

M1.2 Idea Journal

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Idea 1- Data& Platform: ecosystem for shared AV

Problem One of the biggest challenges of shared autonomous vehicles is “reliability”. Many factors may contribute to this. (1)Transportation infrastructure. When it comes to road congestion, it is hard for the system to predict the time to match the next user. (2)Limited parking. (3)Adaption. It is hard to be demand-responsive in different areas, such as from downtown to suburban.

Importance This influences mobility efficiency, which will damage the interest of both companies and users. Especially for those in emergency, failing to match a shared vehicle is suffering.

Solution Potential solution is to advocate community oriented development for a data-constrained sharing system. Each community as a unit, may connect with neighboring stations, hospitals, commercials, etc. Hope that the shared autonomous vehicles distributed within the living circle would be more reliable.

Idea 2- Data& Platform: MaaS assisting SUMP

Problem Infrastructure management, end user services, data and access to related systems.

Importance MaaS can bring new tools to analyze and monitor traffic conditions, encourage sustainable choices, expand stakeholder participation and data sharing management.

Solution (1) Commercial corporations play the role of MaaS operators; (2)The open back-end platform will be established by public entities, and APIs will be integrated; (3)MaaS can be developed and operated by the public domain, with conditional authorization to private organizations within a specific period of time.

Idea 3- Data& Platform: Blockchains to protect privacy

Problem The data privacy of private users’ mobility.

Importance To protect the safety of individuals and avoid the misuse of private data.

Solution Use Blockchains to promote data governance, reduce human intervention, and create an open environment for data sharing.

Idea 4- Urban Mobility: transit optimization based on IOT

Problem Traffic congestion and stagnant response on traffic lights.

Importance The efficiency of road traffic, especially the reliability of public transit.

Solution Based on the 5G transportation network, (1) sensors on the bus station should be leveraged to monitor the real-time awaiting individuals and optimize the frequency of public transit; (2) sensors on the vehicles should give feedback to intelligently control traffic signals, and ensure the priority of public transportation.

Idea 5- Urban Mobility: wearable device for elders’ safety

Problem Elders with lower perception to surroundings may be dangerous to be exposed to road traffic, no guardians.

Importance Individual safety and maintenance of smooth traffic.

Solution Elders wear intelligent device to detect their mental and physical status, with a responsive

guidance to the surrounding environment and a reminder of predicted dangers. When emergencies such as heart attack or car accident occur, the wearable device could autonomously send messages to the passers-by and the hospital.

Idea 6- Urban Mobility: VR education for parents and kids

Problem Tedious time on travel journey on bus or subway; transportation education for kids.

Importance Help the next generation to get to know transportation and enjoy the travel time.

Solution Set up a corner for parents and kids in buses or subways, where they could wear VR equipment in an immersive environment for scenario-based transportation education.

Idea 7- Technology: CVIS aided autonomous vehicle safety

Problem For autonomous vehicles: difficulty on responsive reaction to the real environment; high standard for the capacity level of AV.

Importance Provide travel safety of the AVs and control of cost of AVs due to its relatively lower capacity level.

Solution Advocate on a CVIS (cooperative vehicle infrastructure system) that could give a real-time guidance to the AV to guarantee the driving safety, and thus allow the ride of AV with a lower autonomous level.

Idea 8- Technology: efficient charging for AV

Problem Time cost for the charging time; space occupation for infrastructure.

Importance Save time cost for charging to encourage AV use; provide more space for the public.

Solution Wireless charging underneath each parking lot with highly efficient process (stop); sensed charging underneath the road (on-drive) to approach seamless travel.

Idea 9- Technology: adaptive micro mobility

Problem Monotonous function of inner vehicle; occupation of public space along the street.

Importance Full use of on-vehicle time; more street space for public activities.

Solution This will be a pokeball vehicle with adaptive materials (i.e. membrane). With the flexibility, it could change forms on drive based on different demands of functions such as HaaM (home as a mobility) or OaaM (office as a mobility). Moreover, it could serve as a street furniture when it change forms following time series led by people's operations on Apps.

Idea 10- Finance: circular economy in transportation

Problem Urban waste capacity each year concerning mobility; unsustainability in development.

Importance Reduction on environmental impact, and cost-saving due to circular economy for carbon.

Solution (1) Recycling of the materials used for highways, infrastructures, and cars, etc. (2) Modification of business models and operation strategies. (3) Data-sharing system collaborated with upstream and downstream relations.