Zero-effort Payments (ZEP)

Victor Bahl, Ronnie Chaiken, Weidong Cui, Jay Lorch,
David Molnar, Jitu Padhye, Bryan Parno,
Stefan Saroiu, Chris Smowton, Alec Wolman

Microsoft Research

Disclaimer

- All work presented is part of computer science research conducted at Microsoft Research
- Microsoft Research's role is to develop new ideas and technologies
- We cannot comment on when or if such technologies will make their way into Microsoft's products

Imagine The Future of Commerce

- Imagine a world in which:
  - At Starbucks, they start making your favorite drink the moment you enter the store
  - Sales people will already know your purchase history, and the kind of clothes you are shopping for
  - You can return merchandise without showing receipt
  - You can check-in a hotel or on a plane without waiting in line

This Talk's Goal

- In this talk, we show that the technology needed to turn this vision into reality is coming soon!

Main Problem: Customer Identification

- Mission: identify customer on the fly with zero-inconvenience
- General idea: Use unobtrusive biometrics
  - Biometrics: identification of humans by their characteristics or traits
- Our work: Apply customer identification to making payments at Microsoft cafeterias
  - Zero-effort Payments

Possible Biometrics

- Using fingerprints
  - Accurate, but invasive
  - Easy to commit hard-to-detect fraud
  - Not everyone has a fingerprint
- Using voice
  - Inaccurate
  - Requires users to keep a “long speech”
- Iris scanning
  - Accurate, but invasive

Face Recognition

- Benefits:
  - Accurate when used to select among few people
  - Non-invasive
  - Difficult to commit hard-to-detect fraud
- Cons:
  - Accuracy falls when selecting from many people

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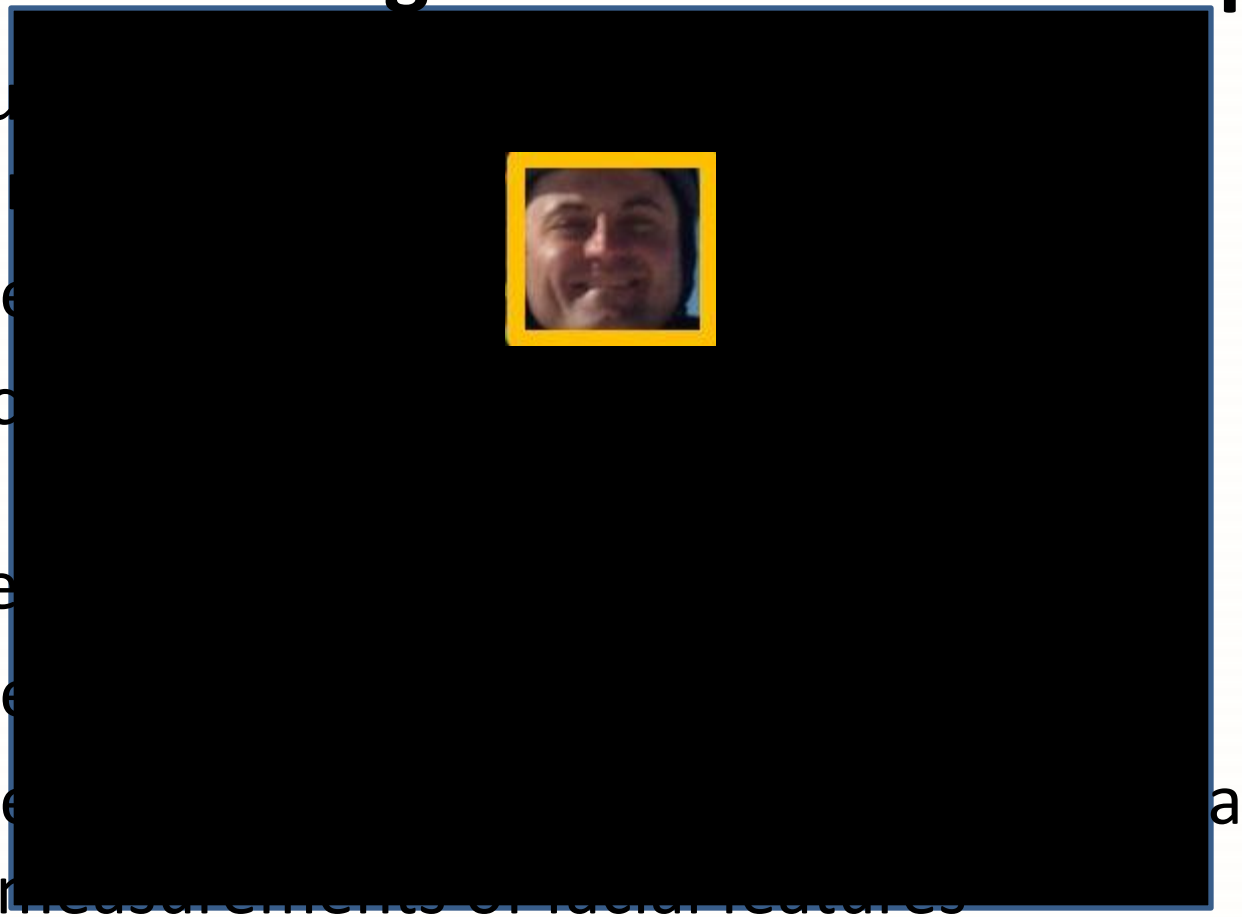

Overcoming Accuracy Barriers

- Leverage wireless proximity technology found in today's smartphones
  - Enables quick discovery of "nearby" devices
- e.g., Bluetooth Low Energy (BLE)

Combining the Best of Both Worlds

- Wireless proximity: works well to discover "nearby" people
- Face recognition: works well when selecting among few people
- Two steps:
  1. Use wireless proximity to discover the 20 people in a Starbucks store; eliminate everyone else
  2. Do face recognition on 20 people (not millions)

Final Solution in Practice

- Two steps + final human-based validation:
  - Wireless proximity
  - Face recognition
  - Add human-assistance for final confirmation

Video-based Demo

ZEP Workflow

Bluetooth/BLE continuous scanning → **Face recognition** → **Human assistance** → **Payment**

BLE devices

$50 webcam

Cashier

Customer

Opportunity for Better Receipts

- Once purchase transaction is final, ZEP sends an e-mail receipt:
  - Includes link to video showing the purchase
  - Mechanism used for disputes

Privacy Issues

- How will people react when cameras at every cash register?
- No legal precedent available
  - Unlike security, traffic cameras
- ZEP includes privacy protocol for turning off camera

Conclusions

- ZEP enables new opportunities for commerce by identifying customers quickly and seamlessly
  - Many opportunities for new scenarios

- Privacy issues *can* be handled and mitigated

Questions?

- ssaroiu@microsoft.com