

Brief description of ORTS client – Team Blekinge

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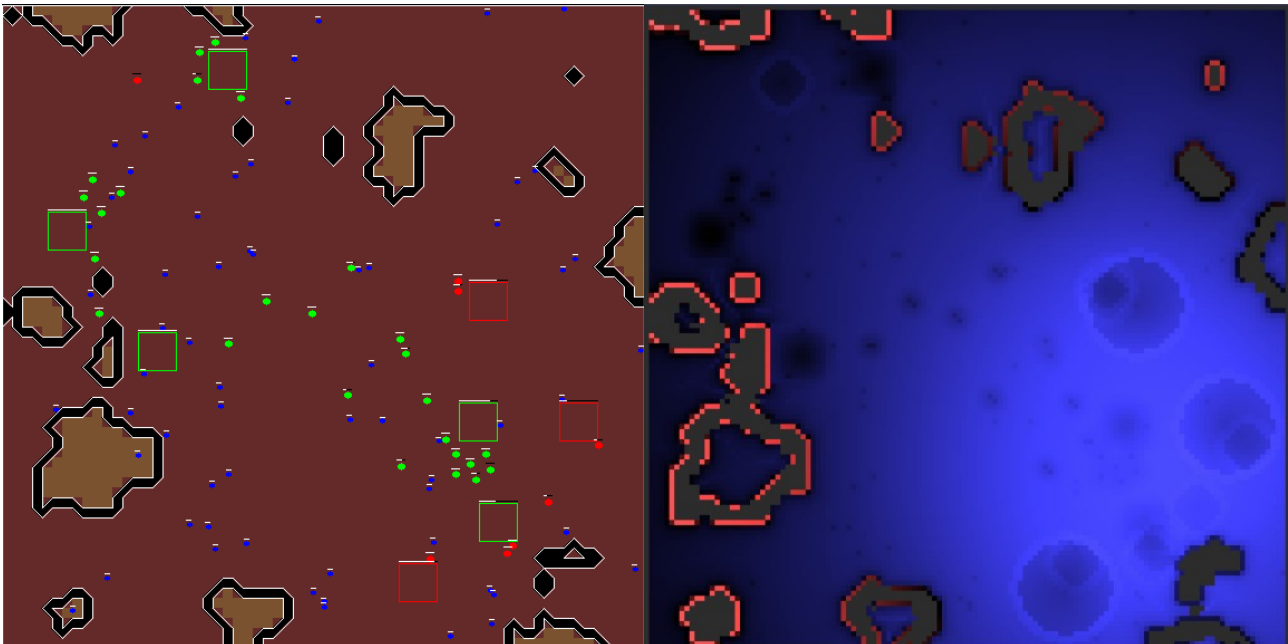
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General overview

Our client is based on potential fields. Each unit (friendly or enemy), control center, sheep and impassable terrain tile has a charge which generates a potential field around the object. Below you will find a more detailed description of the different fields. All fields generated by objects are weighted and summed to form a total field which is used for tactical decisions. When deciding actions for a unit, the potential of the current position and the surrounding tiles are compared. The unit moves to the position with the highest potential, or is idle if the current position is highest. We have also introduced a restless state where units which have been idle for a time move some distance in a random direction. This reduces the effect of units getting stuck in local maxima. Note that no pathfinding is used in our client.

Below is a graphical representation of the potential field from the green player's point of view. Areas with negative potential are red (lighter red has lower potential than darker red). Areas with positive potential are blue (lighter blue has higher potential than darker blue). The grey areas are impassable tiles.

The light blue circles around the red player's units or control centers are the most desirable position when attacking the unit or base. The green units move towards the highest potential and surround the red units or bases at some distance (in the example half maximum fire range is used).



When deciding which enemy unit to attack we use a global fire coordination.

The fire coordinator constructs a matrix with all own units ready to fire the current frame and available targets for each unit. If more than one target exists for any own unit, the coordinator

processes the matrix so each unit has a single target. The coordinator aims to:

1. Destroy as many targets as possible this frame.
2. If unable to completely destroy targets, aim at damaged targets.
3. If two targets with same hit points are within fire range, aim at the one the largest number of own units can fire at.

Potential fields

Each game object or impassable terrain tile has a different type of potential field. The fields are as follows:

Own units

Own units generates a circular field of negative charges. This prevents units from moving into each other.

Own bases

The field around own bases are similar to the field around own units. It is a circular field of negative charges to help units move around a base.

Enemy units

Enemy units generates a circular field with the highest potential at desired distance for own units when attacking the enemy unit. The field affect a large area to make own units move towards the desired attacking distance even if the distance between a friendly unit and enemy units is large.

Enemy bases

An enemy base generates a circular field similar to the field around the enemy units. The highest potential is at the desired attacking distance. The field affect a very large area to make units at one end of the map move towards enemy bases even if they are located at the other end of the map.

Sheep

Sheep generates a small circular field of negative potential to help units move around the sheep.

Impassable terrain tiles

Impassable terrain generates a field with negative potential to prevent units from colliding with the terrain. The terrain field is post-processed to reduce the negative potential in narrow paths (which help units using the path) and increase the negative charge in dead-ends (to prevent units from getting stuck in dead-ends).