




intelelect

Intelligent Electric Transportation Network

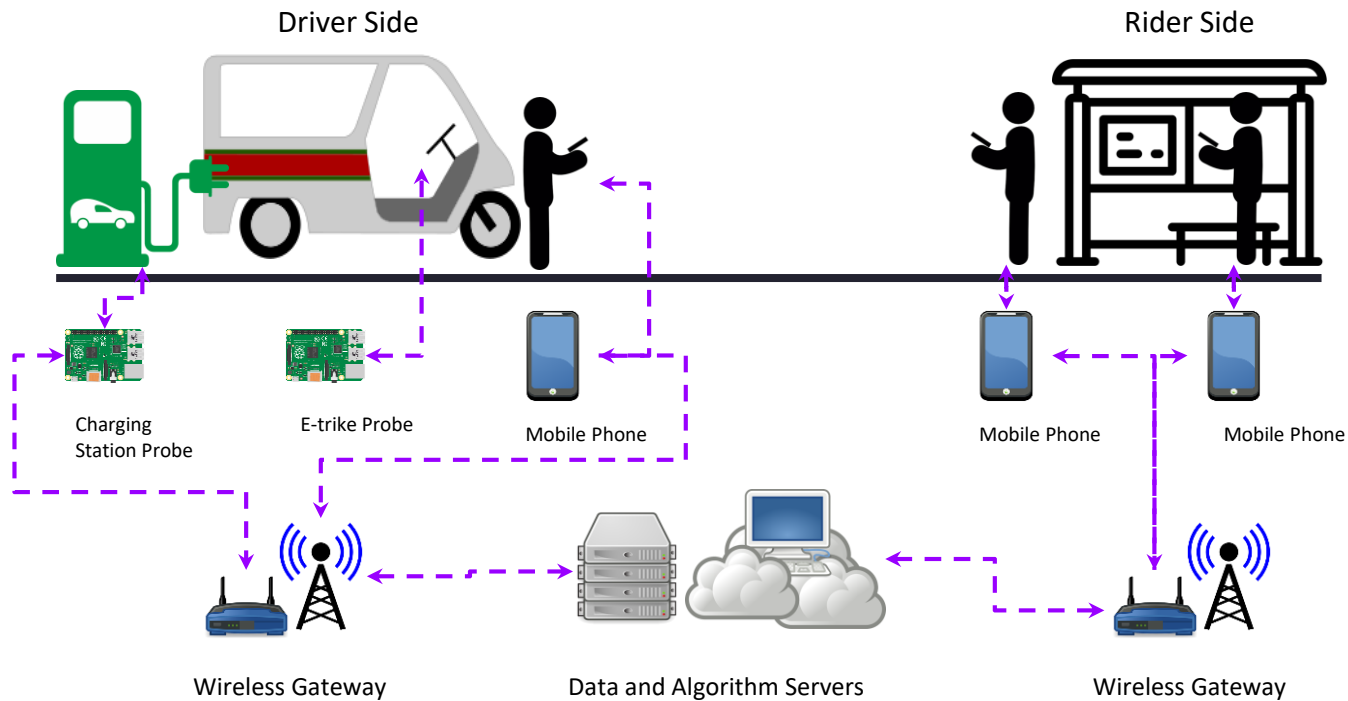
Lew Andrew R. Tria, Ph.D.

TSSP Intelligent Transportation Systems Forum  
25 October 2019

A photograph of a white electric vehicle (EV) at a charging station. The vehicle is positioned on the right side of the frame, with its front and side visible. It is plugged into a charging station on the left. The background shows an exhibition or trade show setting with various displays and posters. The text is overlaid on the left side of the image, with 'SMART NETWORK OF' in orange, 'ENERGY AWARE' in white, and 'ELECTRIC VEHICLES AND CHARGING INFRASTRUCTURE' in orange.

SMART NETWORK OF  
ENERGY AWARE  
ELECTRIC VEHICLES  
AND CHARGING  
INFRASTRUCTURE

# SYSTEM OVERVIEW

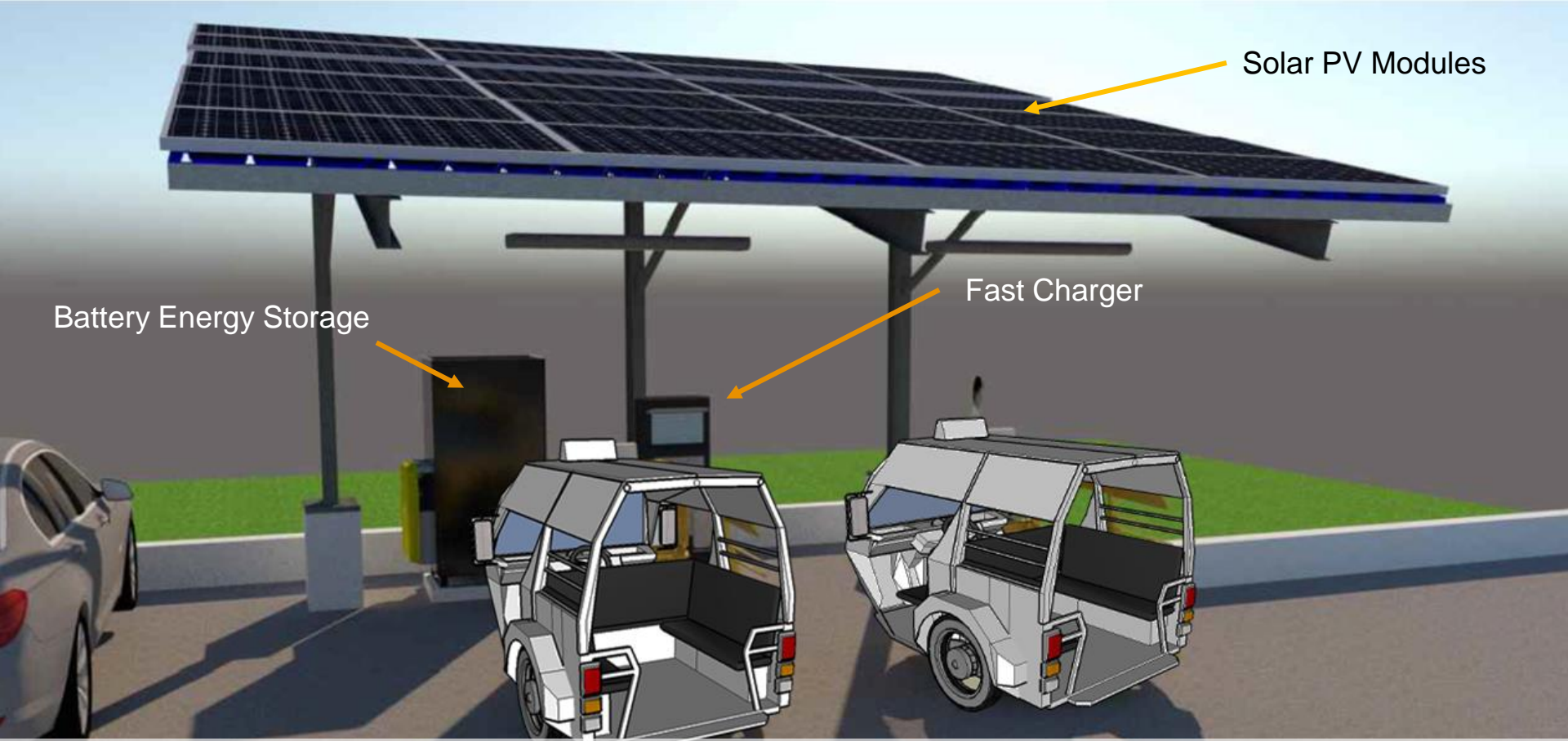


# COMMUNITY-BASED EV RIDE-SHARING

# INSTRUMENTATION

Portable data loggers for monitoring and characterization





Solar PV Modules



Battery Energy Storage



Fast Charger



## CHARGING INFRASTRUCTURE

Charging station capable of slow and fast charging

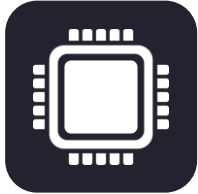
# SYSTEM COMPONENTS

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## RIDE-SHARING MONITORING AND GUIDANCE SYSTEM

Charging station placement, driving route, and booking match calculations



## DATA HARVESTING SYSTEM

Communication systems for data collection and analytics



## RIDE-SHARING MOBILE APPS

Driver and rider application and internet platform

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# Optimization

## Objectives

### **Vehicle Routes**

Create routes for driver to follow based on e-trike parameters and destination

### **Charging Stations**

Place stations that consider e-trike parameters, riding stops, and possible routes

### **Ride Matching**

Match riders and available drivers that consider e-trike parameters and proximity from rider







# Data Harvesting

## Network Setup

### **4G LTE**

Given the wide coverage of 4G Long-Term Evolution (LTE) today, it is the most logical wireless communication standard to use in transmitting the data from EVs to the servers.

### **Long Range WAN (LoRaWAN)**

In the case that a 4G network is not available, Long Range WAN (LoRaWAN), a license-free wireless modulation technology with low bandwidth and low battery usage, would be deployed.



emocion



advice





## emocion

Vehicle Instrumentation,  
Network of Charging  
Stations, Renewable  
Energy

Electric  
M**o**bility  
C**h**arging  
Infrastructure  
O**o**perating as a  
N**e**twork





advice

Ride-sharing  
monitoring and  
guidance system

Ad-hoc  
Vehicle  
Infrastructure  
Cooperative  
Environment

**Project Leader: Asst. Prof. Jethro Limjoco**



# TESTING LOCATIONS



University of the Philippines  
Diliman Campus

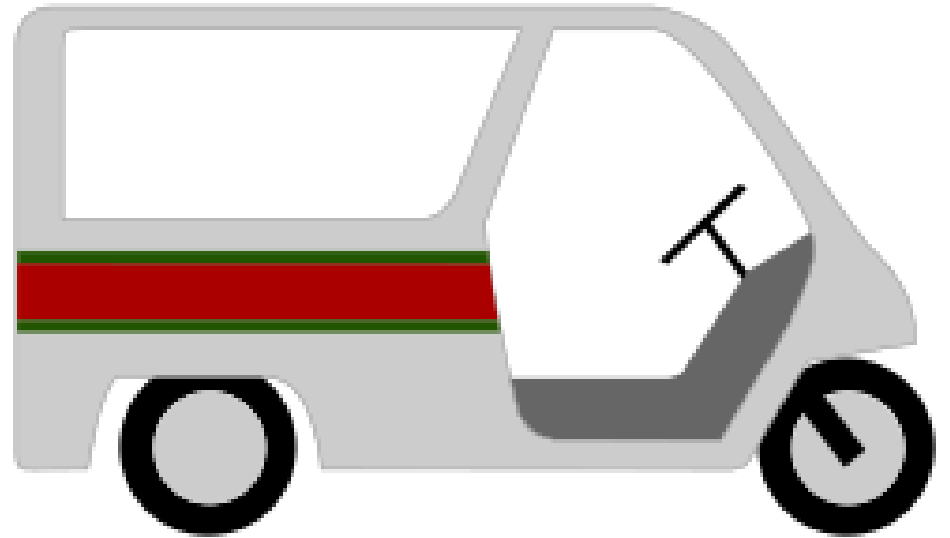


Cagayan Regional Center  
Tuguegarao City, Cagayan

# 10 E-TRIKES...

... to be driven in  
each testing  
location to  
service

admin personnel  
for  
official purposes



# Project Team

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- Lew Andrew R Tria – EEEI
- Marc Caesar Talampas - EEEI
- Wilbert Jethro Limjoco – EEEI
- Karl Vergel – NCTS, ICE
- Ernie Abaya – NCTS, Architecture



DOST-PCIEERD



DOE, EUMB



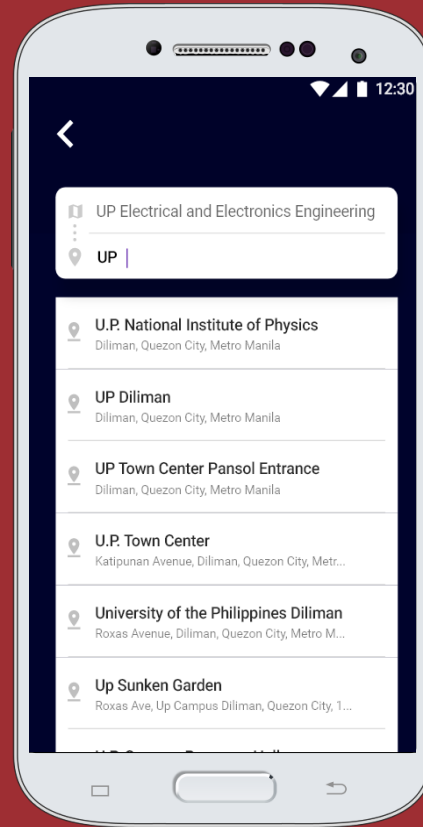
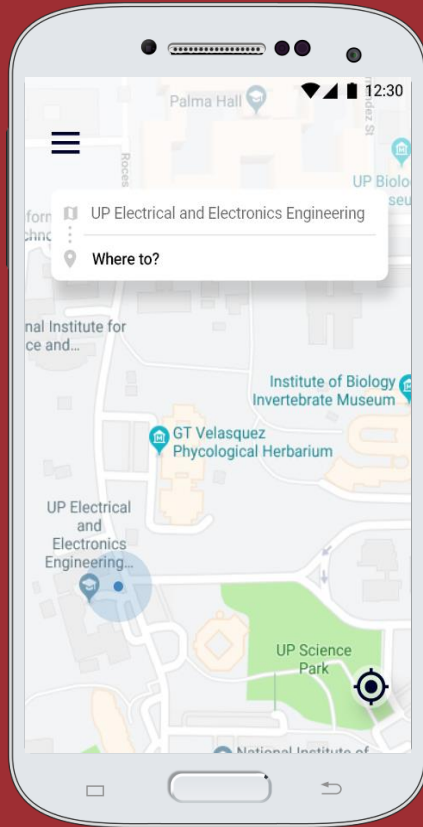
Cagayan State University





E-TRIKE RIDE-HAILING  
SERVICE

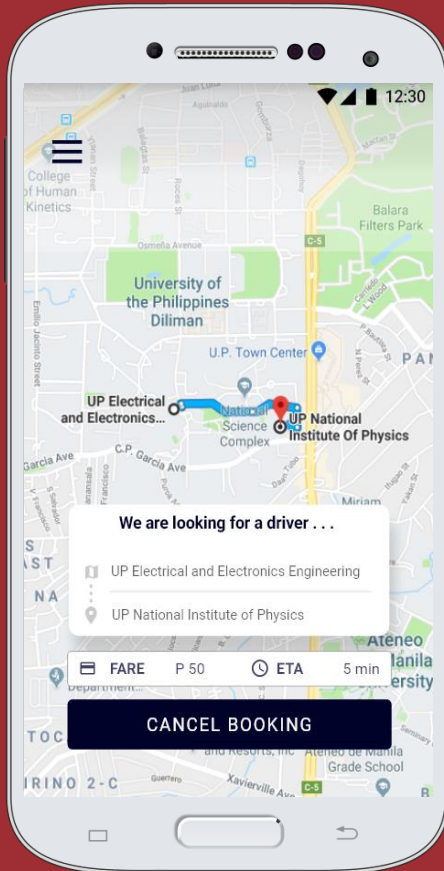




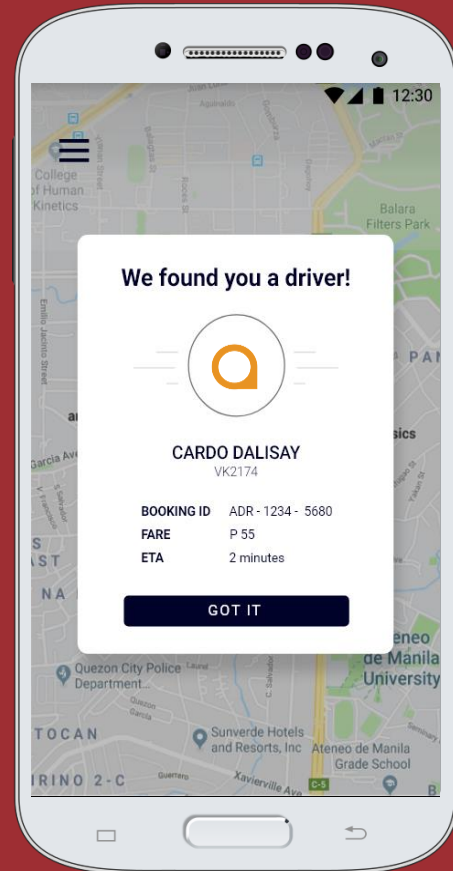
hotid

... lets you book a ride anywhere around the UP Campus

Book...



and wait for a ride!



TARA NA AT  
MAGPAHATID!





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