used for creating Open Street Map networks with SUMO's OSM Web Wizard and reading SUMO generated files that describe a networks logic and layout.

3.8.2 Member Function Documentation

3.8.2.1 GenerateOsmNetwork()

```
void SumoCreator.GenerateOsmNetwork ( )
```

Open the OSMWebWizard to build a real world road network. The user will save the new network to a zipfile when done. The processes remain open so the user can build multiple network at once.

3.8.2.2 LoadNetwork()

```
void SumoCreator.LoadNetwork ( )
```

Go through all network description files and build the network into Unity. Most files will be passed over but there are some handles left for upgrades.

The documentation for this class was generated from the following file:

- src/AR_Sumobox/Assets/Scripts/SumoCreator.cs

3.9 TraciController Class Reference

Traci Controller class manages a running simulation by communicating with a Sumo process.

Inheritance diagram for TraciController:

Public Member Functions

- void RemoveWorkZoneOnLane (GameObject Road, String LaneId)

  Removes the construction zone attribute for a defined lane in the given road, and updates the simulation in SUMO.
- void RemoveWorkZoneEntireRoad (GameObject Road)

  Removes the construction zone attribute from every lane in the road, and updates the simulation accordingly in SUMO.
- void SetWorkZoneEntireRoad (GameObject Road)

  Sets the construction zone attribute for every lane in the road, and updates the simulation accordingly in SUMO.
- void SetWorkZoneOneLane (GameObject Road, String LaneId)

  Sets the construction zone attribute for a defined lane in the given road, and updates the simulation in SUMO.
- void Subscribe ()

  Subscribes to all vehicles in the simulation
- void OnVehicleUpdate (object sender, Traci.Types.SubscriptionEventArgs e)

  Event handler to handle a car update event

Public Attributes

- GameObject Cars_GO

  The Car main Game Object
- float speed = 2.0f

  The simulation speed.
- Traci.TraCIClient Client

  The Traci client.
- String HostName

  The hostname of the computer for remote connections.
- int Port

  The post of the computer for remote connections.
- String ConfigFile

  The current simulation config file.

3.9.1 Detailed Description

Traci Controller class manages a running simulation by communicating with a Sumo process.

3.9.2 Member Function Documentation

3.9.2.1 OnVehicleUpdate()

```
void TraciController.OnVehicleUpdate (
            object sender,
            Traci.Types.SubscriptionEventArgs e )
```

Event handler to handle a car update event

Parameters

sender	The client
e	The event args

3.9.2.2 RemoveWorkZoneEntireRoad()

```
void TraciController.RemoveWorkZoneEntireRoad (
            GameObject Road )
```

Removes the construction zone attribute from every lane in the road, and updates the simulation accordingly in SUMO.

Parameters

Road	The Road GameObject with an Edge component of roads to update

3.9.2.3 RemoveWorkZoneOnLane()

```
void TraciController.RemoveWorkZoneOnLane (
            GameObject Road,
            String LaneId )
```

Removes the construction zone attribute for a defined lane in the given road, and updates the simulation in SUMO.

Parameters

Road	The gameobject to whom we will update the specified lane
LaneId	The lane Id as specified in the SUMO network file

3.9.2.4 SetWorkZoneEntireRoad()

```
void TraciController.SetWorkZoneEntireRoad (
            GameObject Road )
```

Sets the construction zone attribute for every lane in the road, and updates the simulation accordingly in SUMO.

Parameters

Road	The Road GameObject to update the road

3.9.2.5 SetWorkZoneOneLane()

```
void TraciController.SetWorkZoneOneLane (
            GameObject Road,
            String LaneId )
```

Sets the construction zone attribute for a defined lane in the given road, and updates the simulation in SUMO.

Parameters

Road	The gameobject to whom we will update the specified lane
LaneId	The lane Id as specified in the SUMO network file

3.9.2.6 Subscribe()

```
void TraciController.Subscribe ( )
```

Subscribes to all vehicles in the simulation

3.9.3 Member Data Documentation

3.9.3.1 Cars_GO

```
GameObject TraciController.Cars_GO
```

The Car main Game Object

3.9.3.2 Client

```
Traci.TraCIClient TraciController.Client
```

The Traci client.

3.9.3.3 ConfigFile

```
String TraciController.ConfigFile
```

The current simulation config file.

3.9.3.4 HostName

```
String TraciController.HostName
```

The hostname of the computer for remote connections.

3.9.3.5 Port

```
int TraciController.Port
```

The post of the computer for remote connections.

3.9.3.6 speed

```
float TraciController.speed = 2.0f
```

The simulation speed.

The documentation for this class was generated from the following file:

- src/AR_Sumobox/Assets/Scripts/TraciController.cs

3.10 Triangulator Class Reference

Public Member Functions

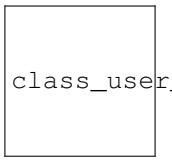
- **Triangulator** (Vector2[ ] points)
- int [ ] **Triangulate** ()

The documentation for this class was generated from the following file:

- src/AR_Sumobox/Assets/Scripts/Triangulator.cs

3.11 UserController Class Reference

Inheritance diagram for UserController:



Public Attributes

- Camera **Main_Camera**
- GameObject **Canvas**
- float **speed** = 2.0f

The documentation for this class was generated from the following file:

- src/AR_Sumobox/Assets/Scripts/UserController.cs