I, Game & Robot Hackathon

AI-Land Mobile Game

Game Feature Design

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Game flow

Typical game flow will be linear. Players will be given a portion of the narrative, **which would be a reason to do missions**, and once the mission is over the same basic sequence will happen with some new challenges to keep the game interesting.

Scattered between the usual game flow conventions will be special set pieces, which will behave as a buffer between challenges in the main plot and will mostly house a cutscene, or fleshing out plot. **They will occur once something unexpected on the road, or in case of new thing introduction.**

The main flow of the game is that a player does missions, and while doing this it teaches the NEV robo-vehicle new skills, as he is responsible for supervising the tests of newly-designed robo-vehicles, **which target to be fully autonomous.**

The game starts with presenting a main goal to the player. As mentioned it would be displayed on the main screen as a sequence of monolog/dialog between the in-game character AI-developer being the narrator in the game and between the player.

In a series of cutscenes the game's environment will be presented to the player so the following: garage's view, map view and a mission's view, wallet's view and social's view.

An exception is when it comes to the activities of the enemies. That part will be hidden from the player until it happened for a first time, and even in that case, not whole explanation should be revealed to the player at once, but rather step by step while progressing with the game

That way it would be a surprise for the player to see that something is going on, and also start looking for a mitigations of the bad impact they have on the whole progress in the game.

Player roles

Inventor

Be a creator, invent items following the NEV robo-vehicle standard, produce unique, good quality items for wider audience which may be used in new missions.
In this role, the player can use external tool for modifying the NEV robo-vehicle in the shape, core functionalities, interior, exterior excluding “not-changeable” elements, be rewarded with a $AUT tokens

Designer

Be a designer, play with colors, graphics, create artistic style, recognizable personal label, be rewarded with a $AUT tokens

Game modes

- **single mode (default),** 500 $AUT at start for a player
- **shared mode** - shared with friends or strangers via a link, a QR code or by inviting a player from the list (the list of active players should be available on the social view's screen) 500 $AUT at start for each player

shared mode

As the main idea is to **keep skills and resources through the gameplay and transfer them to σther ones**, that mode will differ from the default one with **the amount of resources and skills available. But as in default mode they have to balance how they use them as they work as a team,** so it could happen that sometimes instead of buying some tools to do a step on its own, it would be good to "rent" an item or even "implement" a skill from a co-player (for a lower amount)

From game's design perspective it would only mean that more missions available on the map will be required to choose from, as all players in a shared game mode will do their missions in a specific district of the city on their own.

So each uses their own board to play on, and they **can communicate during the gameplay via chat.**

To cut expenses during their separate missions they can talk to each other and decide what to buy (if they both miss this item) and what to rent from each other instead, and keep funds for other fancy things like buying unique skins for their the NEV robo-vehicle or lucrative buildings in the city (more later)

Next benefit of shared gameplay is that once finished the mission and watched the video-recording of the mission and in case of mission's failure both players can request a missing skill (for a small fee) from the co-player (on condition that the co-player owns it) to avoid the need to repeat the steps (so quicker progress).

Last but not least benefit from shared playing is that in case of being stopped (more about this later) the another player can switch to other's player mode and complete the mission instead (with keeping all the skills and resources gained) so the gameplay is not stopped but it may continue anyway.

The different skills, levels of autonomy, $AUT tokens possessed or elements collected don't impact the other players possibility to engage. So a player from level 0 can potentially play with a player from level 4.

Both game modes can turn into the other one any time during the gameplay. In such case the players resources are recalculated accordingly (more below)

They don't differ much from each other when it comes to the background and views (a map or a mission view).

One change will be in social view which includes a chat, and a preview of partners' wallets.

Game flow - Mission

From the map view screen a player taps on the marker to enter the mission's view.

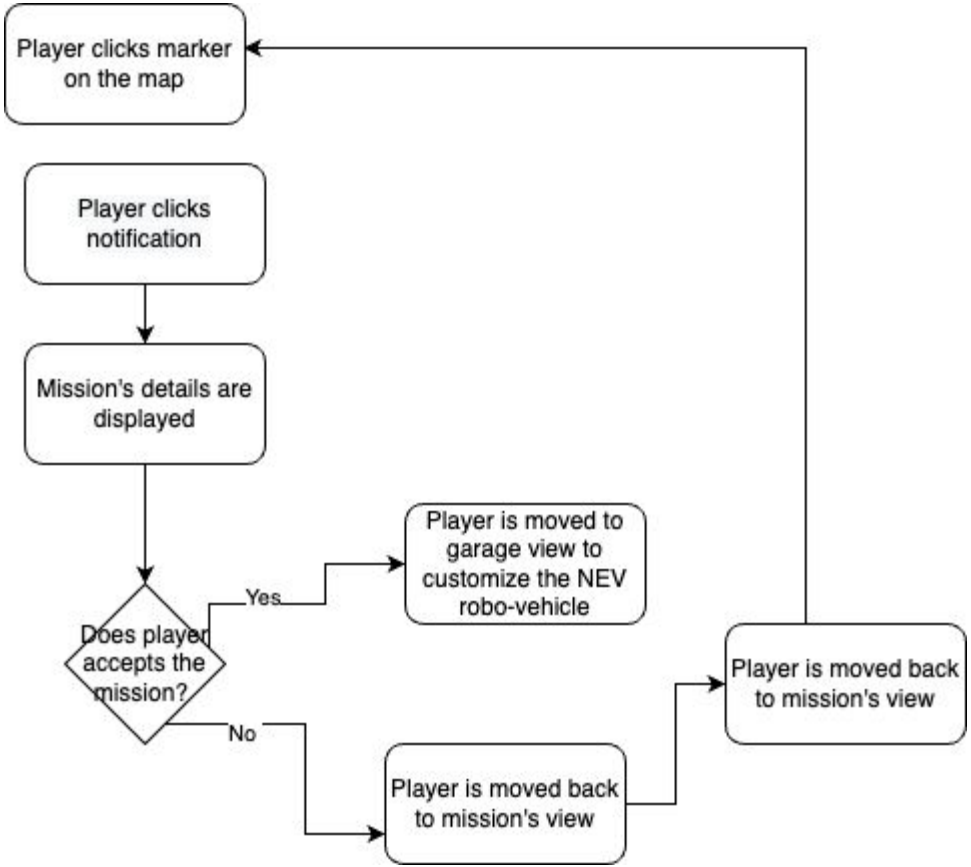
Then once mission's view is opened they can see a notification on the right corner and once taped on this the missions details are displayed. **They include the mission's description and the mission's prerequisites (the NEV robo-vehicle customization required). An example below:**

In point A, you need to pick up the drugs and deliver these to the chemist, the prerequisite is to maintain 7 Celsius degrees inside the trunk. You need to install these cooling items in your trunk. There are roadworks in the city, so the road may be not perfect so you need better tires and a extra car wheel.

It may happen, though, that a player receives an incomplete message or/and something changed at the latest moment, or something happens in the city and other customizations will be needed during the gameplay. In such case a player will react accordingly (update the NEV robo-vehicle settings), similarly when it comes to the case where the players can't afford for the things they need and need to collect some $AUT tokens from city's resources first) **Player has then the freedom to accept by taping a "start mission" button or back to the map's view and choose another mission***

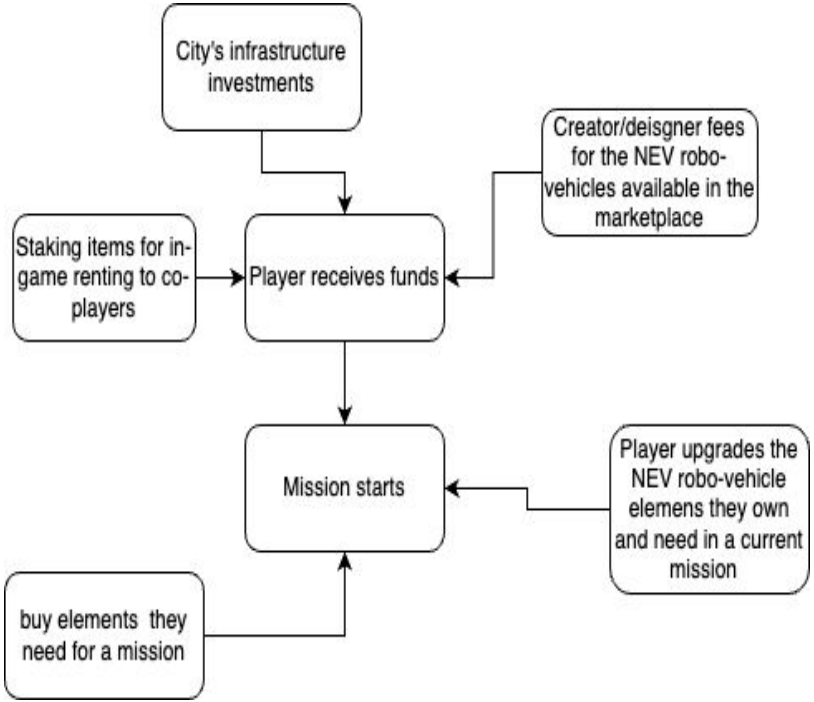
In core game mechanics there is not timeframe for the mission. But there are the wait time for the investments to give profits (to have the token resources)

**It means that the mission still needs to be done in the future , so it's not about skipping the mission but postponing it on time*


Player clicks marker on the map
Player clicks notification
Mission's details are displayed
Does player accepts the mission?
Yes
Player is moved to garage view to customize the NEV robo-vehicle
No
Player is moved back to mission's view
Player is moved back to mission's view

Before each mission a player collects the funds from their investments (city's infrastructure, creating fees, offering items for renting). It happens automatically, the funds are added to the player's wallet with a notification being sent. Depending on the investments the return from them may vary between 5-15% per AI infrastructure items (more about infrastructure flow later)

eg. BTS 15%, solar panel 10%, sensor 5%, chagrin station 20%

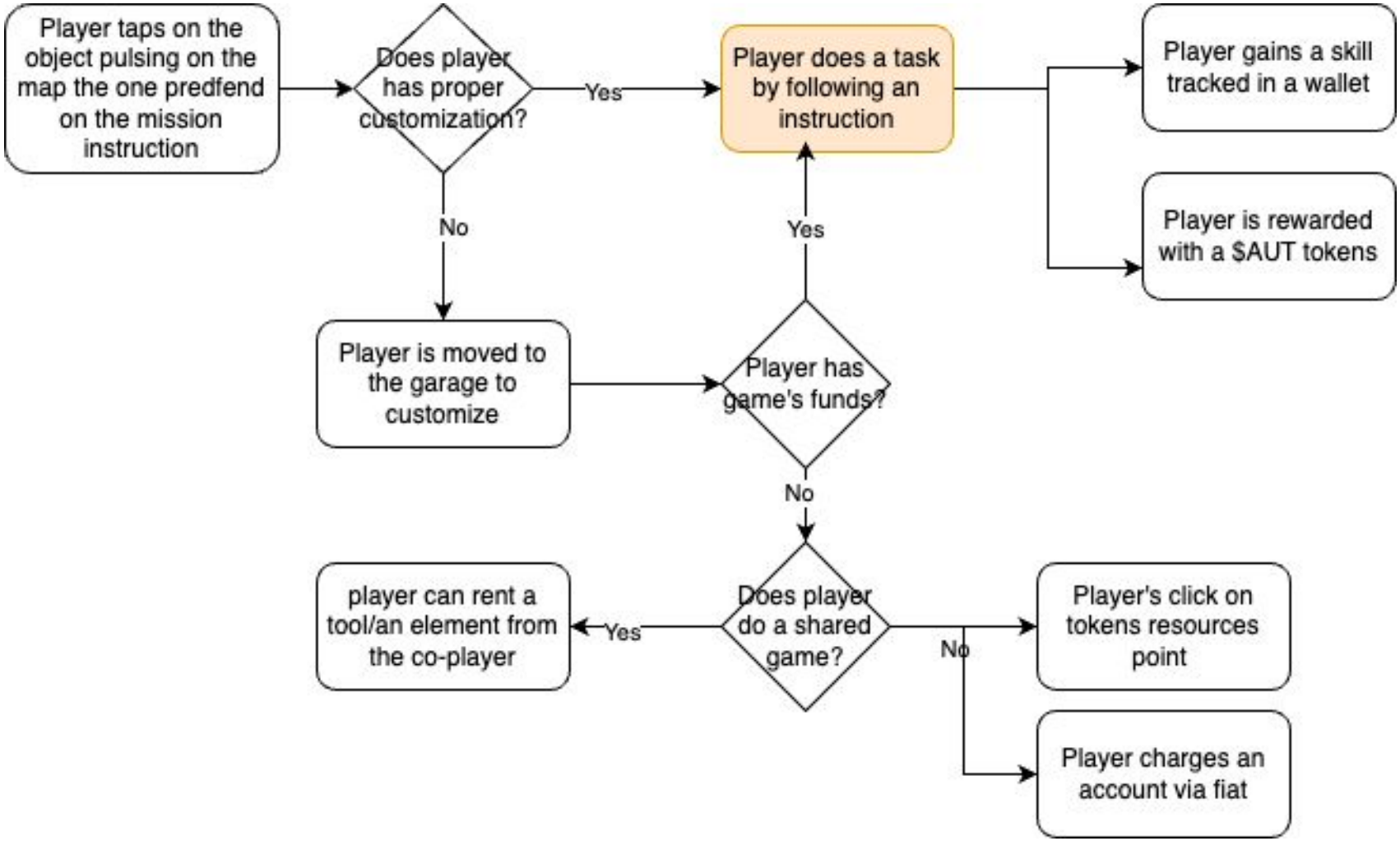


During the mission collecting funds may be only from city's infrastructure or renting elements to other players and it happen by tapping funds' source visible on the board or by accepting a request to rent a thing from different player.

Each skill acquired decreases energy. It's around 15-20% per skill, so it means that they player needs to recharge the NEV robo-vehicle few times during a mission. To costs around 50 $AUT and means waits time.

But each step a player takes on the board is counted as a new skill, eg. going straight, turning left, turning right, reversing, accelerating, overtaking, packing, unpacking, opening/closing the door/roof/window, updating internal mode, customizing, pulling up, reacting to pedestrians, animals, cyclist, driving on roundabout, reacting to traffic lights, road signs.

The number of skills to acquire during a mission may vary but **that should be around 15 per board**.


Player taps on the object pulsing on the map the one predfend on the mission instruction
Does player has proper customization?
Yes
No
Player does a task by following an instruction
Player gains a skill tracked in a wallet
Player is rewarded with a $AUT tokens
Player is moved to the garage to customize
Player has game's funds?
Yes
No
player can rent a tool/an element from the co-player
Yes
Does player do a shared game?
No
Player's click on tokens resources point
Player charges an account via fiat

Game Flow - Player

On board's view:

Player starts a game with 100 $AUT tokens to be able to buy items and do a trial mission, later in the game it depends on player's incomes through acquiring skills and investing in a city's infrastructure. Then player drives through the city following on-board instructions.

These are the things a player needs to do on each board:
- get from point a to point b
- react to the changing circumstances (customize the NEV robo-vehicle on demand)
- build city infrastructure
- recharge energy
- collect funds from resources available with a wait times

In player's wallet:

Wallet is available on the right top of each view.

Amount of $AUT tokens is displayed

All investments' summary with the total amount to collect per each mission

There is a button to connect your blockchain wallet and top up your game account (buy $AUT in-game tokens) and withdrawn earned funds

In social's view

button to create a request for a missing skill

list of available/active players to invite them to the game

a panel to generate a link or a qr code to invite friends to join the game

Game Flow - Completing Mission

Once completed all inside steps, a player is moved to the garage's view. It's announced before via pop-up.

Then, in the garage, the the AI-developer's clicks the button on his screen to enable the NEV robo-vehicle self-mode and both him and a player then watches a video recording of the completed mission.

For the gameplay it means that a players tests what he taught the robo-vehicle and checks if it achieves the autonomy to do this specific sequence of steps (=repeat this mission).

In most cases it goes smoothly and is finished **by a green checkmark** on the screen of AI-developer) and the ability to move forward for the player.

In some cases, though, that's **the place where the opponents of the player takes their places and stops the player***

The user is informed about this in a following way:

while watching a video-recording, they notice that the sequence of the steps is different, eg. there is a fallen tree on the road, or a new sign has been added, or there is a huge hole in the road, or there is a detour, or a sensor is missing,

**more on this in opposition mechanics.*

and **the NEV robo-vehicle stops as it's not able to continue, and the red cross is displayed on the screen.**

It's not very clear for the player from the scratch what's the origin of those problems as mentioned, as they have a "what's going on impression", and think at the beginning that these are only the random events, but after a while they discovered (by discussing with an AI-developer)

The AI-developer being a narrator, in-game suggested it and **since then the narrative is like that**. Since then the final result of the mission is also unknown as it happens randomly and it's a built in-game mechanism, but the origin of it, for the player, is known.

With missions failure a player **fails to achieve a new level of autonomy, has to pay a “fine” 100 $AUT has to teach the vehicle the skills missed.**

There are two ways to proceed in such case:

- **tap button on the garage’s view screen** to repeat the mission and then the player is moved to the mission’s view
- **request a missing skill from the co-playe**r (only available in a shared mode) by creating a request in a social view panel

Game Flow - Limitations

- element consumption limit (more in marketplace view's description)
- time waits
- energy level decrease and the need to recharge on charging station or buy dollar panels to be installed on the NEV robo-vehicle
- $ AUT tokens decrease while boying/paying fines etc.

Examples of tasks to be implemented on levels

- picking up a child to a school
- delivering a coffee
- delivering groceries
- delivering ice-creams
- picking up a person on the wheelchair
- picking up a passenger to the train/airplane
- letter/package delivery
- top secret letter/package delivery
- medicaments deliver
- organs delivery to the hospital
- a blood delivery
-

Examples of tasks

- manage vehicle turns
- react on the traffic lights
- break
- object detection
- accelerate
- control the inner temperature
- adjust speed to weather condition
- stops on pedestrian crossing
- emergency braking
- detect the lines on the road
- detect signs
- detect parking lot
- overtaking the object/vehicles
- open doors
- turn on/off the lift

Game’s core functions

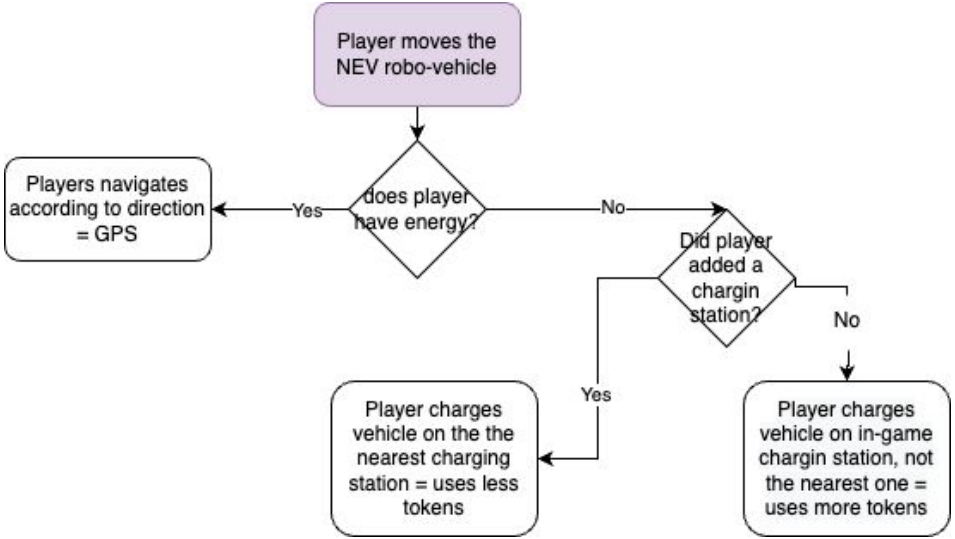
[Core] - Driving by car and completing a mission (=learning a specific task)

The game consists of missions and skills.

The missions have different levels of complexity depending on the road conditions and task complexity. As the the main goal is to make the NEV-vehicle fully autonomous which will be able to complete daily tasks on its own, the player needs to teach it all the roads and all configurations in the city and how to customise itself to do the specific tasks and (so to become immune to the enemies' activities by default)

So Eg. at the beginning the NEV-vehicle requires player's control, so the player is within the vehicle, and once a section of the road is done successfully it means that the NEV robo-vehicle gains a bunch of new skills and is able to repeat the road A to B all by himself, and progresses on the road to be fully autonomous.

Each skills mentioned at the beginning is recorded at the player's wallet, and those are the skills they can also share with other players (awarded with some $AUT tokens)



[Core] - Vehicle's customization

Each mission is announced/showed with the prerequisite to complete it. It basically means that the player needs to have the sufficient funds to buy the elements (=learn the vehicle to customize itself)

Some customization are visual only and are called skins. They can be done so to express the mood, style of the NEV robo-vehicle, increase it's uniqueness and then even sell to other players.

The player can customize both the NEV robo-vehicle in general, and also prepare small designs of elements - colors, artistic style, exterior or interior design etc, varying according to player's role.

Exterior customization

- Grille - the better grille the better cooling for the batteries and cpu's
- A pillar
- Roof - assemble the railings to extend the functionality for example for additional trunk space
- Roof line - Possible to install additional lights
- C pillar - possible to assemble additional transporting items
- WheelHub cover
- Fender - covers all suspension components
- Front wind shield - to generate more energy from solar panels which are installed in the wind, protection features against rays, opacity to change interior visibility
- solar panels - connected to the game's enhanced mechanics as it enables to move without the need to stop for charging
- Hood - better access to the engine, allows to add additional cooling
- Bumper - assembly of additional features, like a bulldozer for removing the snow from the road or helping in the road work, which helps to move other cars when the car is stuck into the ground
- Door panel - different types of doors(wide, sliding), needed for a specific mission
- Side window

Interior customization

- interactive mood lights -
- dashboard
- HUD - displays differents information about the current situation on the road, AI control percentage, current speed, engine params
- game consoles
- internal equipment - umbrella, table, heating
- temperature - can be adjusted to specific mission
- internal design - comfortable chairs
- inner space - can be modified to transport people, large-sized furniture, liquids, packages, som times specific items needs special environment

Embeded systems

- heating system - crucial to maintain the level of temperature inside the vehicle
- gps system - needed to shows the path to the point
- Road trackers - collecting data for ai learning
- ai data collector - collecting events which happens around the car
- object detector - detecting items which are on the road, vehicle can break if it is needed or accelerate or turn
- collision system - emergency breaking
- driving system -
- engine sensors
- sensors for measure endurance items

Drivers

- New software
- Software upgrades
- increase item endurance

Additional Features

- Different batteries capacity
- Fridge
- winch
- hook
- bulldozer
- scrubber
- energy generator - apply the energy to different objects
- solar panels
- Faraday cage - outer user doesn't have an connection to the items which are inside the vehicle
- safe encrypted WiFi
- antivirus
- better protection level

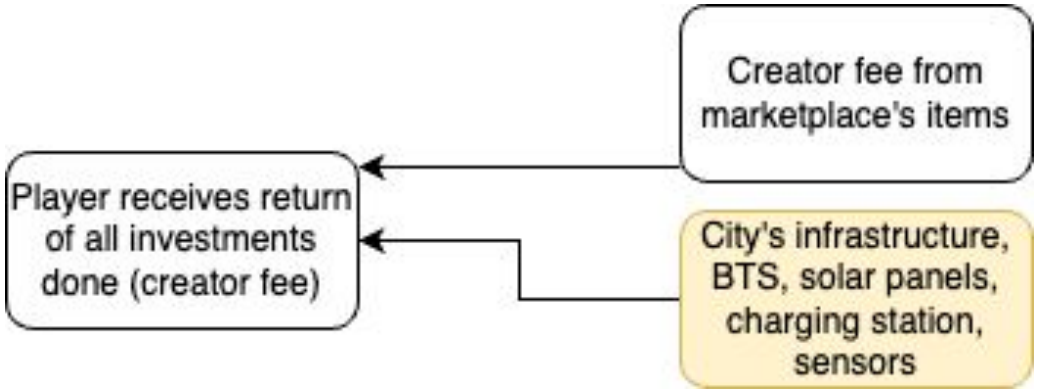
[CORE] - Sharing

- **your skills with other players** (as explained in a shared game's mode)
- **your ownership of the NEV robo-vehicle, its elements and the design** (depending on the player's mode)

Selling the things you created and/or don't need anymore, or renting them for a predefined period of time to help them while playing a game. The idea is that renting or buying the things from other players will be cheaper than buying the things offered by default on the marketplace. Also renting enables progressing when you run out of the money.

[CORE] - Idle

The player gets a fee for the AI infrastructure items they invested or the NEV robo-vehicles designs they created even while being away from keyboard. It calculates automatically and is being added to the player's wallet.



[CORE] Building AI-infrastructure

The idea behind is that to proceed AI needs many sources of knowledge to work mainly sensors and BTS station, while the NEV robo-vehicle needs an energy (charging station and solar panels)
Also the idea is that with a new release of more reliable and trustworthy items, the price increases so it basically means level by level.

There are 4 types of infrastructure items available on the marketplace to be bought, varying by the price and the return on investments

- sensors costs 10 $AUT, return 4%
- bts stations costs 25 $AUT, return 8%
- solar panels costs 30 $AUT, return 10%
- charging stations costs 40 $AUT, return 12%

They should be placed on the predefined places on the board (the player is informed via pulsing point on the board and the popups)

A player is required to place them during each mission on each board and cannot move forward without

They are available only on marketplace and cannot be shared by co-players

Alternate Mechanics

[ALT] Solving riddles as a phone call to a friend (an AI-developer)

A player can teach the NEV robo-vehicle a new skill by only implementing a proper software/fixing a bug which is done by solving different-levels puzzles which may be something like sudoku, maze, or similar.

Enhanced Mechanics

- Driving with a higher speed

  Initialy the NEV robo-vehicle is not very fast
- Driving for a longer time

  At the beginning the time to do a task without the need to load the energy is not very long.
- Independence on the current charging stations
- Independence of the external Internet resources

  You have own source of the internet, it is your own safe, protected infrastructure, you can provide it to the other users
- Higher protection on the hacker attacks and viruses

  the latests software upgrades, antivirus programs etc.

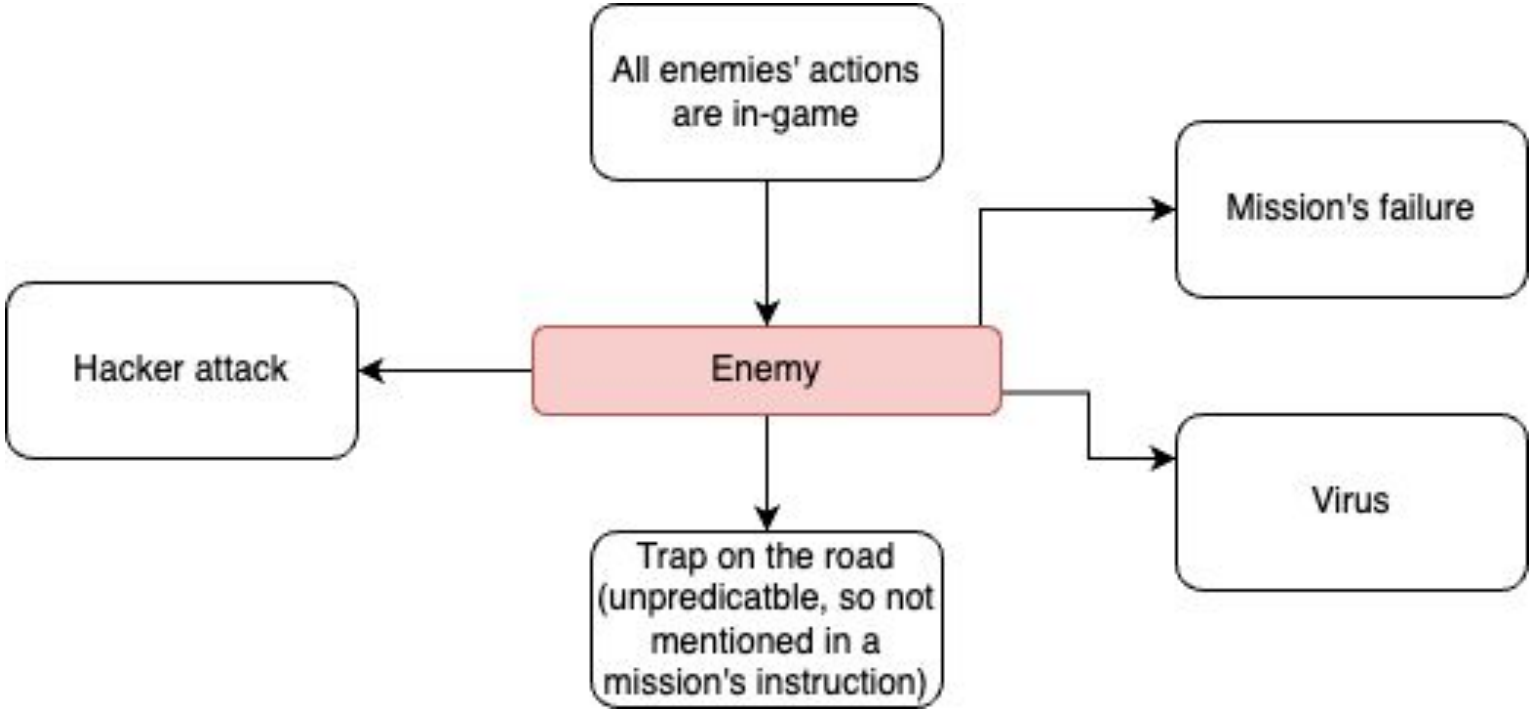
Opposition Mechanics

Enemies Flow

Destroying player's efforts to progress on the way of teaching the NEV robo-vehicle is the one of the main activities the in-game bots (enemies) do.

The way they do this, means that while progressing with the skills a player become more immunised to them (by default), as skills gained from previous missions eg. reacting to a fallen tree can be used while doing a self-mode in a future missions, even if this element was not the initial part of the mission. (Eg. a player completes a mission without a fallen tree, then the video shows how the robo-vehicle avoids the obstacle whether) and level up to a new missionl.

but on the other hand, each level the enemies are smarter and make new obstacles.


All enemies' actions are in-game
Mission's failure
Hacker attack
Enemy
Virus
Trap on the road (unpredicatble, so not mentioned in a mission's instruction)

Other tools in the hands of enemies are: **sending a virus or attacking the NEV robo-vehicle software.**

Getting a virus means that the help of the AI-developer is needed which costs some amount of $AUT token (~250$) and adds a time wait (around 10min)

Being hacked basically means than the player stops the game and need to recover (around 1 day)/or in other version they could also be a game over.

Hacker attack don't happen often and there could be few countermeasures which may be taken to both a virus, and an attack in order to prevent it.

Virus and hacker attack' countermeasures:

Against virus:

buy at the marketplace and upgrade the software, which is expensive (-$150 AUT) but the prevention is high

Against hacker attack:

the only way to progress anyway is to replace the attacked player by the co-player which does a mission instead.

All skills and tokens gained such way are saved to the co-player account as a reward for being helpful, but both attacked player and a player are able to complete the mission and increase the level once done successfully

Overtaking some embedded systems

Some more tools would be “road obstacles”, with definite list of examples below, which may be used in a place of “final” mission’s failure:

- The hacker can take control over the heating system and directs to break transported products, like unfreeze fruits, heating the vaccines, melting the plastic products, which ends up with the fine for the user 150 $AUT and the need to repeat the steps
- Overtaking GPS system to direct the player to wrong location (same as above)

Interaction instruction

&

core UI design

Tutorial

The game's tutorial should be the contextual, step-by-step lessons.

That way, the players can be instructed with pointers and text lines, which are not too long, they quickly explained what's going on. This talkative helper, AI-developer is a person, who guides the player through.
As players uncover new features, the tutorial continues. Every time a new booster, obstacle, or something else new appears on the board, the game explains them. This way, players don't need to figure out their purposes on their own,

it’s happening via chatting with a in-game friend, AI developer. Every time they complete a tutorial action, players earn extra resources and currency. This makes their tutorial actions feel worthwhile.

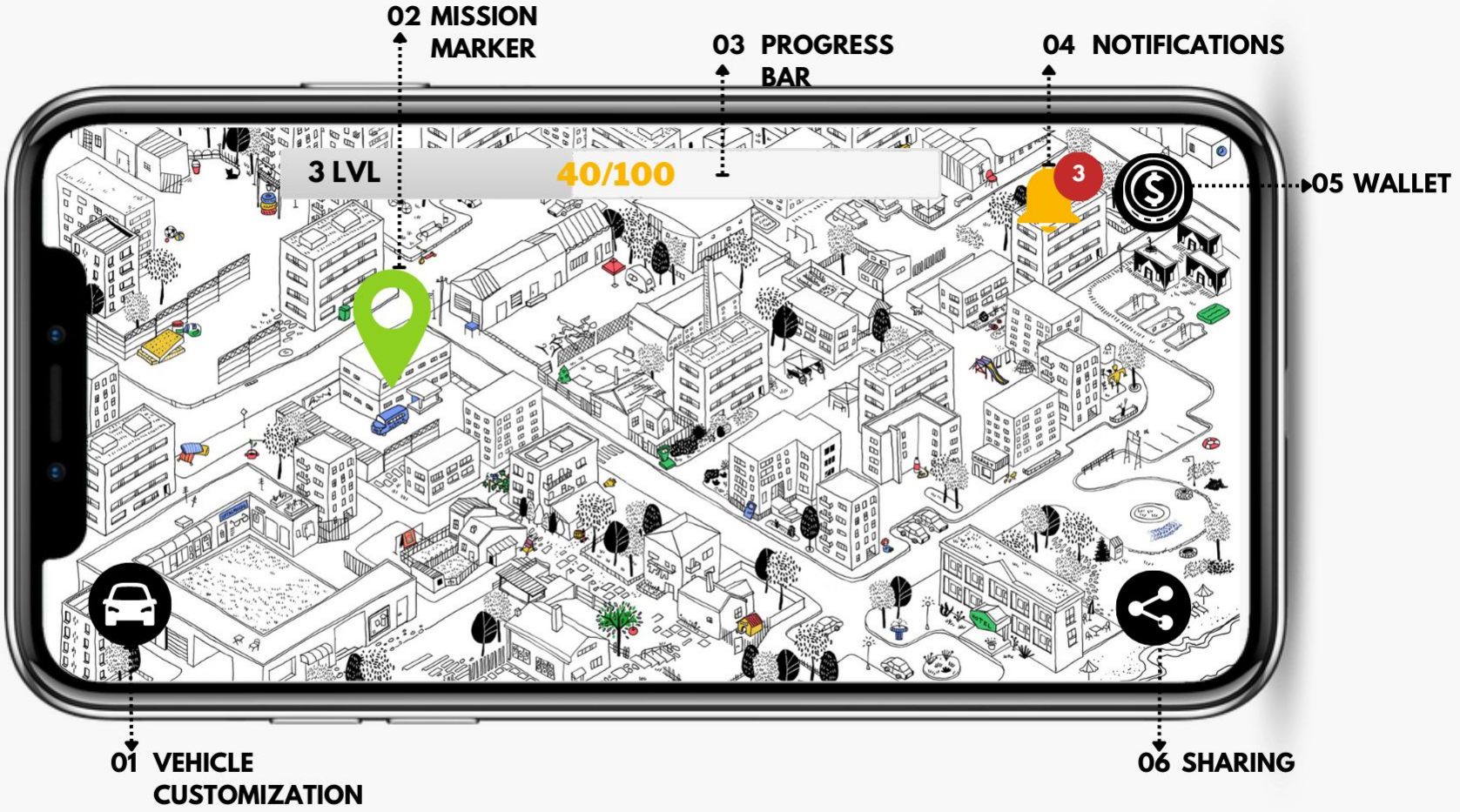
While progressing the game, the less and less instructions are displayed as the player knows what to do. There is still a ph there is not need to

Core UI design

Map View

The whole city will be viewed from directly above and presented like a map, then each mission would be presented there as pin of the map, and the plan would be updated automatically while player progresses with the main objective.

Then an each mission, handled in a different place in the city would be displayed as a more detailed view including all city facilities (buildings, roads, people, bridges, traffic lights and road signs, lights, pedestrians, other vehicles, bins etc)



Pressing a pin on the map's view redirects to a mission's view and enables a player to reach a detailed view

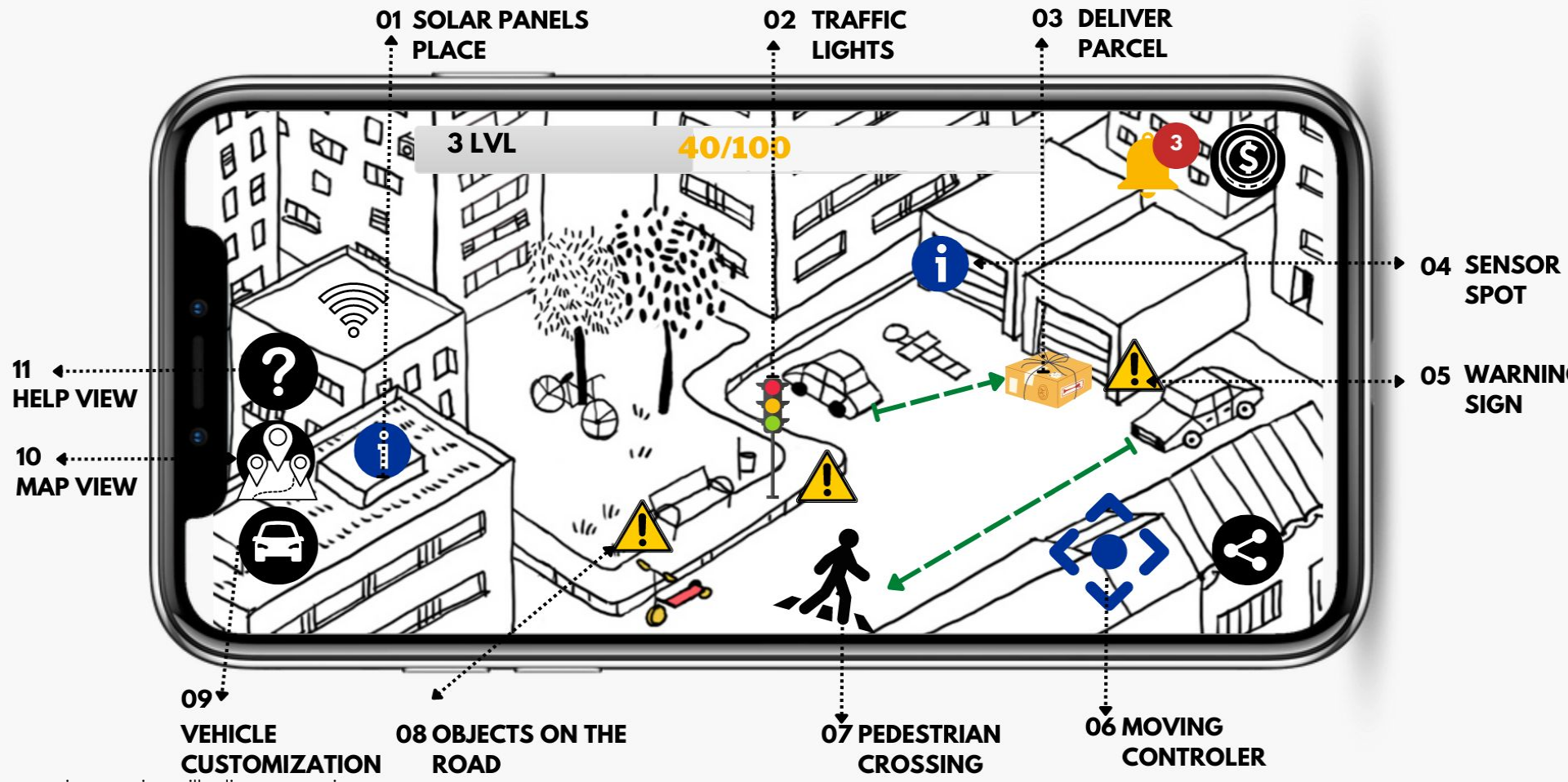
Resources:
Diana Stanciulescu

Mission View

The top right corner shows you how well the playing is doing in terms of the game's currency: the &AUT token. At the top middle of the screen, you can see how many **wheels(or any other indicator of the skills** you collected). It works as a **progress bar** to let you know how much more it takes to level up.

The bottom right is where you can get **social, invite other players to the game, share on social media/stream on different channels, or chat with a co-player in a shared mode.**

In the bottom left corner, there are is a garage icon, a map icon an a help icon. This is where the player gets everything to progress, uses a garage to customize vehicle, get some hints or return to map view.



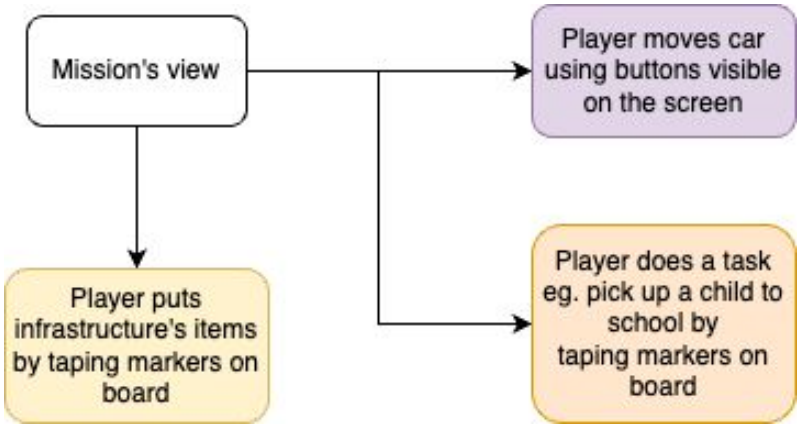
- pressing a map icon will redirect to map view
- pressing car button open a marketplace to choose NEV robo-vehicle items.

Resources:
Diana Stanciulescu

The screen will scroll left/right/top/bottom as the player's vehicle, so that the view is kept approximately centered. The screen will not tilt or rotate but it would be possible to zoom in/zoom out so to do the moves which require more precision. The screen will also zoom in/zoom out automatically depending on the action, eg. it can zoom in, if the players approaches the obstacle on the road, or zoom out when they only needs to go straight.

Controls

- pressing left/right buttons to turn left/right,
- pressing a gas button to start the robo-vehicle
- pressing a break button to stop the robo-vehicle
- pressing a phone button to connect with a AI-developer to get directions/clues to the following
- pressing a wallet button to show account details (token, skills recording and level of autonomy)



Garage View

- a board with a list of skills acquired
- board with elements owned and be up to use
- button to marketplace to buy missing elements
- main view with the NEV robo-vehicle
- AI developer computers' desk

Marketplace View

- Selling/Buying/Renting vehicle items
  - each item has metadata:
    - total number of uses
    - level on which it can be used
    - total number of possible uses
    - price in $AUT tokens depending on level
- Buying/selling vehicles
- Buying/selling skins (vehicles' visual improvements)

[UI] Pop-ups

They are the continuation of the initial tutorial, but are displayed during the gameplay, they don't take the whole screen width, but are small and shows above the place they indicate. and are the the hints to the player's or an explanation of what happens, what to do next, etc.

[UI] Token

A skill acquired by a player or a player's return of investments would be awarded by the $AUT token, it's visible **as a progress indicator in the center at the top of each view** (and in the wallet's view)
It can be presented as a wheels (to keep the rob-vehicle's concept) or any other indicator which fits.
It goes with a level number a player is on.