Talk:

Blockchain Based Secure Decentralized Vehicle Communication

Madhusudan Singh, PhD, SMIEEE,
Research Professor, Seamless Transportation Lab
Yonsei Institute of Convergence Technology, Yonsei University
Songdo, South Korea
Introduction

✓ Vehicle Communication way -
  ▪ Vehicle to Vehicle (V2V) \( \rightarrow \) (Smart Vehicles)
  ▪ Vehicle to Everything (V2X) \( \rightarrow \) (RSU, Electronic Devices)
  ▪ In-Vehicle \( \rightarrow \) (CAN, ECU sensor)

✓ Blockchain Technology
  ▪ Mutual
  ▪ Cryptography
  ▪ Digital Signature
  ▪ Ledger

2017-09-19
# Motivation

<table>
<thead>
<tr>
<th>Topics</th>
<th>Industry</th>
<th>Academic Research</th>
</tr>
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<tbody>
<tr>
<td>Topics</td>
<td>Toyota Research Institute, USA [1]</td>
<td>MIT-Digital Currency Initiative [1]</td>
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<tr>
<td></td>
<td>ZF Group, Switzerland [2]</td>
<td>University of New South Wales (UNSW), Sydney [3]</td>
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<td>Oaken Innovations, Canada [1]</td>
<td>Institute of Automation, Chinese Academy of Sciences (SKL-MCCS, CASIA), Beijing, [5]</td>
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<td>Commuterz, Israel [1]</td>
<td>Seamless Transportation Lab, Yonsei University</td>
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| Share driving | Yes | - |
| Autonomous vehicle | - | Yes |
| Manage ride-share | Yes | - |
| Transactions (Fuel, Toll, insurance etc.) | Yes | Yes |
| Store vehicle usage information | Yes | Yes |
| Decentralized Transportation System | Yes | Yes |
| Secure Vehicle Communication | Yes | - |
| Privacy | Yes | - |

**Research Area: Service based Intelligent Vehicles**

- **The Blockchain for VT:**
  - Data Sharing
  - Ride Sharing
  - Payment (toll, energy, insurance etc.)

**Research Area: Security**

- **The Blockchain for VT:**
  - Communication
  - Transactions
  - Security
  - ITS

**ITS/Vehicle communication**

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**Reference:**
Proposed Work

✓ Challenges:
  - Centralized Authority
  - Trust between Machines
  - Message Integrity
  - Data Management
  - No Privacy

✓ Solution:
  - Decentralized
  - Distributed
  - Cryptography
  - Message with signature
  - One word “Blockchain”
**Proposed Blockchain Scenario**

<table>
<thead>
<tr>
<th>Vehicle ID</th>
<th>Transaction id</th>
</tr>
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<tbody>
<tr>
<td>IV-1</td>
<td>1233asw12d1</td>
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<tr>
<td>IV-2</td>
<td>2833agf12i21</td>
</tr>
<tr>
<td>IV-3</td>
<td>3273asw1h21</td>
</tr>
<tr>
<td>IV-4</td>
<td>4233ase12t21</td>
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<tr>
<td>IV-5</td>
<td>653hgd543j21</td>
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<tr>
<td>IV-6</td>
<td>753kme12f21</td>
</tr>
<tr>
<td>IV-7</td>
<td>9833vde1d21</td>
</tr>
<tr>
<td>IV-8</td>
<td>7653vde12gf1</td>
</tr>
<tr>
<td>IV-9</td>
<td>9833vde1d21</td>
</tr>
<tr>
<td>IV-10</td>
<td>733uce12y21</td>
</tr>
</tbody>
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- **IV-4**
  - 4233ase12t21
- **IV-5**
  - 653hgd543j21
- **IV-6**
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**Diagram:**
- Blocks connecting vehicles with their respective transaction IDs.
Thank you

Madhusudan Singh, PhD
Research Professor,
Yonsei Institute of Convergence Technology,
Yonsei University, Global Campus,
Songdo, South Korea
Email ID: Madhusudan.singh@ieee.org
Cell Phone: +82-10-5625-1301
https://sites.google.com/site/madhusudaniita/