

oueees-202206 topic 00:

電気工学特別講義

2022年6月21日分

インストラクション

# OU EE ES Lecture Series

## June 21, 2022

### Lecture introduction

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21-JUN-2022

School of Engineering Science, Osaka

University

On the internet

@jj1bdx

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# Lecture notes and reporting

- <https://github.com/jj1wdx/ouees-202206-public/>
- Check out the README.md file and the issues!
- Keyword at the end of the talk
- URL for submitting the report at the end of the talk

COVID-19  
has changed  
everything  
... and is still there!

Since 24-FEB-2022:  
**WAR** on Ukraine

by Russian full invasion against the democracy

Since 24-FEB-2022:  
**WAR on Ukraine**

by Russian full invasion against the democracy  
and Japan has already engaged in

The Digital Divide has become irrelevant  
The Physical Divide

# The Physical Divide <sup>1</sup>

Digital is now cheap, it's physical that is expensive.

70 years ago the cost of putting a bunch of transistors on a chip was astronomical. Now that's cheap. What's expensive is putting a bunch of people in a room.

– *Balaji S. Srinivasan*

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<sup>1</sup> <https://twitter.com/balajis/status/1247518697385684992?lang=en>

Digital-first society has come  
Internet is infrastructure  
Software builds the world

Physical ubiquity matters:  
Broken supply chains  
Weak infrastructures kill people  
Natural resources are *limited*

In the meanwhile:  
Oppressions everywhere  
by people with power  
to enslave oppressed people





2020

Black Lives Matter



A photograph of a protest against Asian hate. In the foreground, a man wearing a black mask holds up a purple sign that reads "PROTECT ASIAN LIVES". Behind him, another person holds a yellow sign that says "STOP ASIAN HATE". Other protest signs are visible in the background. Large, white, outlined numbers "2021" are superimposed over the top half of the image.

2021

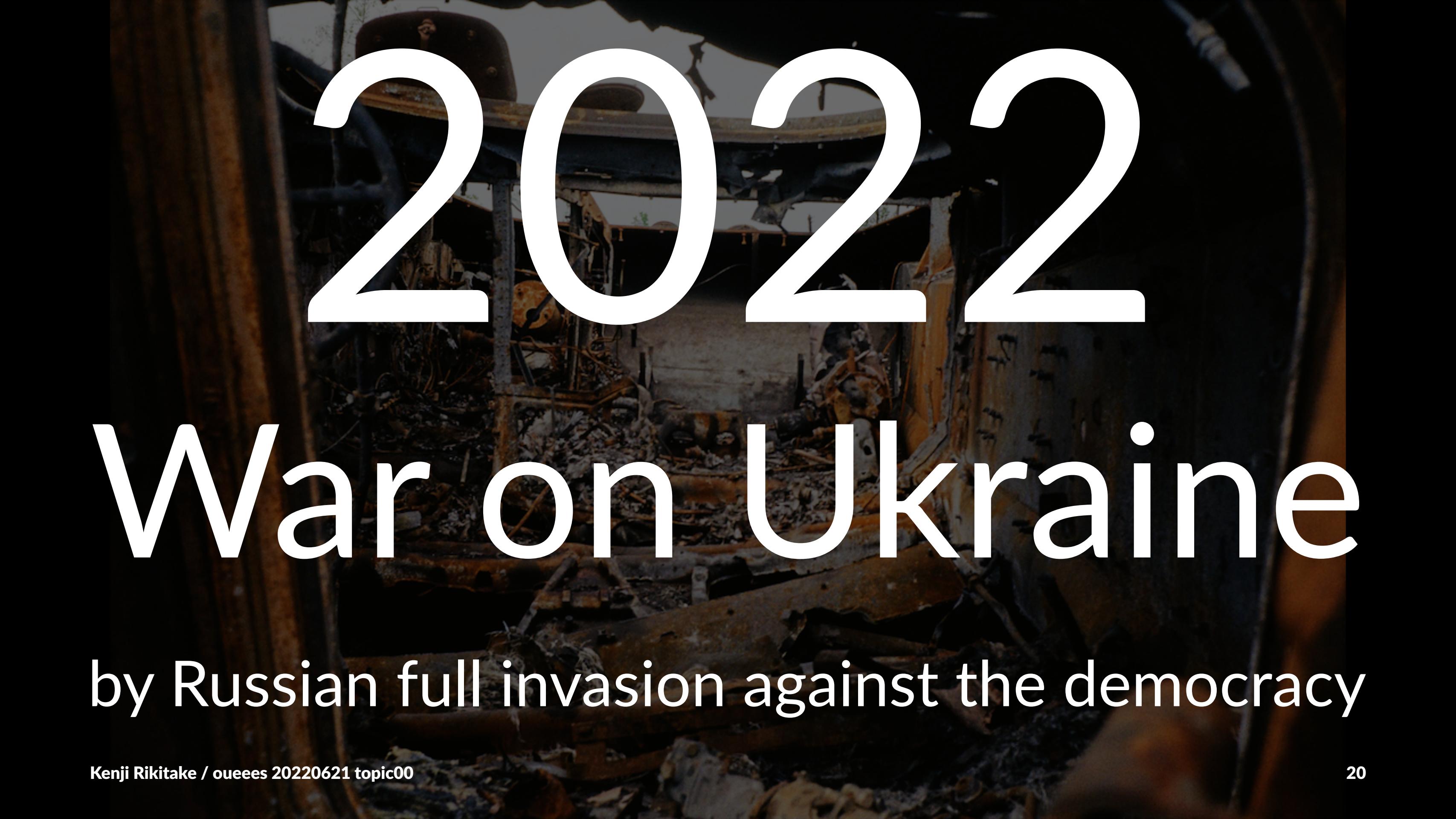
Stop Asian Hate



In 2020, Kyiv, Ukraine



Borodyanka, Kyiv Oblast, Ukraine  
after 24-FEB-2022 Russian invasion



2022

# War on Ukraine

by Russian full invasion against the democracy

Safety first

Stay alive

Get out of slavery

Who | am



# Professional Internet Engineer

技術士（情報工学部門）  
力武健次技術士事務所 所長  
情報処理安全確保支援士

Guest Researcher  
Pepabo R&D Institute  
GMO Pepabo, Inc.  
GMOペパボ株式会社  
ペパボ研究所 客員研究員



ペパボ研究所

Pepabo R&D Institute, GMO Pepabo, Inc.

# My career

Erlang, Elixir, C, FreeBSD, Linux, TCP/IP, PHP, mruby, Lua, C++, C#, Visual Studio, Moodle, macOS, Windows, Vim, VS Code, Arduino, AVR, radio engineering, music, distributed systems, fault tolerance, software defined radio, Python, R, machine learning apprentice, whatever.

32 years in Computer Science, 17 years since PhD, 46 years of ham radio op as @jj1wdx, 2010-2012: Professor, ACCMS/IIMC, Kyoto University, ACM Senior Member, whatever.

Past records are meaningless, unless:  
*you work on what you really want to do now*

Ignore past achievements  
Focus on now

Ignore everybody  
to stay creative and maintain originality

Lecture theme:  
Information delivery on internet  
In other words:  
How internet works

容錯設計

Fault-tolerant design

# Internet is a survival technology

Modern life is full of failures  
How internet works under failures?

# Technology 1: Packet switching

# Technology 2: Flexible packet routing

# Technology 3: Centralization, and: decentralization

# Topic sections (1/3)

- Latency and Laws of Physics
- Centralized communication
- Multiplexing
- Packet switching
- Routing basics

# Topic sections (2/3)

- IP addresses
- Routing in details
- Network transports
- Cloud computing basics
- Social implication of cloud computing

# Topic sections (3/3)

- Network fault-tolerance
- Network services and programming trends
- Wireless/radio and internet
- Information warfare and radio surveillance
- Reference books
- Career choice

Summary:

Divide data into packets  
Route flexibly and wisely  
Decentralize and distribute

OK let's get down to business!

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- Stop Asian Hate: Jason Leung, from Unsplash, <https://unsplash.com/photos/WAch7jpfk8U>
- Kyiv (on October 2020): Viktor Talashuk, from Unsplash, <https://unsplash.com/photos/iMhFpP0laGw>
- Borodyanka, Kyiv Oblast, Ukraine: Mikhail Volkov, from Unsplash, <https://unsplash.com/photos/2KRGjLL4xYo>