YOUR QUALITY PARNER FOR SOFTWARE SOLUTIONS

TMA - R&D Collaboration

Presenter: Thai Bui

TMA TechDay 2016, 15 Oct.

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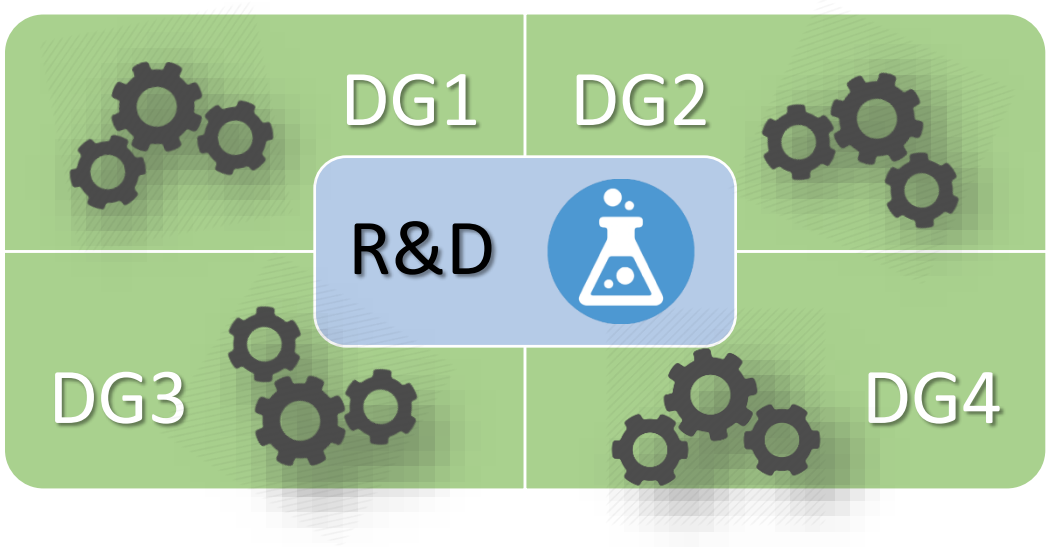
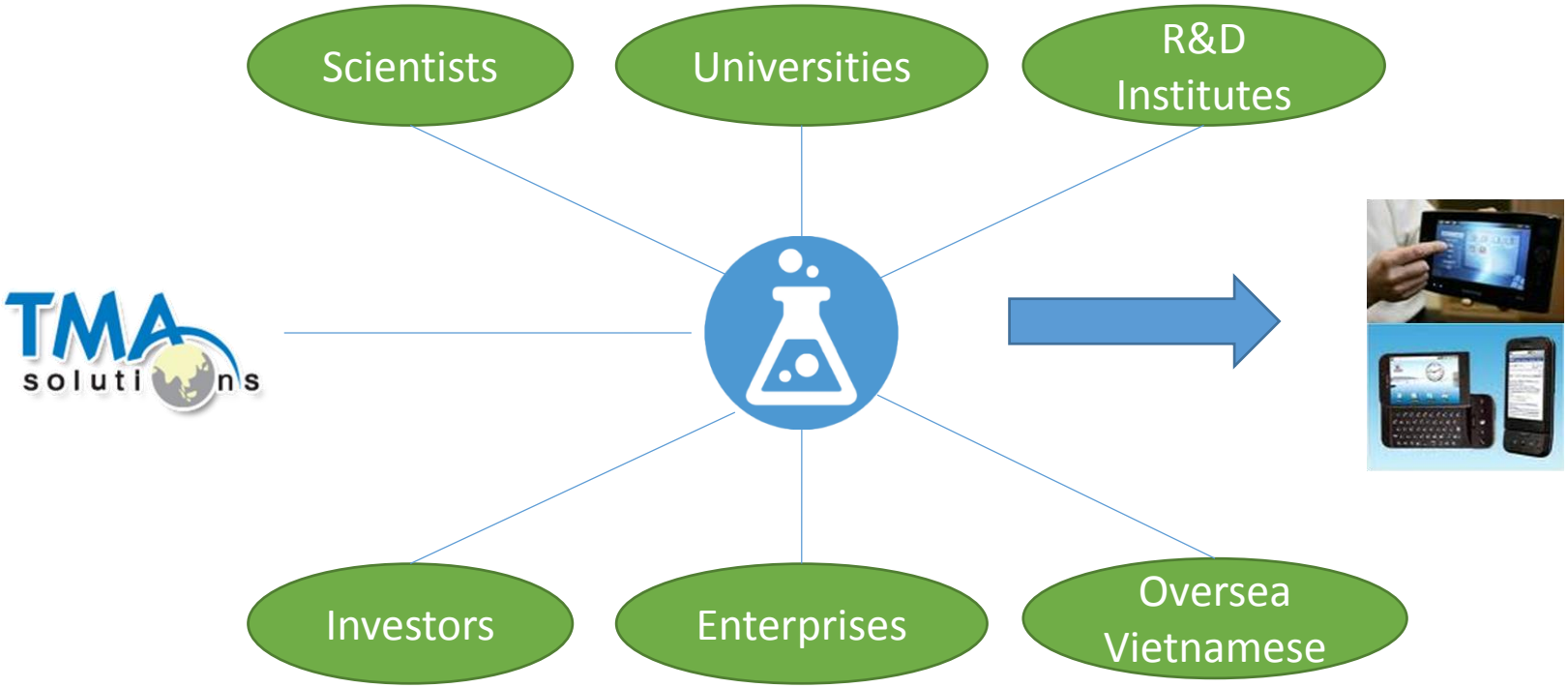
R&D at TMA

- **R&D at TMA are various in both workforce and expertise**
  - 4 DGs including 15 DCs + 1 TMR
  - Each DG has at lease one R&D group
  - Expertise in various domains: Embedded, IoT, Data Analytics, Networking, Cloud computing, Virtualization,…



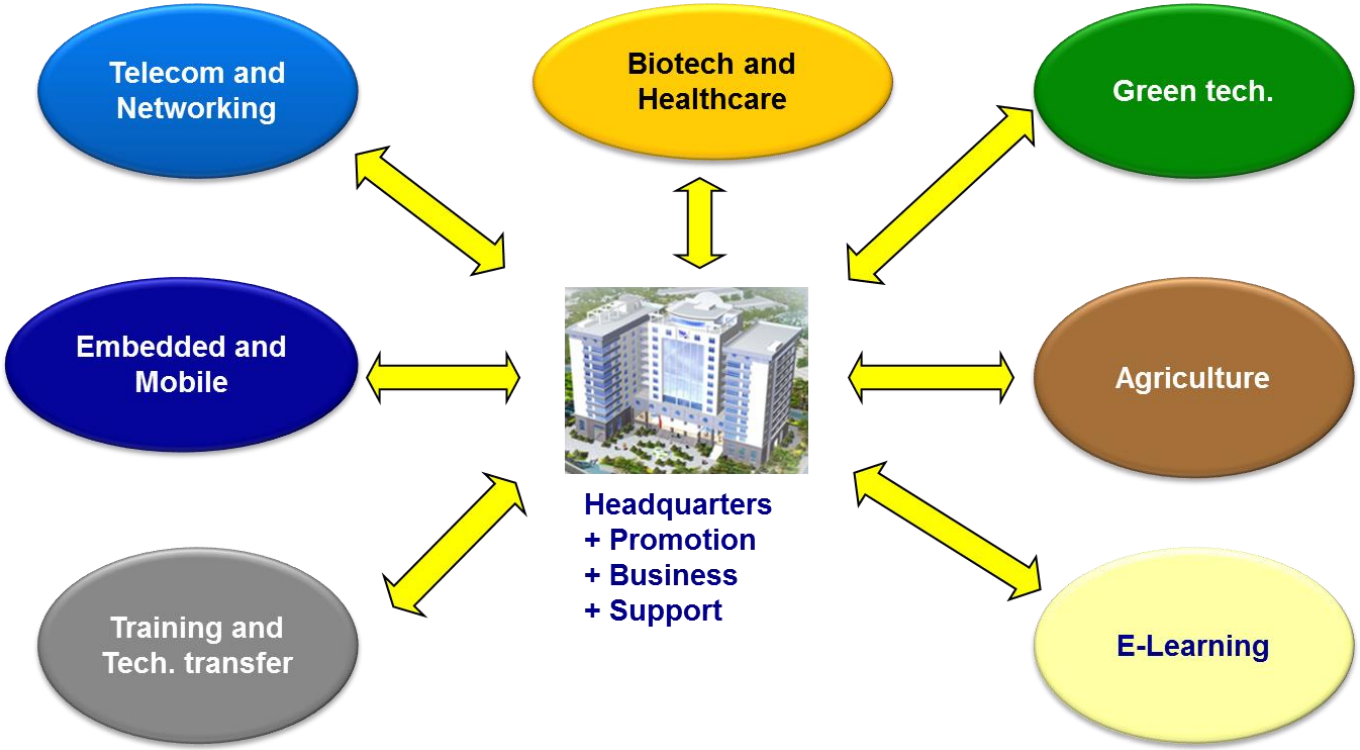
R&D Collaboration Model at TMA



Mission

To foster Research and Development, Technology Transfer and Collaboration to develop and commercialize "Made in Vietnam" technologies and products

R&D Collaboration Model at TMA



Our Strategy

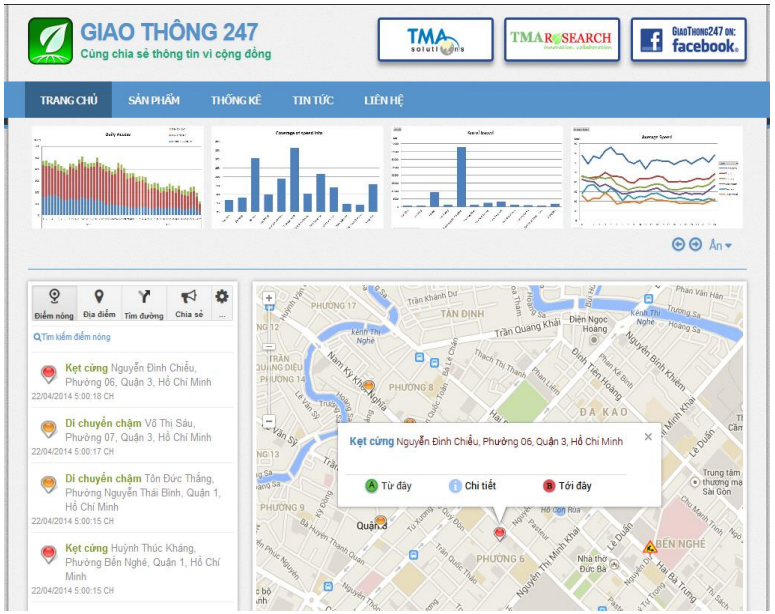
- Target on ICT-enabled projects: IoT, Embedded, Data Analytics…
- Invest in an international-level environment for R&D
- Stimulate foreign/domestic investment attraction
- Facilitate training and technology transfer

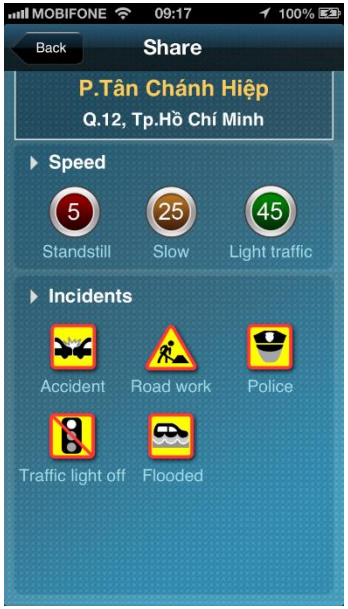
R&D Collaboration Case Studies

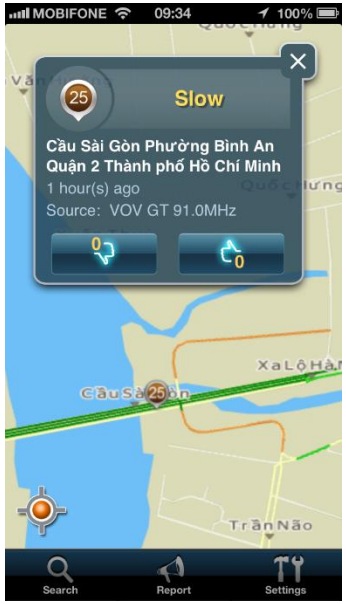
- Traffic Data Analysis Portal
- CEQEO: Gnome Alignment & Variant Callings
- Imaging Mass Spectrometry
- Sincerity Sentiment Mining

Traffic Data Analysis Portal

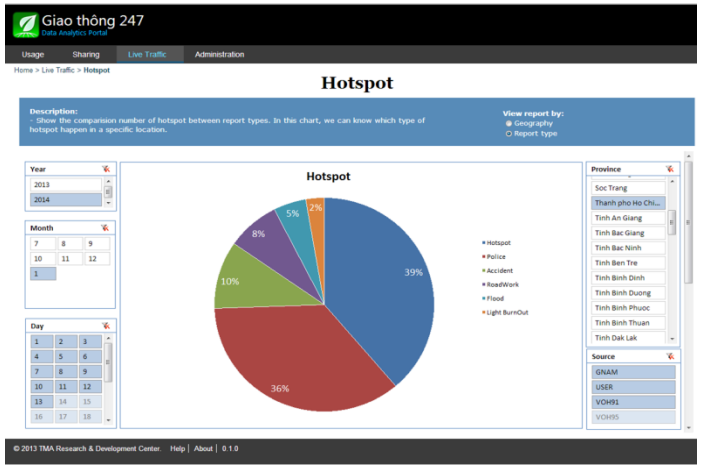
- Invested by TMA
- Technologies: GIS, Data analytics, BI, Map technique
- Domain: Traffic
- Type: Mobile and Web application

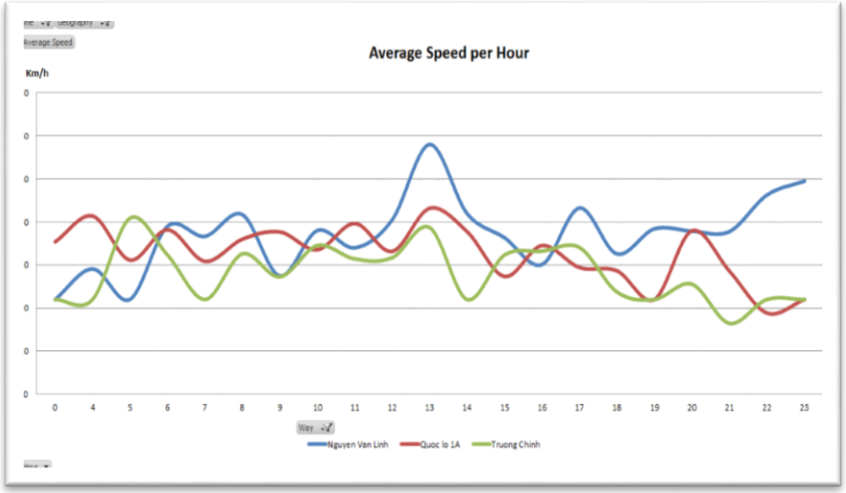


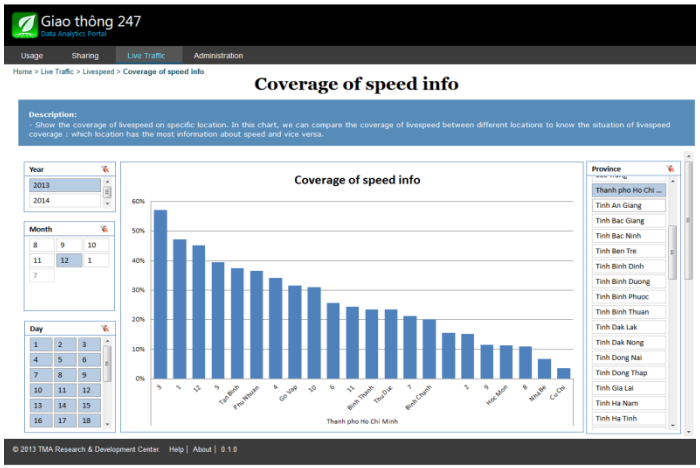




Traffic Data Analysis Portal



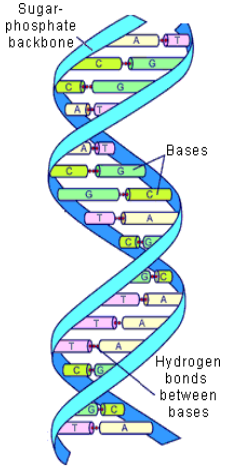




Gnome Alignment & Variant Callings

- Joined R&D Project between TMA and Prof. Greg Knowles, Adelaide University, Australia
- Technologies: Chip Design (FPGA), Linux Embedded
- Domain: BioTech, DNA Alignment
- Type: Embedded application

Gnome Alignment & Variant Callings

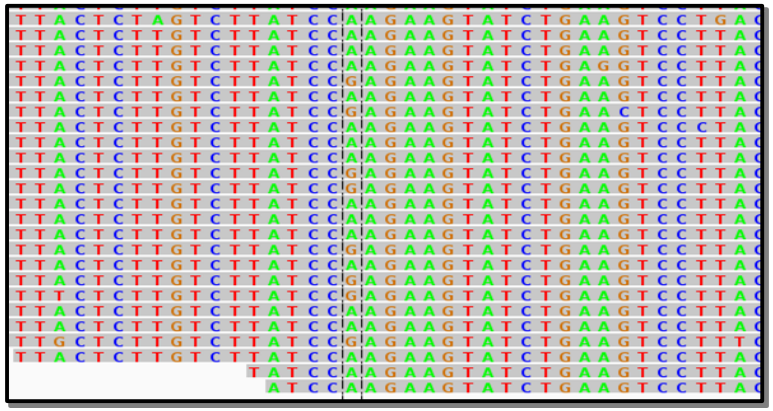


Human genome has about 3 giga bases/letters

Next-Generation Sequencing Machine
(e.g. Illumina machine)

ACGTGTACAAGGTCCGGTT
CTGAAAGTTGACCATGGAT
AACCGGTTAATTTAAGGAT
.....
AGTCCTTTTACATTGAGTAG

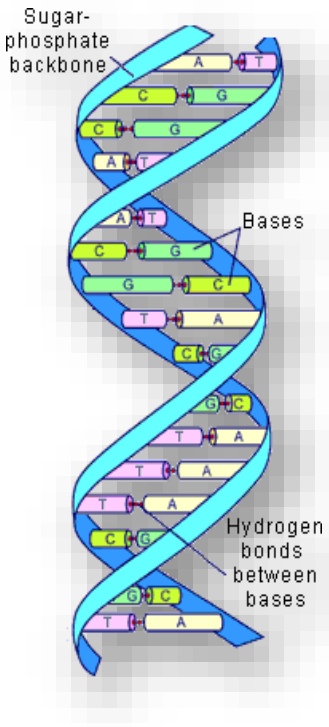
Hundreds of million reads
(30X coverage ~ 90GB)



Aligned reads and Variant callings

Gnome Alignment & Variant Callings

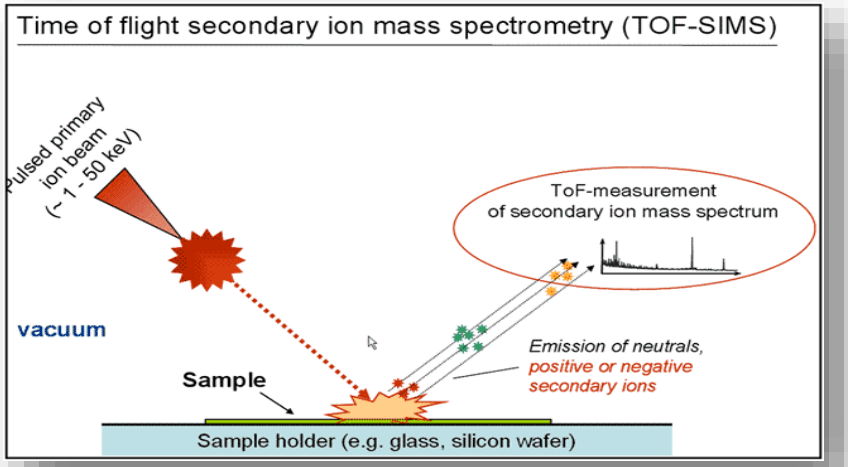
Alignment & SNPs Calling	Our Running Time	Amazon EC2's
Human genome 30x Coverage	<45 minutes on a single server (Xeon CPU)	>1hours with 320 cores



- **Passed Illumina Isaac's gold standard test**
- **Possible to integrate as a service on cloud**

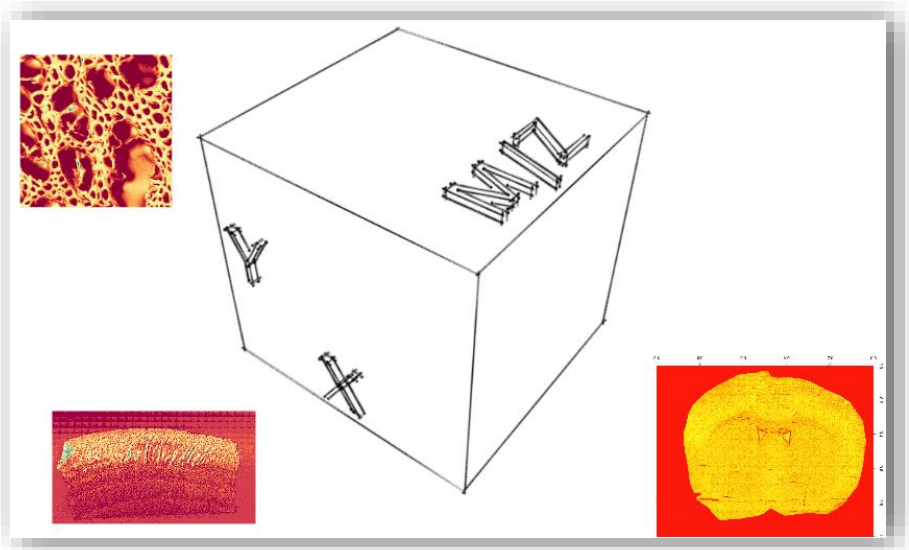
Imaging Mass Spectrometry

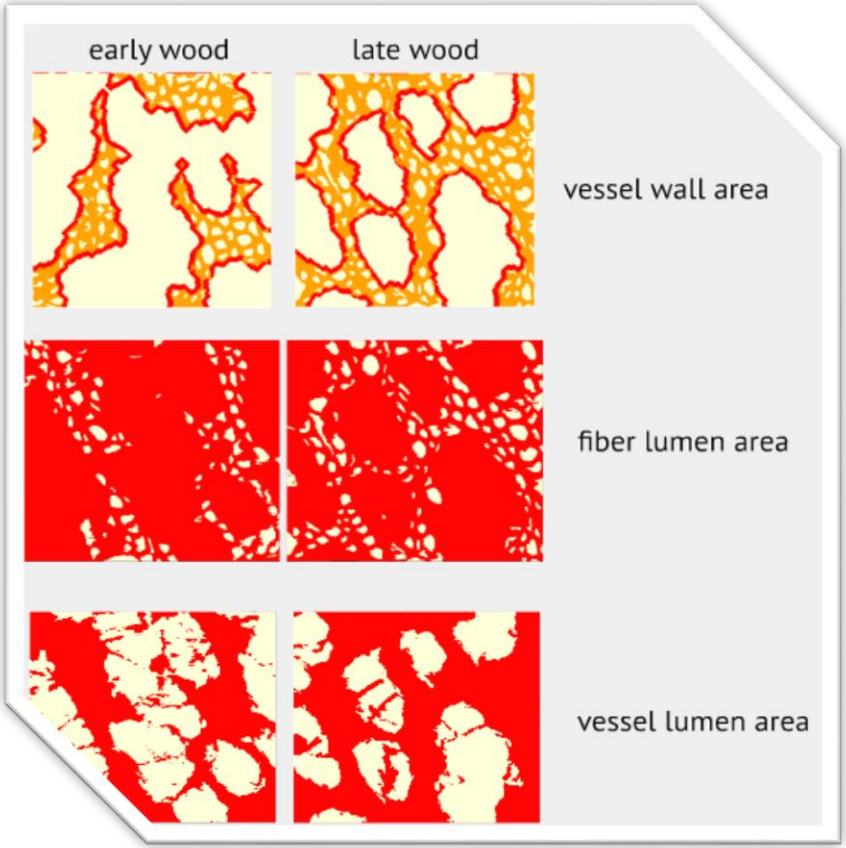
- Joined R&D Project between TMA and Dr. Lorenz Gerber, Department of Forest Genetics and Plant Physiology, Swedish University of Agricultural Sciences, Umeå, Sweden
- Technologies: Data analytics, Multidimensional data analysis (PCA algorithm, Bayes theorem), R language
- Domain: Agriculture
- Type: Visualization Application



Imaging Mass Spectrometry

Raw data in multi-dimension





Imaging Mass Spectrometry

Published in international conferences and Journal

Using imaging ToF-SIMS

onlinelibrary.wiley.com/doi/10.1002/sia.5661/abstract

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Lorenz Gerber, Viet Mai Hoang, Linh Tran, Hoang Anh Tuan Kiet, Per Malmberg, Jörg Hanrieder, Andrew Ewing

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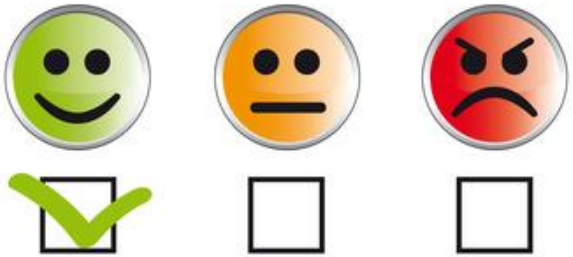
Abstract

Here, we demonstrate the use of time-of-flight secondary ion mass spectrometry

Sincerity Sentiment Mining

- Joined R&D Project between TMA and an investor from Canada
- Technologies: Analyzing & ranking sincerity sentiment, Natural Language Processing R language
- Domain: Sentiment analysis
- Type: Data Analysis Engine



Thank You &
Looking forward to collaborating with you!