Integrating Social Values into Software Design Patterns

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Question!

What is the average cost of a flight from Miami to Phoenix?

Distance 1974 Miles / 3174 Km
Duration of Flight 5 Hours
Hurricane Irma

- **Prices skyrocketed** from
- $547 to over $3,000 USD
Breach of Values: Price Gouging

• New York Times reported

“there are no ethics valves built into the system that prevent an airline from overcharging”
Volkswagen Fuel Emission Fiasco - 2015

illegal software designed to
- suppress the emissions control system on road &
- keep it engaged in the lab

Result: nitrogen oxide (NO$_x$) far in excess of the legal limit.

www.cnbc.com/
Volkswagen fuel emission-rigging scandal

Volkswagen CEO was charged in this scandal with
• conspiracy to defraud US govt. & customers
• wire fraud, (financial fraud involving IT).

Economic Impact - Brutal
• 30% drop in stock price
• 25% drop in sales within a year.
• VW has paid out billions since!!!

The Cause - misalignment of
the company’s stated corporate values and
the realization of its values in its software systems

Value Breaches in Software
What are values? Ask Google!
• Whose Values?

Donald Trump

Donald Gotterbarn
Values
current SE methods address only a small subset of these Values.
Values – Compatible vs Competing?

Schwartz: An Overview of the Schwartz Theory of Basic Values

Diagram showing the circle of values with axes for Openness to Change and Self-Transcendence, and branches for Self-Direction, Universalism, Benevolence, Conformity, and Security.
Solution - Software Design
Pattern ‘Valuefication’
Research Aims

(A1) Specify the value implications of the design patterns
(A2) Extend the existing or develop new patterns that account for social values
(A3) Develop Guidelines, Indicators, Tools, and Techniques (GITTs) for adoption of design patterns.
(A4) Gather insights on the value aspects of the design patterns.
(A5) Collect and analyze feedback on the adoption of Valuefied Design Patterns.
(A6) Maintain a list of valuefied design patterns, and value breaches and the GITTs
Value-Design Hub (VDH)
Some Examples
User Interface design patterns and Values

• Values in User Interfaces are manifested in choice of symbols, colors and rituals, hero and heroines which vary across cultures.

• Accounting for human and social values in UIDPs, reduces the risk of software rejection.
Example: UI Design Patterns and Value Manifestation
National park websites in US vs Costa Rican Park

**Individualism**
- Designed for *individuals*
- Aims at *individual* visitor’s interest and actions

**Collectivism**
- Aims at emphasis on the *nature*
- Propagates collectivism
  - Badge shows *national agenda.*

Example (CONT.):
UI Design Patterns - embedding Values via Value Design Hub

**Classifier** component can *classify* UI design pattern for US site as **Individualistic** and the Costa Rican as **Collectivist**

**Monitor** receives feedback on the valuefied UIDPs from actual users

**Pattern Maker** extends the design pattern by making value implication explicit

**Guide** provides guidance on adoption of Design Patterns

**Connector** engages Practitioners and Value Experts for DP use and feedback
Example:

Data Ownership

- More control of shared data
- Freedom to use an invented identity
Example:

Privacy Design Patterns – Location granularity

- A collaborative effort “Privacy-by-design”
- 53 Design patterns
- [https://privacypatterns.org/patterns/](https://privacypatterns.org/patterns/)

Location Granularity design pattern example

*Privacy* is **just one** of the **56 values** in Schwartz theory of human values

*Don’t other 55 human values including fairness deserve similar attention and effort?*
Example:

Value - *Sense of belonging*

requires our attention
Example:

Value - *Enjoying life*

also requires our attention

Most HR systems make Work-life balance harder to achieve over emphasise work over the values of well being and enjoying life
What we plan to achieve!

• Promote a Valuefied approach of developing software
• Catalogue of Valuefied Design Patterns
  
  Design Pattern – Added Dimension of Value Implication
  1. Name
  2. Problem
  3. Solution
  4. Consequences/results and trade-offs
  5. Implementation: An architecture using a design class diagram
  6. Value implication (Identified value(s), and value conflicts)
• Value certification for software
Thank you!

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