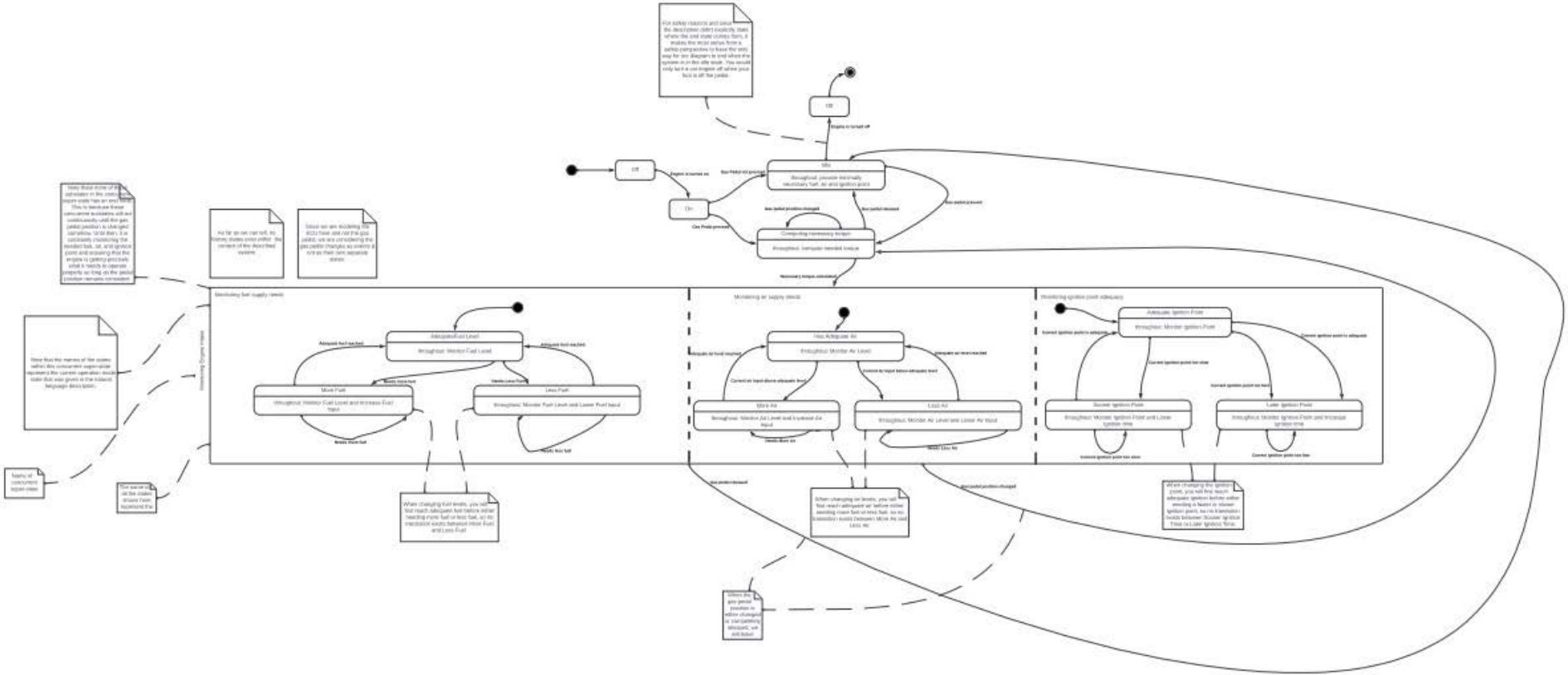
For safety reasons and since the description didn't explicitly state where the end state comes from, it makes the most sense from a safety perspective to have the only way for our diagram to end when the system is in the idle state. You would only turn a car engine off when your foot is off the pedal.
Off
Engine is turned off
Off
Engine is turned on
On
Idle
throughout: provide internally necessary fuel, air and ignition point
Gas Pedal not pressed
Gas pedal pressed
Gas pedal position changed
Gas pedal released
Gas Pedal pressed
Computing necessary torque
throughout: computer needed torque
Necessary torque calculated
Note that none of the substates in this state machine state has an end state. This is because these concurrent substates will end continuously until the gas pedal position is changed (semi-idle). Until then, it is continually monitoring the needed fuel, air, and ignition point and ensuring that the engine is getting precisely what it needs to operate properly so long as the pedal position remains consistent.
As far as we can tell, no known states exist within the context of the described system.
Since we are modeling the ECU here and not the gas pedal, we are considering the gas pedal changes as events and not as their own separate states.
Monitoring Engine Intake
Monitoring fuel supply needs
Adequate Fuel Level
throughout: Monitor Fuel Level
Adequate fuel reached
Adequate fuel reached
Needs more fuel
Needs Less Fuel
More Fuel
throughout: Monitor Fuel Level and increase Fuel Input
Less Fuel
throughout: Monitor Fuel Level and Lower Fuel Input
Needs more fuel
Needs less fuel
Monitoring air supply needs
Has Adequate Air
throughout: Monitor Air Level
Adequate air level reached
Adequate air level reached
Current air input above adequate level
Current air input below adequate level
More Air
throughout: Monitor Air Level and Increase Air Input
Less Air
throughout: Monitor Air Level and Lower Air Input
Needs More Air
Needs Less Air
Monitoring ignition point adequacy
Adequate Ignition Point
throughout: Monitor Ignition Point
Current ignition point is adequate
Current ignition point to adequate
Current ignition point too close
Current ignition point too late
Current ignition point too late
Sooner Ignition Point
throughout: Monitor Ignition Point and Lower Ignition time
Later Ignition Point
throughout: Monitor Ignition Point and Increase Ignition time
Current ignition point too close
Current ignition point too late
Gas pedal position changed
Gas pedal released
Name of concurrent super-state
This name is as the states shown here represent the
When changing fuel levels, you will first reach Adequate fuel before either needing more fuel or less fuel, so no mechanic exists between More Fuel and Less Fuel
When changing air levels, you will first reach adequate air before either needing more fuel or less fuel, so no mechanic exists between More Air and Less Air
When changing the ignition point, you will first reach adequate ignition before either needing a faster or slower ignition point, so no transition exists between Sooner Ignition Time or Later Ignition Time.
Unless the gas pedal position is either changed or start pattering released, we will loop