Unlocking the Power of Curiosity with IOTA Vue

Revolutionizing Data Visualization for Cost-Efficient Knowledge Pursuit

Petter Moree & Sasha Jones
Chapter I: What brought us here?

Unlocking the Power of Curiosity
1400 BC Spreadsheet Tablet, Iraq Nippur
1700 BC Vitlycke-hallen, Bohus, Sweden
300 BC Painting - Proof of the Pythagorean Theorem (Euclid)
1786 W. Playfair – trading in Nordics

Exports and Imports to and from Denmark & Norway from 1700 to 1780

BALANCE in FAVOUR of ENGLAND.

BALANCE AGAINST

The Bottom line is divided into Years, the Right hand line into £10,000 each.

Published at the Act House, 17 May 1786, by W. Playfair.
1821 W. Playfair – Price of Wheat
1822 Gauss Least Squares
1901 K. Pearson – PCA (Principal Component Analysis)
Algorithm 3 NIPALS algorithm

Input: $E_0 = X$
Output: $P = [p_1, \ldots, p_H], T = [t_1, \ldots, t_H]$

for all $b = 1, \ldots, H$ do

Step 0: Initialize $t_b$

Step 1:

repeat

Step 1.1: $p_b = E_{b-1} t_b / (t_b^T t_b)$

Step 1.2: $p_b = p_b / \| p_b \|$

Step 1.3: $t_b = E_{b-1} p_b / (p_b^T p_b)$

until convergence of $p_b$

Step 2: $E_b = E_{b-1} - t_b p_b$

end for

$X_{a-1}$  $t_a$  $u_a$  $M$  $Y_{a-1}$

$N$  $W_a$  $c_a$
1996 C. Ahlberg – Spotfire
1980 J. P. Kennedy – Plant Information (PI) System

“Data is unique because it is one of the few resources that becomes more valuable the more people consume it”
The fundament
Technology

Hybrid environments

On Premise + Virtualization + Private Cloud + Public Cloud
IOTA Vue and the AVEVA PI System
IOTA Vue and AVEVA PI Data Infrastructure
People – Technology – Processes
People of IOTA

Hundreds of man years of relevant experience

- Across Industries
- Data, Analytics and Visualization Technologies

Team of leaders and experts from:

- OSIsoft and AVEVA
- Seeq
- SAP
- Umetrics
Chapter II: From curiosity to discovery
Pathway to discovery

Explorer

- Process engineer
- Data analyst
- Data scientist
- Shift supervisor
- Maintenance engineer
- Operations manager

- Mechanical engineer
- Colleague
- Intern
- Your manager
- Your team member
- You
Pathway to discovery

**Explorer**

- Sustainability
- Asset Optimization
- Energy Optimization
- Maintenance Strategy
- Cost reduction
- Operational Efficiency

**Initiative**

- Health and Safety
- Market Expansion
- Production Optimization
- Digital twin
- Assets of the Future
- Supply Chain Optimization
Pathway to discovery

- Strategic alignment
- Budget and resources
- Timeline
Pathway to discovery

- New for user or new for organization
- Exploring beyond the limits of a single system
- Technology landscape defined by the Digital transformation strategy
  - Data centralization vs distributed approach
  - Synchronization of systems and controls
  - Security and data governance

Explorer | Initiative | Executive Support | New Environments

On Premise | Cloud Based
Pathway to discovery

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<th>Explorer</th>
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<th>Executive Support</th>
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<th>SME Tools of Choice</th>
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- Geospatial view
- Process Visualization
- Data Science environment
- BI dashboards
- 2D/3D

- Excel spreadsheets
- Analytics and calculations applications
- Mobile, remote, collaborative
- Ad-hoc or pre-configured

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## Pathway to discovery

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### Future proof technology

- **Data Availability** – work natively with on-premise, private and public cloud data infrastructures – AVEVA PI Server, AVEVA Data Hub, Snowflake, Azure, Google Cloud platform, AWS, SQL-based and other data sources
- **Data Accessibility** – provides self-service access to any data of any type (tags, assets, events, batches and data tables) from any device
- **Data Integrity** - connect directly to the source providing trustworthy data to end users
Common Landscape
Enabling Explorers for better discoveries
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