

Ultimative Locomotion system Documentation.

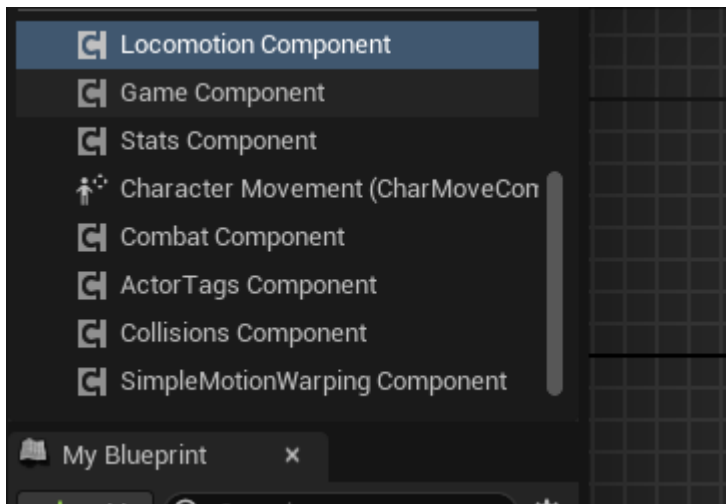
Hello dear user, in this documentation i will explain core features and settings of my Locomotion system.

Let's start from the core concept behind it.

System Concept

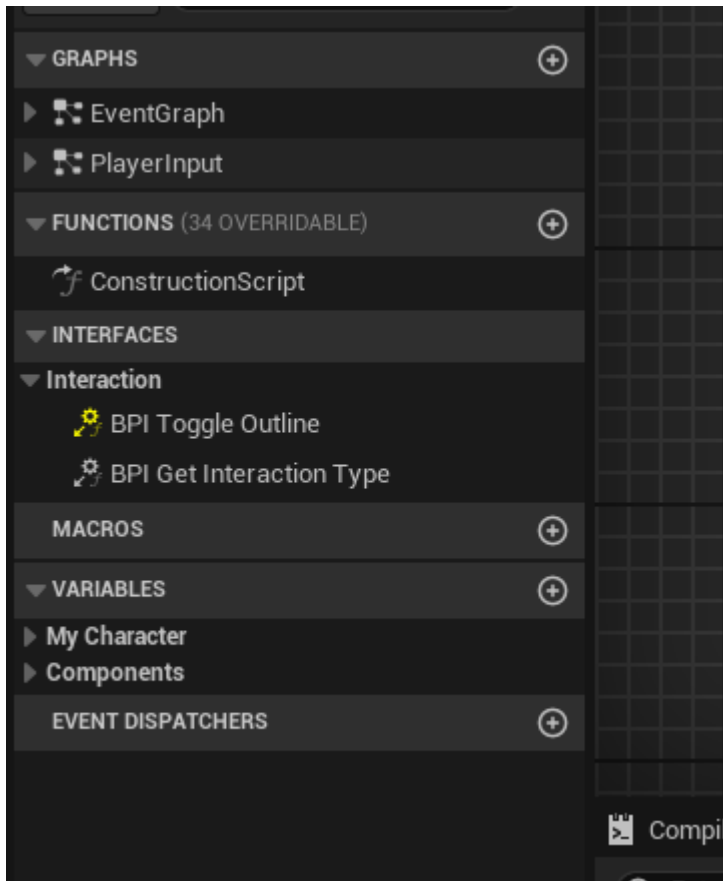
Modularity

All system's code is provided inside of Actor Components so you can attach and control them from character class.



Character class itself does not have any logic except passing the inputs, debug, small interaction interface calls and hp-bar widget initialisations.

It doesn't have any functions or macroses. So you in result will get clean character to achieve your goals.



Each component has a number of settings to control different parameters. Let's start to overview them.

Locomotion Component



Settings		
Default Movement State	Jog	
Gamepad Turn Rate	45,0	
Gamepad Look Up Rate	45,0	
Default Walk Speed	300,0	
Default Crouch Speed	180,0	
Default Locomotion Settings	1 Map elements + -	
▶ Default	18 members	
Crouch Locomotion Settings	4 Map elements + -	
▶ Kneeing	18 members	
▶ Crawling	18 members	
▶ Prone	18 members	
▶ Default	18 members	
Swim Locomotion Settings	2 Map elements + -	
▶ Under Water	18 members	
▶ Default	18 members	
Flight Locomotion Settings	0 Map elements + -	
Default Rotation Rate	0,0	0,0 360,0
X	0,0	
Y	0,0	
Z	360,0	
Aimed Rotation Rate	0,0	0,0 180,0
X	0,0	
Y	0,0	
Z	180,0	
Default Rootmotion Mode	Root Motion from Everything	
Swimming Offset	30,0	

Default Movement State setting allows you to put your character by default in one of three movement states, it's Walk, Jog and Run. By default character movement is set to Jog, but. If you making open world game, probably, NPC's should Walk by default. So here you can set it.







Gamepad-based settings are for this type of controller.

Default Walk and Crouch speed values set if you not filled Locomotion Settings for this states

Next we have Default **Locomotion Settings** setup for different locomotion modes that can be added or removed.

Default Locomotion Settings		1 Map elements	 
▼	Default	18 members	▼
	Default Speed	300,0	
	Aimed Default Speed	300,0	
	Run Speed	600,0	
	Aimed Run Speed	600,0	
	Slow Speed	180,0	
	Aimed Slow Speed	180,0	
	Not Moving Treshold	1,0	
	Braking Friction	50,0	
	Braking Deceleration	500,0	
	Capsule HalfHeight	96,0	
	Capsule Radius	42,0	
	Closest Obstacle Distance	5,0	
	Can Desired Rotation?	<input checked="" type="checkbox"/>	
	Apply Rootmotion Movement?	<input type="checkbox"/>	
	Interpolate Capsule Change	<input checked="" type="checkbox"/>	
	Keep Capsule Mesh Offset?	<input checked="" type="checkbox"/>	
	Can WalkOff Ledges?	<input checked="" type="checkbox"/>	
	Follow Floor Normal Rotation?	<input type="checkbox"/>	

This settings are similar with: Crouch Locomotion Settings, and Swim Locomotion settings

Crouch Locomotion Settings		4 Map elements	 
▶	Kneeing	18 members	▼
▶	Crawling	18 members	▼
▶	Prone	18 members	▼
▶	Default	18 members	▼
Swim Locomotion Settings		2 Map elements	 
▶	Under Water	18 members	▼
▶	Default	18 members	▼
Flight Locomotion Settings		0 Map elements	 

Using these settings you can tweak movement of your character in certain states.

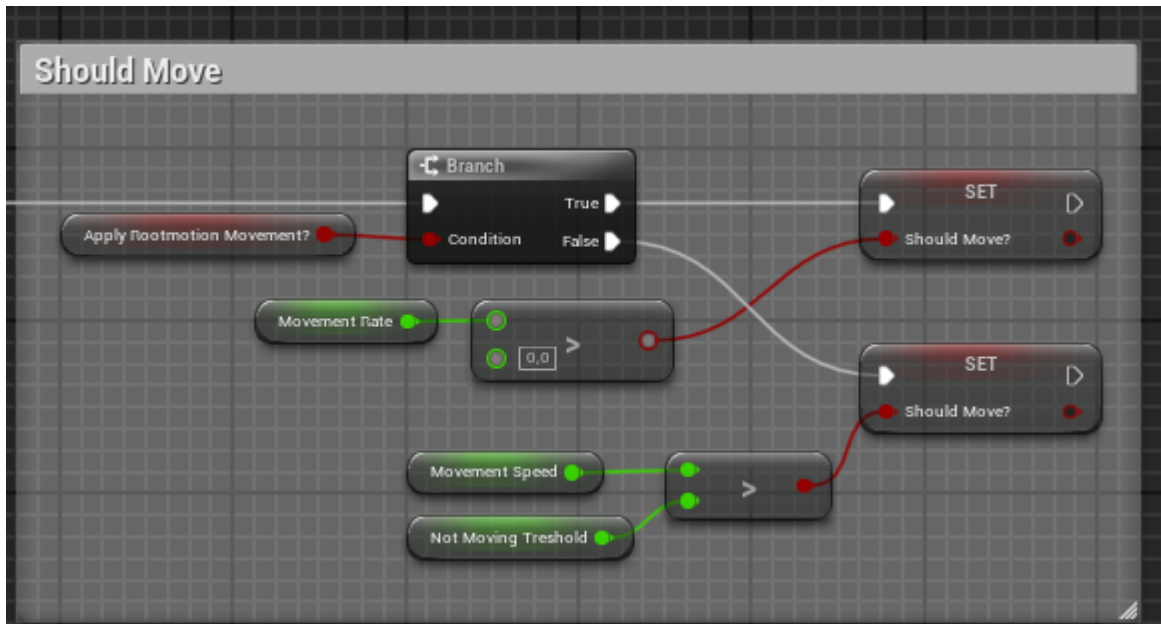
Default Speed is set for default movement speed.

Aimed Default Speed - You can set separate speed for character locomotion if the player is aiming. This is useful for shooter-like games.

Run Speed is for speed in Run state, by default this state is loaded when the player presses Shift key.

Slow Speed if for speed in Slow state, by default this state is loaded when the player presses Ctrl key.

Not moving threshold used by animation blueprint state to detect if character is moving in motion-driven mode.



In Root Motion-driven movement this settings does not affect motion.

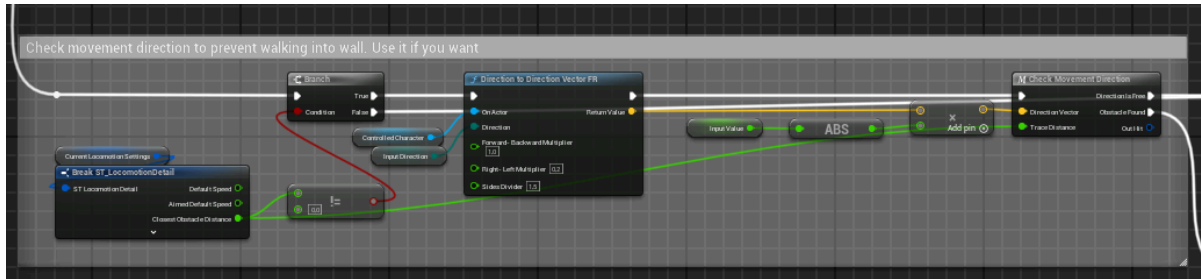
Braking Friction and Braking deceleration mostly set for swimming and flying states, they allows character to inertially slide after braking(stopping).

In Under Water swimming their values set to 0:

Property	Value
Under Water	18 members
Default Speed	150,0
Aimed Default Speed	150,0
Run Speed	300,0
Aimed Run Speed	300,0
Slow Speed	100,0
Aimed Slow Speed	100,0
Not Moving Treshold	20,0
Braking Friction	0,0
Braking Deceleration	0,0
Capsule HalfHeight	96,0
Capsule Radius	42,0

Capsule parameters allow you to scale character capsule in different states. For example during crouch.

Closest Obstacle Distance. This setting is used to prevent walking into walls when rootmotion movement is active.



Can Desired Rotation. Using this setting you can enable on disable character Desired Rotation mode during aiming.

Apply Rootmotion Movement used in combination with rootmotion-based anim-graph setup and enable different ways of speed calculation.

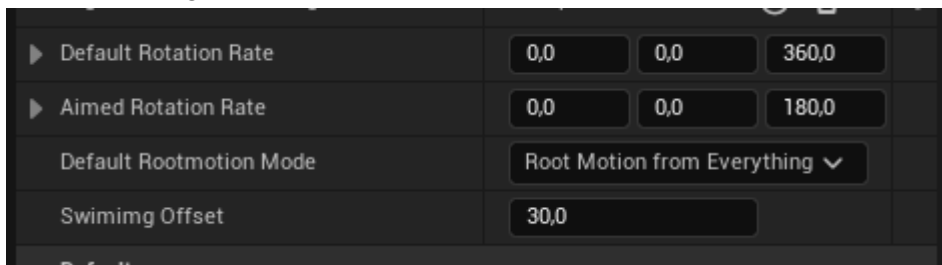
Interpolate Capsule Change. When movement mode is changed capsule size is changed as well. This can happen immediately or with interpolated delay.

Keep Capsule Mesh offset - when capsule size is changed - mesh component should be reposition proportionally. Disabling this will disable reposition of mesh component.

Can Walk Off Ledges as for the movement component's Can Walk Off Ledges setting, Follow Floor Rotation Normal - Enabling this will allow character Mesh to rotate according to floor angle. This is useful for Crawling or Prone locomotion states.



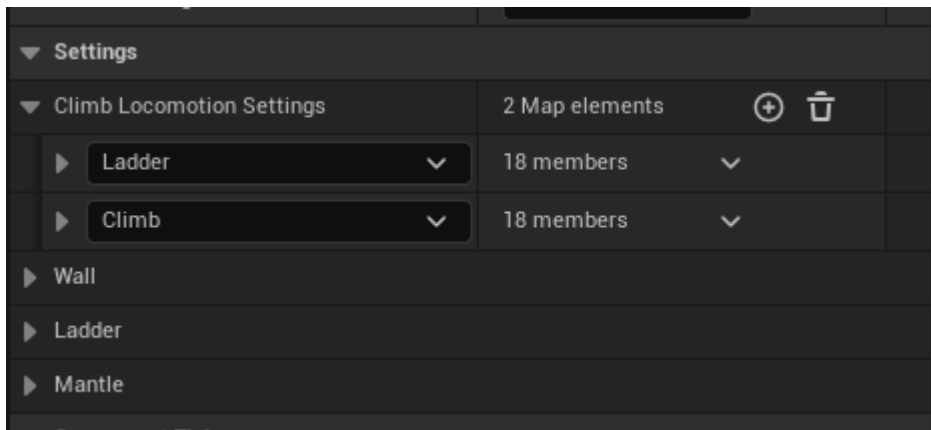
The last settings in the Locomotion Component are:



Here you can control rotation rate during default movement and aiming. Also Swimming offset will start character to Swim when he enters water at this depth.

Rootmotion mode allows to set type of rootmotion in AnimBp.




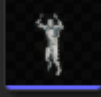




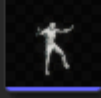

Climb Component Settings



Component has locomotion settings for two climb modes, ladder and wall. I already described these settings before.

And Anim montage sources for different interactions in states:

For wall climbing we will have this settings:

Wall		
Climb Wall Enter		Climb_Enter ▾ ↶ ↷
Climb Wall Enter Jump		Climb_Enter_Jump ▾ ↶ ↷
Climb Wall Exit		Climb_Exit ▾ ↶ ↷
Climb Wall Exit Jump Down		Climb_Exit_JumpD ▾ ↶ ↷
Wall Angle Min		-75,0
Wall Limit 1		45,0
Wall Limit 1 + Max		25,0
▶ Wall Jump Directions		8 Map elements + 🗑️
Climb Up Montage		Climb_Up_Montage ▾ ↶ ↷
Climb Down Montage		Climb_Down_Mont: ▾ ↶ ↷
Climb Wall Offset		50,0
Climb Corner R Montage		Climb_Base_Corne: ▾ ↶ ↷
Climb Corner L Montage		Climb_Base_Corne: ▾ ↶ ↷
Climb Corner RIn Montage		Climb_Base_Corne: ▾ ↶ ↷
Climb Corner LIn Montage		Climb_Base_Corne: ▾ ↶ ↷









For the Wall climbing we will have this:

Montage settings are obvious but.

Wall Angle Min - is max wall angle that we can climb on.

Wall Limit 1 and Wall Limit 1+Max are used in climbing over corners. Climbable corners are in range $90+WallLimit1$ or $270+WallLimit1+Max$.

For Ladder Climbing Values are this:

▼ Ladder		
Enter Ladder Montage		Ladder_IdleToLadd ▼ ⏪ ⏩
Enter Ladder Left Montage		Ladder_Up_RotLeft ▼ ⏪ ⏩
Enter Ladder Right Montage		Ladder_Up_RotRight ▼ ⏪ ⏩
Swim to Ladder Montage		Ladder_SwimToLai ▼ ⏪ ⏩
Exit Ladder Montage		LadderToldle_Monti ▼ ⏪ ⏩
Ladder Offset	50,0	
Exit Ladder Jump Montage		LadderToldle_Jumj ▼ ⏪ ⏩
Ladder Mantle Up		Ladder_MantleUp_I ▼ ⏪ ⏩
Ladder Mantle Down		Ladder_MantleDow ▼ ⏪ ⏩
Ladder Mantle Up Forward Offset	66,0	
Ladder Mantle Up Up Offset	150,0	

Ladder offset is the offset of player's capsule from the ladder.

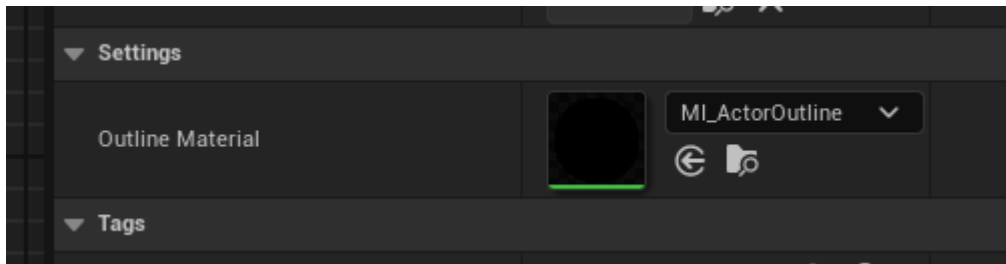
Ladder Mantle Up Forward Offset and Ladder Mantle Up Up Offset (no, it's not a mistake it's actually Up Up) are offsets for ladder Mantle Up Traces.

Mantle Up from ladder logics include trace Up in movement direction, this trace offset is set by Mantle Up Forward offset. And from this trace end, from its upper point we trace again up to see if there any obstacles and floor to step on. For this trace we use Mantle Up Up Offset.

Game Component

This component is designed to store different gameplay logics such as: interactions and UI operations.

Since there is not much logic it has only one setting:





It's Outline Material For interacting object.



Combat Component

This component manages combat system and it's mechanics.

▼ Settings		
Current Weapon Type	Unarmed	▼
Closest Attack Distance	100,0	
Armed Movement Mode	Jog	▼
Armed NPC Movement Mode	Walk	▼
Active Block Duration	1,0	
Parry Pause Duration	2,0	
Impact Rate	0,5	
▶ Combo Montages	4 Array elements	⊕ 🗑️
▶ Kick Montages	3 Array elements	⊕ 🗑️
▶ Impact Montages	16 Array elements	⊕ 🗑️
Arm Montage	 Arm_Montage	▼ ↶ 🗑️
Unarm Montage	 Unarm_Montage	▼ ↶ 🗑️
▶ Parry Montages	9 Array elements	⊕ 🗑️
▶ Hit Push Montages	4 Array elements	⊕ 🗑️
▶ Evade Montages	4 Array elements	⊕ 🗑️
▶ Hit Reset Montages	2 Array elements	⊕ 🗑️
▶ Takedown Montages	2 Array elements	⊕ 🗑️
▶ Finisher Montages	3 Array elements	⊕ 🗑️
▶ Fall Down Montages	4 Map elements	⊕ 🗑️
▶ Get Up Montages	4 Map elements	⊕ 🗑️
▼ Default		

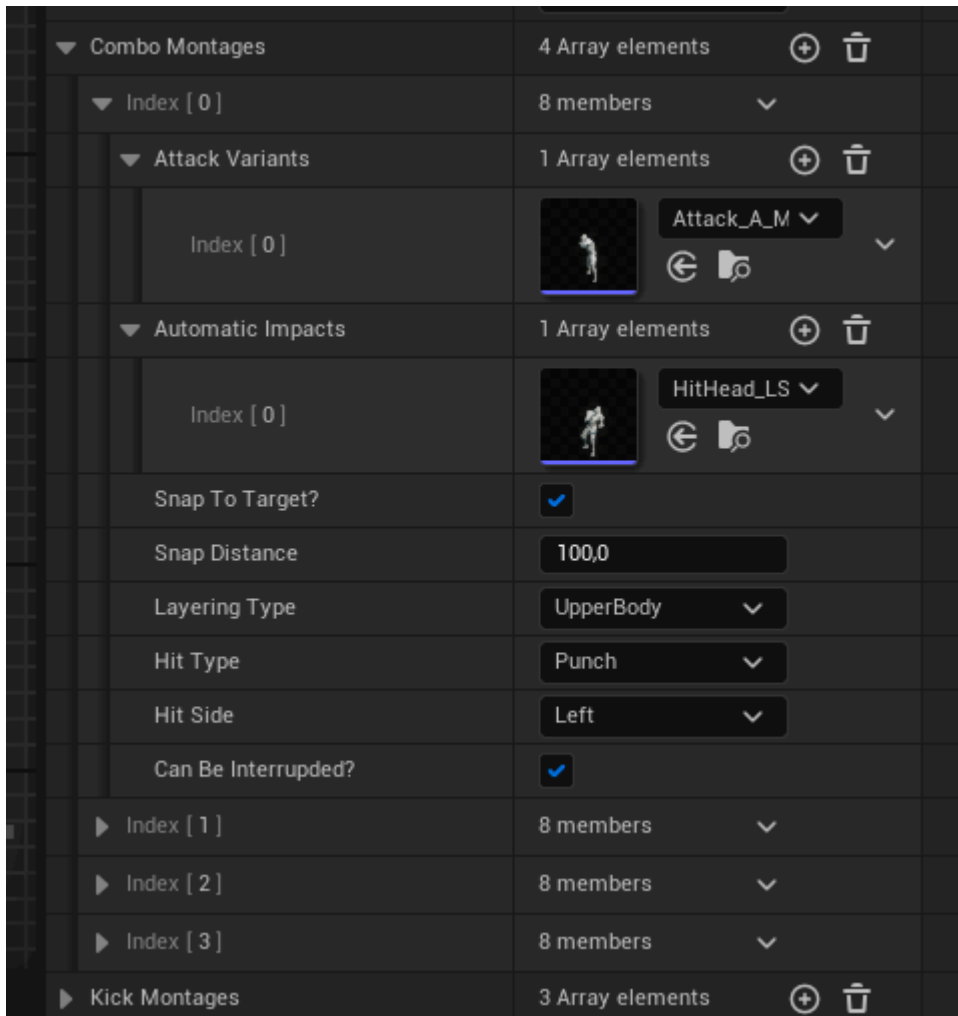
Here you can set character weapon type (this setting is for future updates), attack distance, movement in armed mode for player and NPC's

Active Block Duration is duration when enemy attack can be parried

Parry Pause Duration is duration during enemy attack pause after he being parried.

Impact Rate allows character to play Next Hit Impact Montage after being hit.

Combo Montages Section:



Attack Variants - System will pick from this attacks randomy

Automatic Impacts - works when attack comes from the front of the character. Otherwise Impact animation will be played based on attack direction. This allows to make impacts more realstic.



Snap To Target And Snap Distance - attacker will be moved to it's opponent at it's distance once attack is played and snap is enabled.

Hit Type - this setting used for Damage Dealing system. We have different damages for punch and kick.

Hit Side - Position of enemy that we are hitting with our attack. Left part of body or right.

Can Be Interrupted - well ... some attacks can be interrupted from the side hit. To make attack permantn uncheck this.

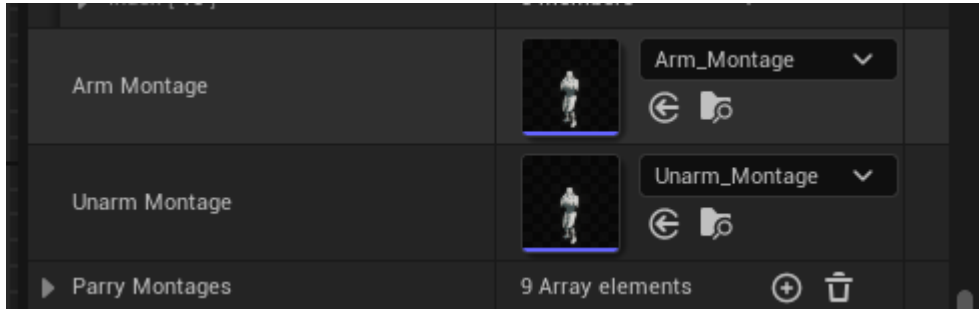
Impact Montages Section

Impact Montages		16 Array elements
▼ Index [0]		8 members
Hit Body Part	Head	
Impact Default Direction	Forward	
Hit Side	Left	
Hit Type	Punch	
Montage Armed	 HitHead_LBottom_	
Montage Aim	 HitHead_LB_Aim_Ir	
Start Time	0,34	
Layering	UpperBody	
▶ Index [1]		8 members
▶ Index [2]		8 members
▶ Index [3]		8 members
▶ Index [4]		8 members
▶ Index [5]		8 members
▶ Index [6]		8 members
▶ Index [7]		8 members
▶ Index [8]		8 members
▶ Index [9]		8 members
▶ Index [10]		8 members
▶ Index [11]		8 members
▶ Index [12]		8 members
▶ Index [13]		8 members
▶ Index [14]		8 members
▶ Index [15]		8 members

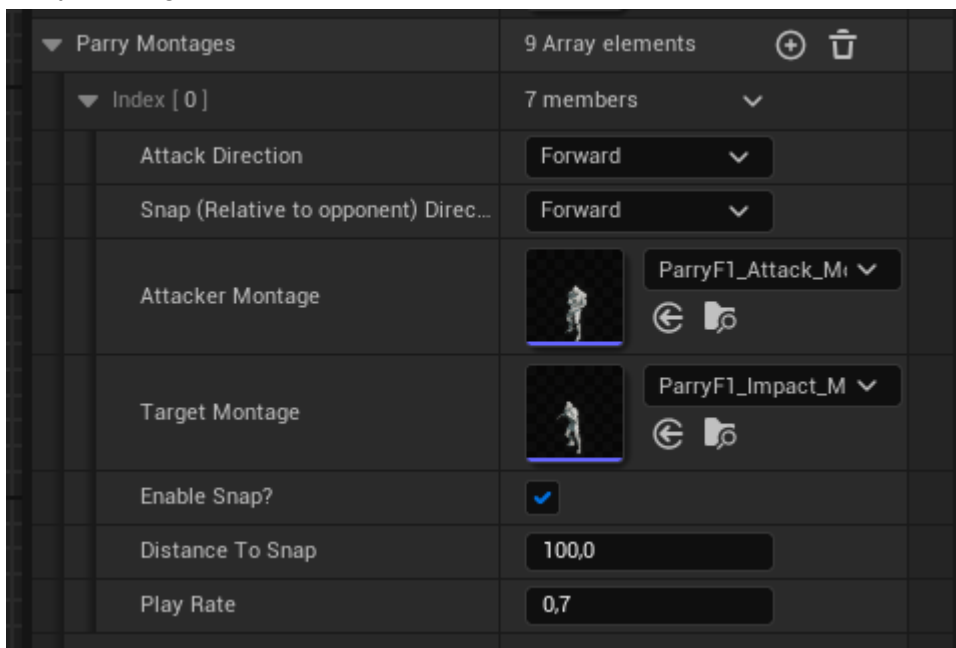
For attack in different directions i provide different impact montages.
Hit Body Part - if attack trace hit certain body part montage will be played
Impact default direction - if hit comes from this direction we play this impact.
Hit Side - attack side that our impact belongs to.
Hit Type - This impact will be played for this hit type.
Montage Armed - this hit impact will be played if character not in block
Montage Aim - this impact will be played if character is blocking
Start Time - you can move impact start time.

Layering - if character is moving only upper part of it will play this impact montage.

Arm montage for Arm and Unarm for Unarm



Parry Montages Section



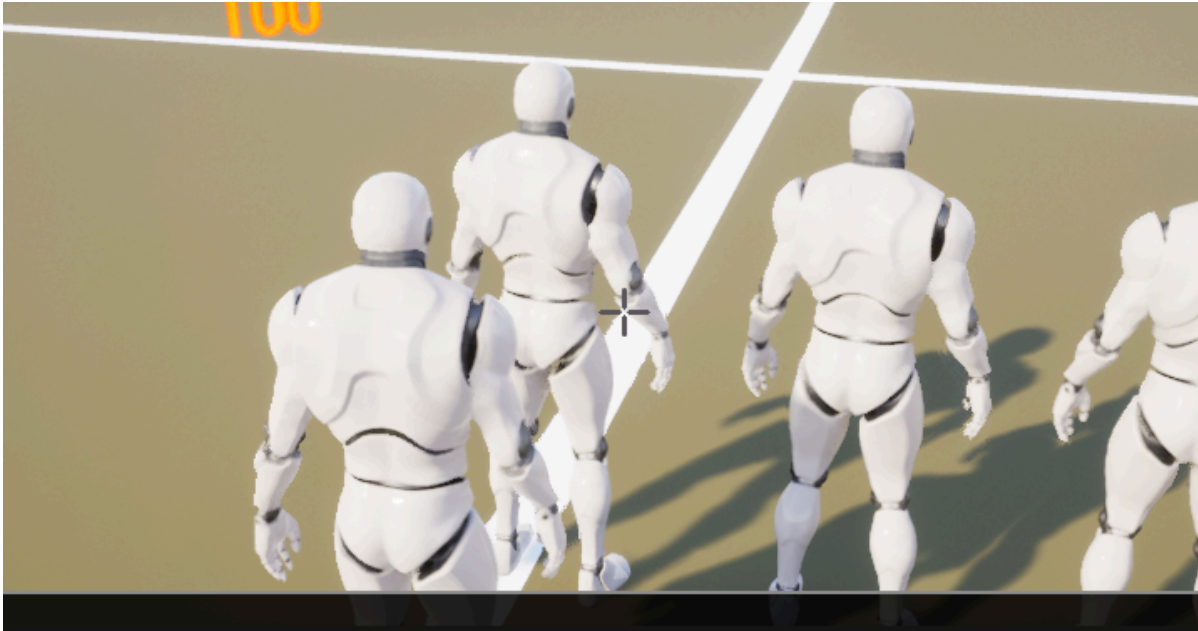
This montages played in pair on attacker and it's target.

We can specify relative direction of attacker and target during this montage.

If attack direction is forward it means that target is on forward.

Snap is the direction to snap attacker to opponent during montage.

Well ... let me explain why there are two of them, not one.



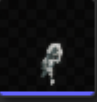




Enemy here stays on front of Us, but we, relative to enemy, stay in Back of it. So we need to Snap to enemy's Back and to keep our rotation in front.





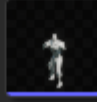





This is how it works. It's not Obvious without this simple explanation. Enable Snap and Snap Distance are for Snap itself and Play Rate is for montages play rate.

Hit Push Montages Section

Hit Push Montages	4 Array elements	 
▼ Index [0]	4 members	▼
Direction	Backward	▼
Montage	 HitBack_ImpactEv	▼  
Play Rate	1,0	
Start Time	0,35	
▶ Index [1]	4 members	▼
▶ Index [2]	4 members	▼
▶ Index [3]	4 members	▼



They played if attacker or enemy is hit from back or kicked.

Hit Reset Montages Section

Hit Reset Montages	2 Array elements	 
▼ Index [0]	7 members	▼
Hit Type	Punch	▼
Hit Side	Left	▼
Blocker Montage	 ResetAttack_Block	▼  
Opponent Montage	 ResetAttack_L_Mo	▼  
Blocker Layering	UpperBody	▼
Opponent Layering	UpperBody	▼
Play Rate	0,5	
▶ Index [1]	7 members	▼

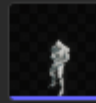
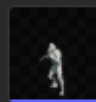
It's "Active Block" Montages. One played on attackerm one on the opponent.

Takedown Montages Section

▼ Takedown Montages	2 Array elements	⊕	🗑️
▼ Index [0]	7 members	▼	
Attack Direction	Backward	▼	
Snap (Relative to opponent) Direc...	Backward	▼	
Attacker Montage		Takedown1_Oppon	▼
Target Montage		Takedown1_Attack	▼
Enable Snap?	<input checked="" type="checkbox"/>		
Distance To Snap	100,0		
Play Rate	1,0		
▶ Index [1]	7 members	▼	

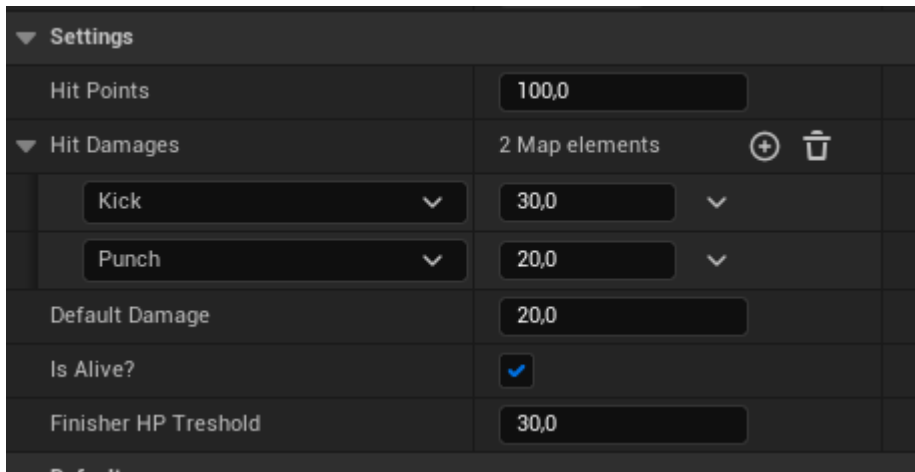
This montages used to make Takedown.

Finisher Montages Section

▼ Finisher Montages	3 Array elements	⊕	🗑️
▼ Index [0]	7 members	▼	
Attack Direction	Forward	▼	
Snap (Relative to opponent) Direc...	Forward	▼	
Attacker Montage		FinisherF1_Attack_	▼
Target Montage		FinisherF1_Impact_	▼
Enable Snap?	<input checked="" type="checkbox"/>		
Distance To Snap	100,0		
Play Rate	0,7		

If the opponent's HP is Below a certain threshold this animations will be plated as Finishers.

Stats Component

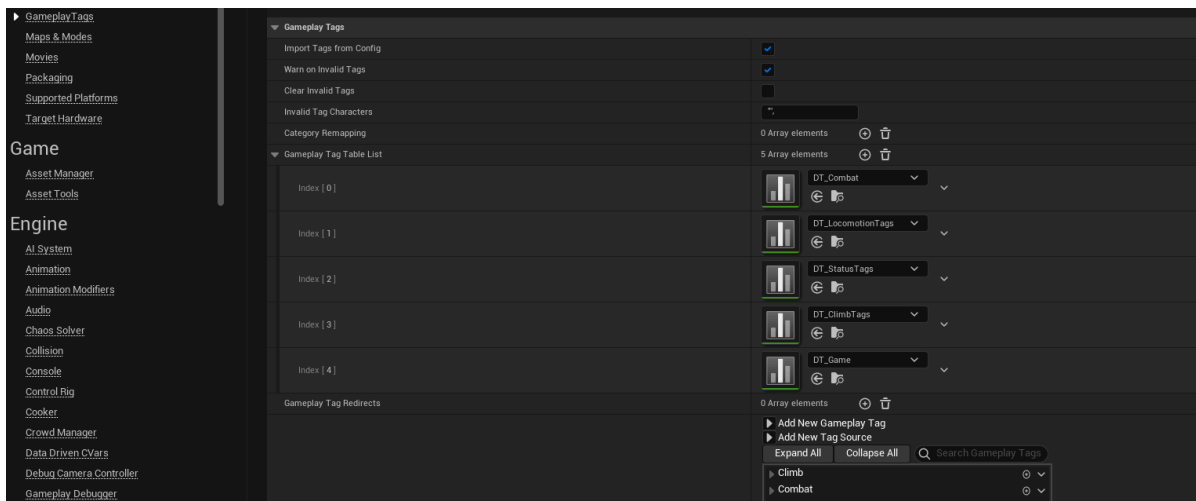


This settings allows to set damages that recived from different attacks. Finisher Hp Threshold - when character's hp is below this amount we have chance to trigger finisher from combat component montages.

Actor Tags Component

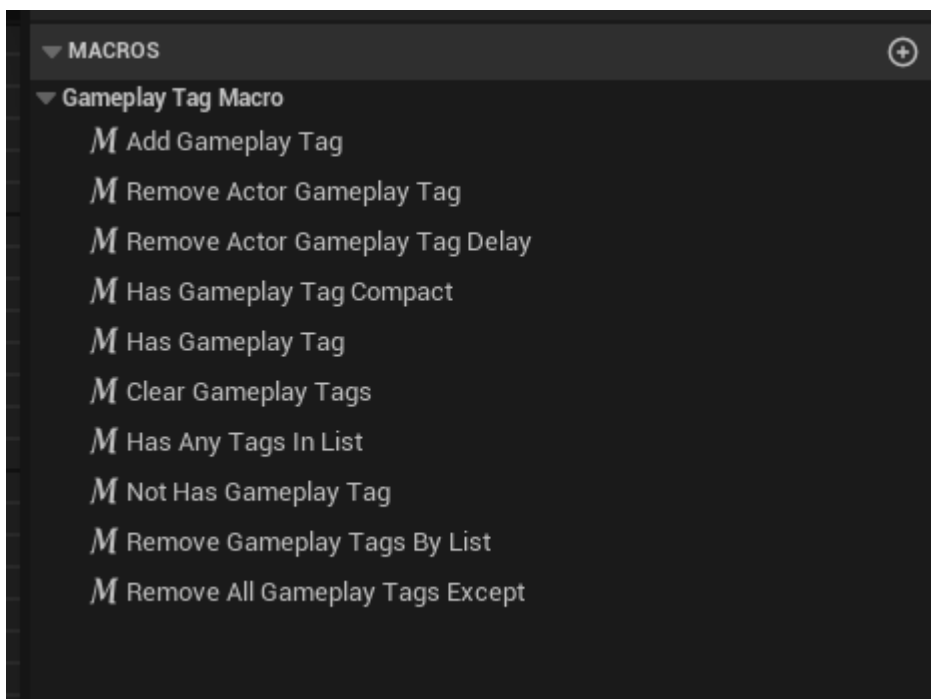
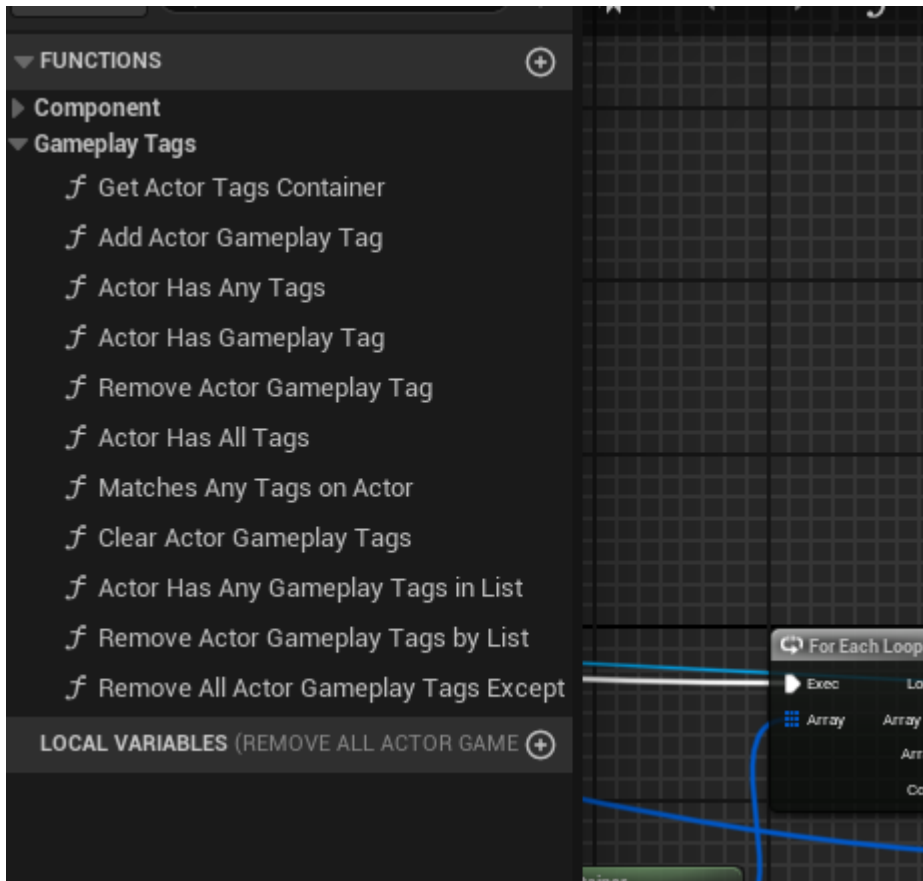
Does Not have any settings, it's just a bridge to integrate Gameplay Tags features into this project.

Gameplay Tags are set in Project Settings, here:



By editing this data-tables you can add or remove necessary tags.

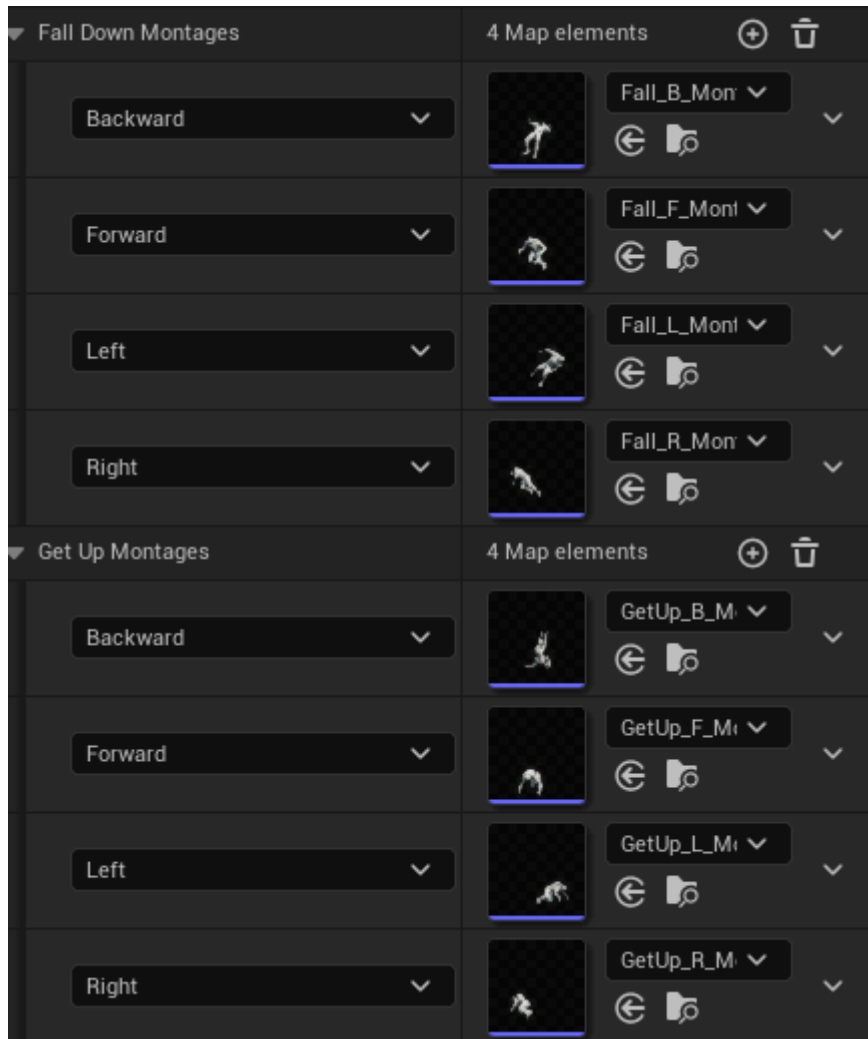
Also component has connected to it function library and number of macro setups:



Collisions Component

This component used to work with collisions and ragdolls. It has number of functions to enter-exit ragdoll and change/restore collision profiles.

It's settings are:



These settings are used for directional fall-down and get-up during ragdoll.

Simple Motion Warping Component

This component works as interface and does not provide any settings.

Main idea behind this component is to snap character to it's target using functions or notifies.

Component has macro library with access to this macro setups:



and notify state that called inside animations to snap character on it's durection:

