

COMS E6176

Applications

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Characteristics of Wearable Computing S. Mann, B. Rhodes

- Portable while operational
- Needs minimal manual input (“hands-free”)
- Context-sensitive
- Always on
- Always able to attract the user’s attention
- The user and others consider it part of the user
- Controlled by the user

Mobile and Wearable Applications

- Which characteristics are exploited?
How are they exploited? How well are they exploited?
- What is the competitive advantage?
- What potential applications are missing?
- Can we group/classify applications to discover relationships?

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Exhibition Guide

- IrDA transmitters broadcast info directionally
- Users' PDAs receive info
- Coarse position/orientation sensitivity



Butz, A., Baus, J., and Krueger, A. Augmenting buildings with infrared information. *Proc. IEEE and ACM Int. Symp. on Augmented Reality 2000 (ISAR 2000)*, 93–96. <http://www.eyeled.com>

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Exhibition Guide

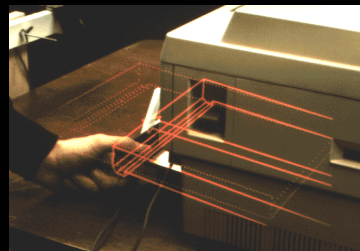
- IrDA transmitters broadcast info directionally
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Maintenance and Repair

- Maintenance and repair information overlaid on equipment
 - Integrated with task environment
 - Customized for user/situation



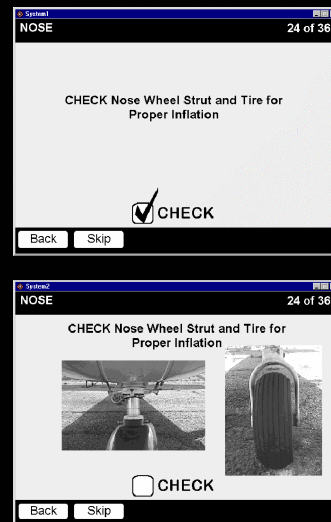
Feiner, S., MacIntyre, B., and Seligmann, D. Knowledge-based augmented reality. *Communications of the ACM*, 36(7), July 1993, 52–62.

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Inspection

- User guided through pre-flight inspection checklist
 - Memory-based
 - Text wearable
 - Text and pictures wearable
- Wearable users are less “hands on”

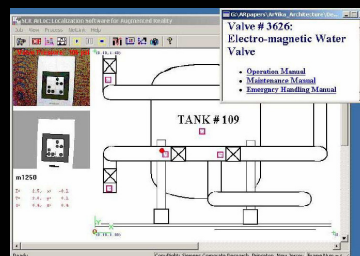
Ockerman, J.J. and Pritchett, A.R. Preliminary investigation of wearable computers for task guidance in aircraft inspection. *Proc. IEEE Int. Symp. on Wearable Computers 1998 (ISWC 98)*, 33–40.



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Inspection

- User guided through industrial site
- PDA with camera to identify markers in environment
- System presents data relevant to objects being inspected



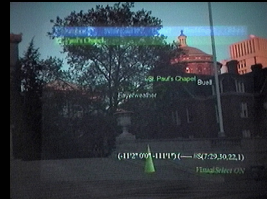
Zhang, X., Genc, Y., and Navab, N. Taking AR into large scale industrial environments: Navigation and information access with mobile computers. *Proc. IEEE and ACM Int. Symp. on Augmented Reality 2001 (ISAR 2001)*, 179–180.

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Tour Guide

- User provided with information about unfamiliar environment
- Overlaid media integrated with user's view of the world

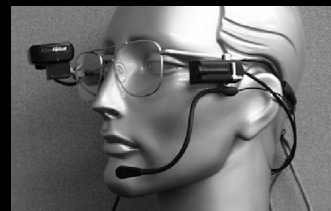
Feiner, S., MacIntyre, B., Höllerer, T., and Webster, A. A touring machine: Prototyping 3D mobile augmented reality systems for exploring the urban environment. *Proc. IEEE Int. Symp. on Wearable Computers 1997 (ISWC 97)*, 74–81.



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Security

- Visitor identification for entry-gate security
- Face recognition to detect “foes”



Rensing, N.M., Weststrate, E., Zavracky, P.M., Chandler, M., Nobel, K.R., Helfter, S., Kinsky, M., Gold, M., and Martin, B. Threat response: A compelling application for wearable computing. *Proc. IEEE Int. Symp. on Wearable Computers 2002 (ISWC 2002)*, 152–153.



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Assistance for Disabled Users

- Deaf user's signing is recognized and converted to text/speech for hearing user
- Head-worn camera and accelerometers on wrists and torso

Brashear, H., Starner, T., Lukowicz, P., and Junker, H. Using multiple sensors for mobile sign language recognition. *Proc. IEEE Int. Symp. on Wearable Computers 2003 (ISWC 2003)*, 45–52.



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Group Sports

- User can communicate with other participants
 - Body belt interfaces with phone
 - Group calls
 - Coordinates phone numbers
 - Digitizes call ("shout")
 - UI for gloved hands



Mikkonen, J., Vanhala, J., Reho, A., and Impi, J. Reima Smart Shout concept and prototype. *Proc. IEEE Int. Symp. on Wearable Computers 2001 (ISWC 2001)*, 174–175. <http://www.reimasmart.com>

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Games

- Assist billiards player by overlaying trajectories for suggested shots

Jebara, T., Eyster, C., Weaver, J., Starner, T., and Pentland, A. Stochasticks: Augmenting the billiards experience with probabilistic vision and wearable computers. *Proc. IEEE Int. Symp. on Wearable Computers 1997 (ISWC 97)*, 138–145.



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Entertainment

- Augmented reality as new media
- User interacts with virtual characters in physical space

MacIntyre, B., Bolter, J.D., Moreno, E., and Hannigan, B. Augmented reality as a new media experience. *Proc. IEEE and ACM Int. Symp. on Augmented Reality 2001 (ISAR 2001)*, 197–206.



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