Can Hi-Tech Hitchhiking Work?

Jim Morris
Carnegie Mellon University
Silicon Valley

Supported by Carnegie Mellon’s CyLab and Google
Some ridesharing companies.

<table>
<thead>
<tr>
<th>Dead</th>
<th>Alive</th>
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<tbody>
<tr>
<td>Smart Traveler, Los Angeles and Seattle, ~1993.</td>
<td>551.org, Bay Area</td>
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<td>M21, Stuttgart, Germany, 2001.</td>
<td>Carriva/eNotions, Frankfurt</td>
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<td>TECAPSY, Alicante, Spain, 2001.</td>
<td>CraigsList, many cities</td>
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<td>Socialtraffic &quot;Easy-Rider&quot;, Amsterdam, 2005</td>
<td>Encorio, Ontario</td>
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<td>Ride Now!, Alameda County, 2005-6.</td>
<td>eRideshare, South Carolina</td>
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<td>Zypsy, Silicon Valley, 2006-7</td>
<td>GishiGo, San Francsico, New York</td>
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<td></td>
<td>GoLoco, Boston</td>
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<td>Goose, Seattle</td>
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<td>Greenride, New York + many</td>
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<td>iCarpool, Issaquah WA</td>
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<td>NuRide, Washington, et al.</td>
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<td>PickupPal, many cities</td>
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<td>PiggyBack, France</td>
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<td>RideSpring, Silicon Valley</td>
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<td>Zimride, Cornell, LaCrosse</td>
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Why might it work now?

- New Technology
  - GPS
  - Cell phones, increasingly capable
  - Google Transit
  - Facebook
  - eHarmony
  - eBay

- New Mood
  - It’s part of the “new normal.”
  - “Yes, we can!”
  - The Millennial Generation (ages 5-25) is different.
The Ridesharing Process

Person

Motivation

Subscriber

Enthusiasm

Propose

Feasibility

Decide

Cost

Compatibility

Partner

Relationship
The number of compatible partners grows exponentially with feasible partners.

- N = number of feasible partners
- P = probability that two people are compatible.
- $1 - e^{-PN} = \text{probability of finding a match}$
There is a tipping point because successful partnering promotes enthusiasm.
Feasibility is increased by agility.

- 1,000 commuters
- 10 neighborhoods
- 20 companies
- 5 people in each neighborhood work together
- If 0.1 is probability of two people matching,
- 0.4 is probability of finding a ride
Agility: allow car switches.

- 1,000 commuters
- 100 residents of X drive on 101.
- 50 workers at Y drive on 101.
- If 0.1 is probability of two people matching, 1 is the probability of finding connecting rides!

Conclusions
- Hubs are a good idea.
- Hitchhiking > Carpooling
Cell phones make agility possible.

- Scheduler arranges feasible trip among a rider and two drivers.
- All three are tracked via their cell phones.
- Adjustments and substitutions are possible.
- All-voice interface is required for driver.
- It’s dependable, safe hitchhiking.
Conclusion

- This problem is hard.
  - Personal automobile maximizes convenience and reliability.
  - People like to drive. Get over it.

- It’s worth solving.
  - Climate Change
  - $131B/year in gas and maintenance used in single-occupancy vehicles

- It provides insight into other social-physical systems.

- It can work this time!
To Learn More…

- Bureau.sv.cmu.edu/~jhm/RideFriends.pdf
- dynamicridesharing.org, a wiki
Backup Slides
Central nervous system for regional surface transportation.

- Provide one-stop planning for traveler.

- Link mass transit, taxis, vans, and civilian drivers.

- Make carfree existence plausible.
Ridesharing works in other times and places.

India

1943

Cuba

Israel

San Francisco

DC
Who says people don’t change?
People Differ.*

* The VALS™ Framework

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# Early Adopter Target

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Marketing Methods

- Focus on natural communities.
  - Leverage common destination and trust.
  - Sell leaders.
  - Merge communities later.
- Actively campaign to reach tipping point.
- Demonstrate participation.
  - Company leader board
Where to start?

- Companies (Goose, NuRide)
  - One location
  - Trust
- University Ride Board (Zimride)
  - Young, friendly, tech-savvy
- Cities
  - People without cars
  - Concentrated
- Asia
  - Fewer cars
  - More people
Other Ideas

- Provide a service just for riders.
  - Patch together public transit, taxi’s, limos.
  - Avoid cultural issues by using professional drivers.
  - Build rider side of market first.

- Integrate with GPS navigators.
  - Exploit good interfaces.
  - Induce drivers to register trips.

- Person-Miles per Gallon Display

- Encourage motorcycles.
  - Deus ex Machina
Challenge: We love our SOV’s and avoid strangers.

- Convenience
  - Point-to-point travel
  - No waiting
  - No planning

- Economic
  - Marginal cost of owned car is half total cost.

- Cultural
  - Safety: Hitchhiking is dangerous, even illegal.
  - Privacy: I have enough friends.
  - Status: Carpooling is for poor people.
Changing our culture is more important than reducing SOV’s.

The old “American Way of Life” is still seen as the model of well-being to imitate because it has not been replaced in America.

—Carlotta Perez
Build a graph of all drivers

Driver 1

Driver 2

Driver 3

Train

Driver: 3
Arrival Time: 11:45
Distance: 0.4 mile
Speed: 40 mph
Find cheap paths for rider.

Rider switches from red to yellow.
Cost

- **Convenience**
  - Keep time penalty to 20%.
  - Enable last-minute requests via cell phone.
  - Eliminate no-shows from community—zero tolerance.
  - Treat lost time as a cost.

- **Economic**
  - Target people without cars.
  - Award coupons.
  - Increase costs, taxes, fees, tolls, and mandates.
  - Extend public transit subsidies to ridesharing.
Relationship = Familiarity + Purpose

- Familiarity = $1/2^D$ where D is degree of separation, counting organizations.

- Common Purpose*
  - Practice skill together.
  - Learn something.
  - Pursue business goal.
  - Share hobby.
  - Get support.
  - Develop deep relationship.

*Selker Design Research, Ted Selker © 2008