Towards (s)low-tech computer science?

thoughts on the place of computer scientists in an upcoming ecological crisis

Naomod Christmas Seminar 2020

Erwan Bousse

University of Nantes – LS2N
Important facts

- Computers allow us to organize society,
- Computers allow us to do science,
- Computers make our lives incredibly better,
- Computers are awesome.
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- Computers allow us to **organize society**, 
- Computers allow us to do **science**, 
- Computers make our lives **incredibly better**, 
- Computers are **awesome**.

Even better: **computer science is awesome**

- We create more applications, more languages, more methods, more tools!
- Very interesting, fun and arguably crucial endeavor.
4% of greenhouse effect gas come from the digital industry (in 2020),
1.6 billion smartphones are sold every year, and now IoT devices keep arriving,
Huge amount of (finite) resources must be mined from the ground
Recycling e-waste is an almost impossible task (delegated to poor countries)
Building computers require a very sophisticated supply chain.
A look at possible (digital) futures

Current state of human societies

- 2020
- 2021−2050
- 2050−2100
A look at possible (digital) futures

- **2020**: Current state of human societies
- **2021–2050**: Major climate change with already difficult consequences (e.g., agriculture production collapse, water shortage)
- **2050–2100**: Huge climate change with a possible end of human life

Temperatures:
- +2°C
- +4°C
A look at possible (digital) futures

Current state of human societies

“Business as Usual” (ie. no changes in how we live)

- Amount of devices (phones, servers, etc.) keeps rising,
- IoT everywhere, IA everywhere, software everywhere,
- The Internet is required for every single task,
- Complexity of systems keep rising,
- Hardware keeps improving.

Huge climate change with a possible end of human life

+4°C

Major climate change with already difficult consequences (eg. agriculture production collapse, water shortage)

+2°C

2020

2021–2050

2050–2100

"Digital Growth " continues
Current state of human societies

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- Zero/Neutral carbon emissions (i.e. drastic changes in how we live)

- "Business as Usual" (i.e. no changes in how we live)

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- huge decrease in mining,
- huge decrease in production,
- huge decrease in technology?

« Digital Sobriety » ?

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A look at possible (digital) futures
What about us?

If we consider that research is about "inventing the future"...

which future are we currently inventing?
Excerpts from MODELS 2020 abstracts:

« Technological advances enable new kinds of smart environments exhibiting complex behaviors; smart cities are a notable example...

« The increasing complexity of embedded systems renders verification of software programs more complex...

« Model-Driven Engineering has been proposed to increase the productivity of developing a software system...
Our grand noble goal is to "manage complexity" through abstractions... ie. making it easier, faster for engineers to build always more and bigger high-tech systems (eg. autonomous cars, satellites).
Which future do we (computer scientists) dream of?

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- **« Digital Growth » continues**

- **Most computer science research aims for (or bets on) this society model**
In summary, we are directly contributing to "high-tech", which:

- relies on a world with an extreme abundance of energy and resources,
- relies on stable internet, stable electricity, stable production of new devices,
- makes the ecological crisis even worse (pollution, energy use).
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Therefore *should not we start imagining a "(s)low-tech" world:*

- where we stop making huge amounts of new devices every day?
- where we are hence compelled to reuse old computers and electronics?
- where systems function in a very unreliable environment (old machines, little or no internet, unreliable electricity)?
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And as scientists, should we not start wondering what research we should be doing for such a future world?
Thank you for your attention 😊

What do you think?

Disclaimer: this talk was voluntarily provocative, I am no climate expert and cannot predict the future... but I am worried!