THE TRADEOFFS OF SOCIETAL COMPUTING

Swapneel Sheth, Gail Kaiser
Department of Computer Science, Columbia University
New York, NY 10027
{swapneel, kaiser}@cs.columbia.edu

@swapneel
MOTIVATION

• Increasing specialization of Computer Science research into subareas and sub-subareas

• “Jack of all trades, master of none”?

• We are experts in our specialized subareas and relatively unaware of the other areas
MOTIVATION

• Advanced research and progress in one area may have a negative effect on some other research area.

• Such tradeoffs exist in many different areas and a broadening of research scope is necessary to effectively address them.

• We need a more holistic view of research.
SOCIETAL COMPUTING

• New research area for Computer Scientists concerned with the impact of computational tradeoffs on societal issues

• Privacy, Climate Change, Sustainability and Green Computing, Cultural Differences, Ethics, ...
Privacy vs. Green Computing

• Privacy is becoming an increasingly important concern
• State-of-the-art techniques to preserve/analyze a software system’s privacy properties - great as far as privacy is concerned
• These might require substantial computational resources - bad idea as far as Green Computing is concerned
• How do we balance privacy with green computing?
GREEN COMPUTING VS. GREEN COMPUTING

• Interesting (and recursive) tradeoff of Green Computing with itself

• We may need to spend a lot of computational resources to (research and) develop greener software systems

• In the worst case, the amount of resources spent on this may far outweigh the energy benefits of replacing the less-green systems - “penny wise, pound foolish”

• How do we analyze this before expending these resources?
HOW CAN WE CONTRIBUTE?

• Common theme - finding the right balance between the different areas of Societal Computing
• Develop metrics to compare impact on diverse subareas
• Spend more human time than computer time?
• More multi- and inter-disciplinary research
HOW CAN WE CONTRIBUTE?

• The **software engineering/programming languages** community has a **special** role to play

• Design patterns, architectural metaphors, better tools, APIs, smarter compilers, better testing techniques, new programming languages to deal with these concerns

• **Help other communities** make an easier decision when it comes to tradeoffs

• Address how to implement these balanced systems
THE TRADEOFFS OF SOCIETAL COMPUTING

Swapneel Sheth, Gail Kaiser
Department of Computer Science, Columbia University
New York, NY 10027
{swapneel, kaiser}@cs.columbia.edu

(enable (v.t.) : to make possible, practical, or easy)