Optimizing Department/Industry Partnerships

Andrew Moore
Dean, SCS, awm@cs.cmu.edu

with many people, including Jessica Hodgins (SCS & Disney), Manuela Veloso (SCS ML & AI), Anind Dey (SCS HCII) and Martial Hebert (SCS Robotics).

CRA Snowbird, July 18th, 2016
This Talk

- What has SCS learned from local industry ties?
- What works?
  - For the companies
  - For the students and the school
- Where we misstepped
- Tips and tricks
  - My personal suggestions
  - Consensus suggestions from this group
This Talk

• What has SCS learned from local industry engagement?
• What works?
  • For the companies
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• Where we misstepped
• Tips and tricks
  • My personal suggestions
  • Consensus suggestions from this group
General Things that work for the companies

• Access to students
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- Access to students
- Advantage in the global talent wars
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• Access to students
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- Access to students
- Advantage in the global talent wars
- Haves & Have-nots

**Have (n):** A global software-focussed company, or a small company with high potential upside, which has its own computer scientist talent.

**Have Not (n):** Any company which does not have a major internal computer scientist cohort.
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• Haves & Have-nots
  • *Haves:*
    • *it’s the donut*
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Insanely large, low latency, discriminative models
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- 3-d vision to detect the visible engagement levels of a classroom of high-schoolers
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- Insanely large, low latency, discriminative models
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- History of weasel worship in the middle ages
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  • **Have-nots**
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    - *it’s the ideas*
    - *it’s the culture changers*
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**Denoising Case Study:** Paper to Press

Fabrice Rousselle, David Adler (WDAS), Henning Zimmer, Oliver Wang, Peter Kaufmann, Wojciech Jarosz, Alexander Sorkine-Hornung

### Originating Research

Path-Space Decomposition for Improved Spatio-Temporal Upsampling and Denoising of Rendered Animations

\[
D(v_z) = \sum_{f \in F} \frac{1}{n_f} \Psi_f(\|f_{i+1}(p) + v_z(p) - f_i(p)\|^2)
\]

### Paper Published

Path-Space Motion Estimation and Decomposition for Robust Animation Filtering - Eurographics 2015

### Patent Filed

Path-Space Decomposition for Improved Spatio-Temporal Upsampling and Denoising of Rendered Animations
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Contribution to Walt Disney Animation Studios Hyperion Team
Collaboration credited in Big Hero 6
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**Carnegie Mellon University**

**School of Computer Science**
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- For Students
  - They have friends in the biz
  - Startups have a much better shot
  - We can close the loop on education relevance much more quickly
  - Much more informed about their possible futures
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### AI infrastructure
- **OS**
- Solvers
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### Decision Support
- Modeling
- ML Components
- Data Science Kernel Layer
- Device Layer
Industry focus areas

- Autonomy
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- Augmented Humans
  - Dialog
  - Q&A

AI infrastructure
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Industry DANGER!!!

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Biometrics

Carnegie Mellon University
School of Computer Science
CMU focus areas

Autonomy
- Outdoor Mobile Platform
- Automated Science
- Fine manipulation
- Reinforcement Learning

Augmented Humans
- Dialog
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- Emotion Processing
- Automated Physician
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AI infrastructure
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CMU/SCS investment

AI infrastructure component

Industry Hotspot 2016
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AI infrastructure component
Industry Hotspot 2016
CMU/SCS investment

Carnegie Mellon University
School of Computer Science
Moonshots

AI infrastructure component

Industry Hotspot 2016

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CMU/SCS moonshot

Agriculture, Water and Air

Automated Science

Self-writing Algorithms

Outdoor Mobile Platform

AI Prosthetics

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Carnegie Mellon University
School of Computer Science
What works for the students and the school?

For Students
- They have friends in the biz
- Startups have a much better shot
- We can close the loop on education relevance much more quickly
- Much more informed about their possible futures

For the school, in reverse order of importance:

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This Talk

• What has SCS learned from local industry ties?
• What works?
  • For the companies
  • For the students and the school
• **Where we misstepped**
• Tips and tricks
  • My personal suggestions
  • Consensus suggestions from this group
Where we misstepped

- Rookie Mistakes
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• Rookie Mistakes
  • Not enough Product Managers and Bizdev people
  • Excessive internships? (There are other things to do with summers)
• Brand Snatching
• University under-delivery (the pie problem)
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• Issues which will always be hard
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  • Grad Student + Faculty + Company triangle
  • Distracted Faculty
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- Requires careful attention but a good problem to have:
  - So-called faculty “poaching” by industry
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**My personal suggestions**
## Tips and Tricks for a loving University/Company relationship

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I would be grateful for changes and additions to this tip/trick set.

My personal suggestions