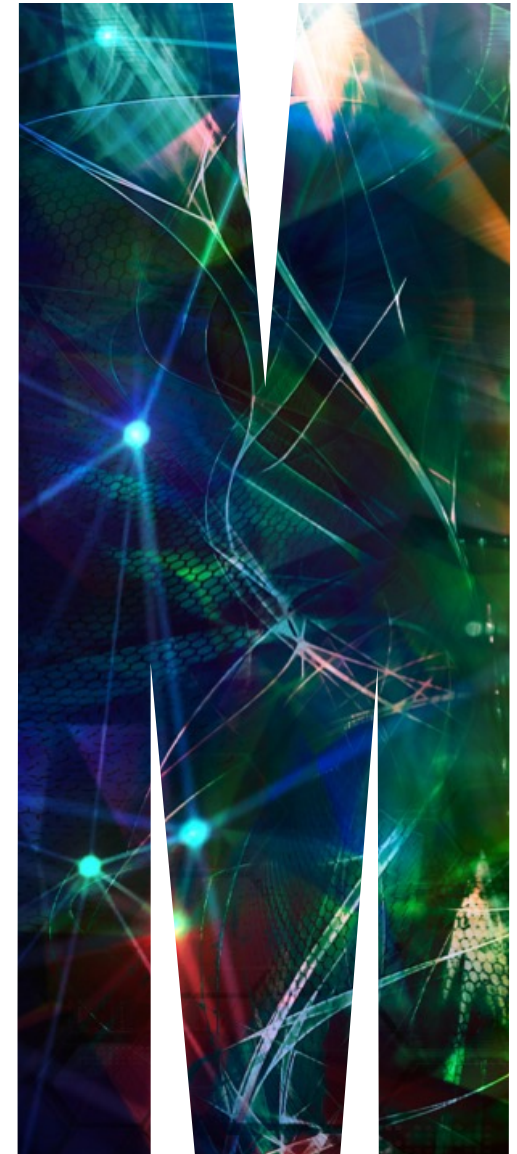# Integrating Social Values into Software Design Patterns

Waqar Hussain, Davoud Mougouei, Jon Whittle

Faculty of IT, Monash University

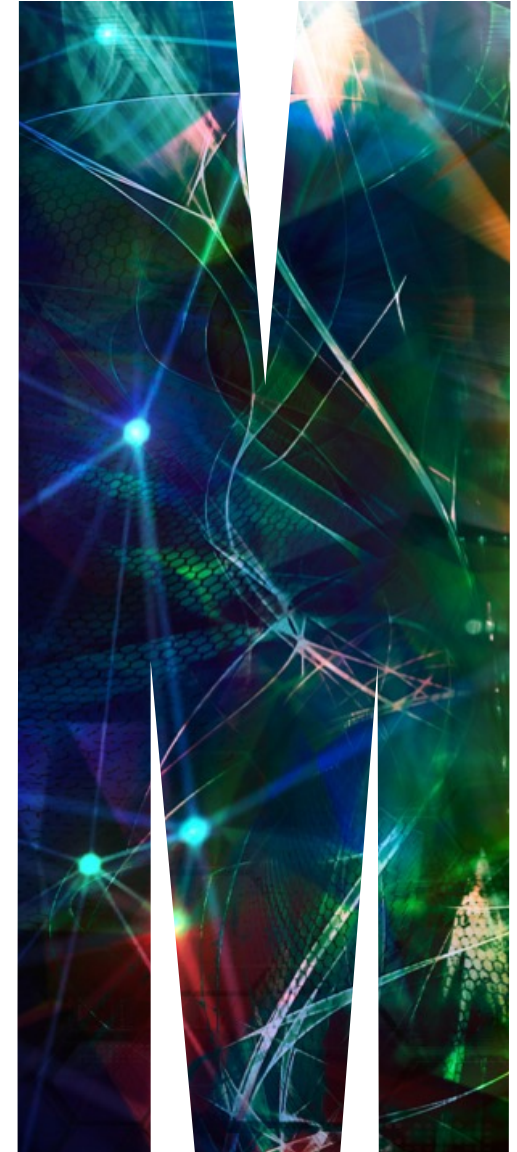ICSE 2018, Gothenburg, Sweden

29 May 2018

Question!

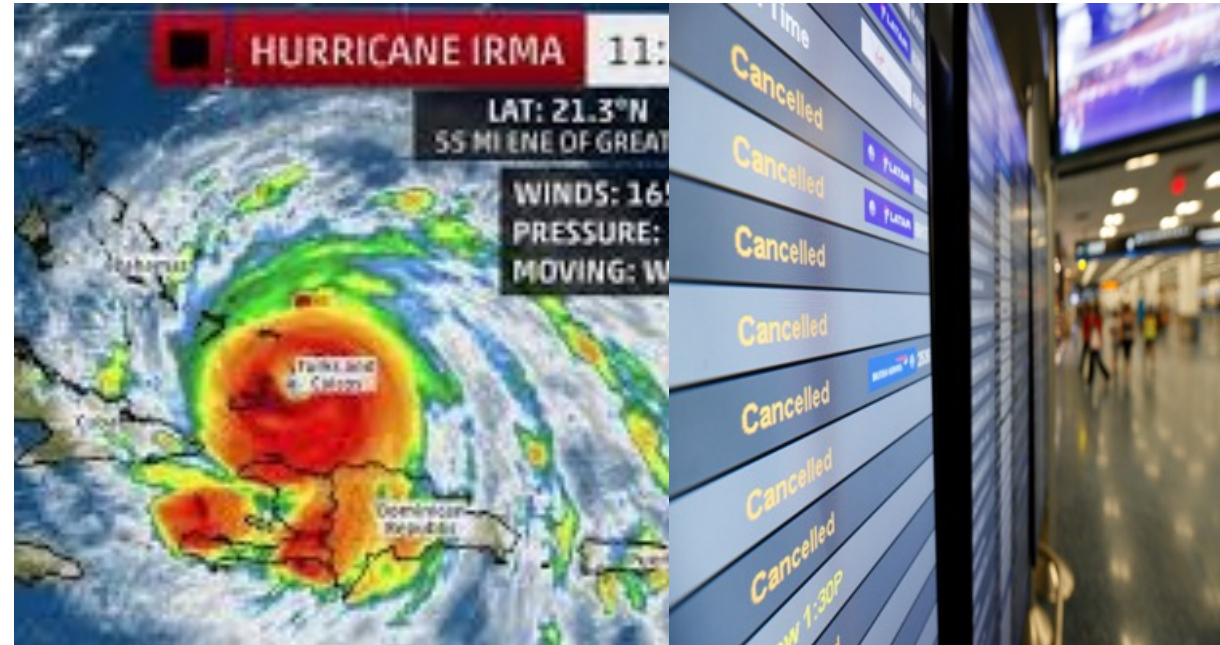What is the average cost of a flight from

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

SHHH...

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.

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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

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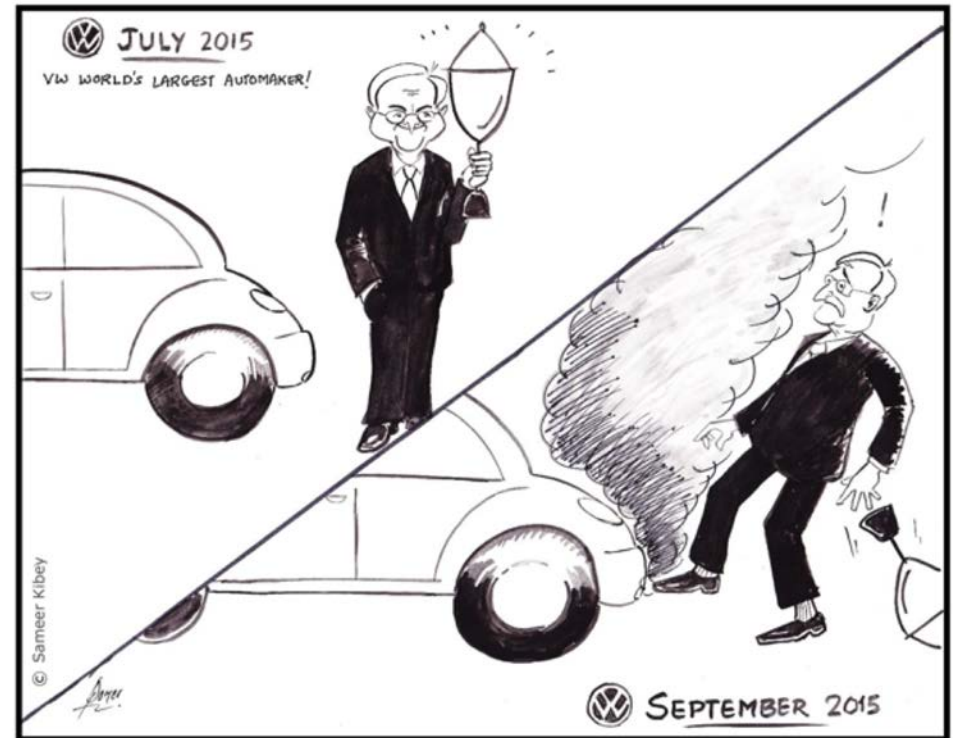
Value Breaches in Software

What are values? Ask Google!

www.google.com

•Whose Values?

Donald Trump

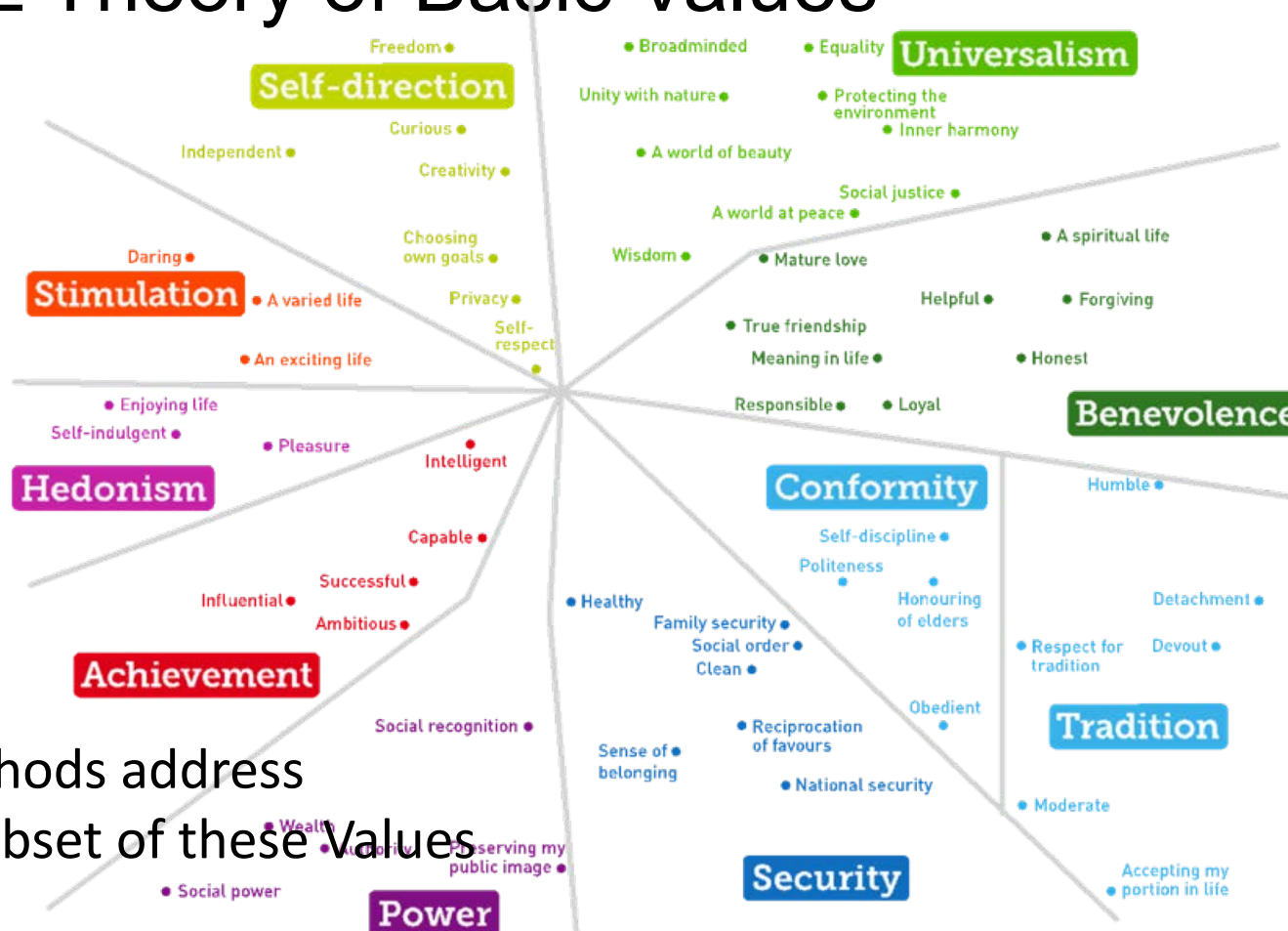

Donald Gotterbarn

MONASH
University

Values

Schwartz Theory of Basic Values

current SE methods address
only a small subset of these Values

Schwartz: An Overview of the Schwartz Theory of Basic Values

- **Values – Compatible vs Competing?**

Schwartz: An Overview of the Schwartz Theory of Basic Values
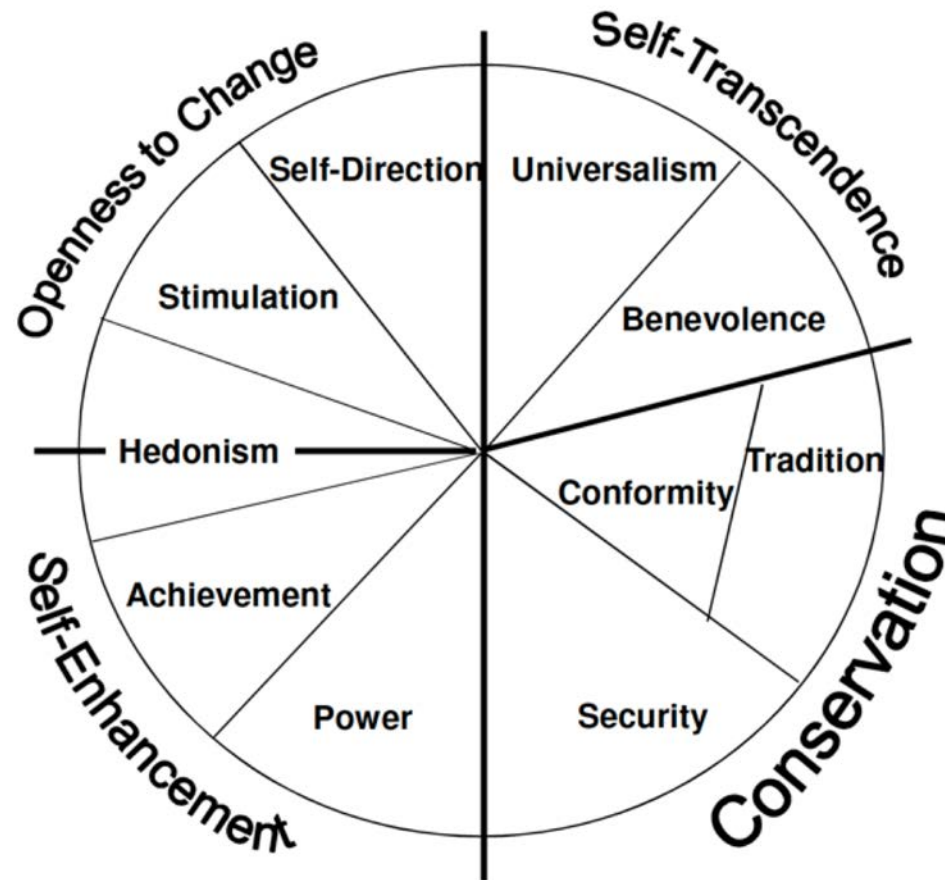
Solution - Software Design Pattern 'Valuefication'

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
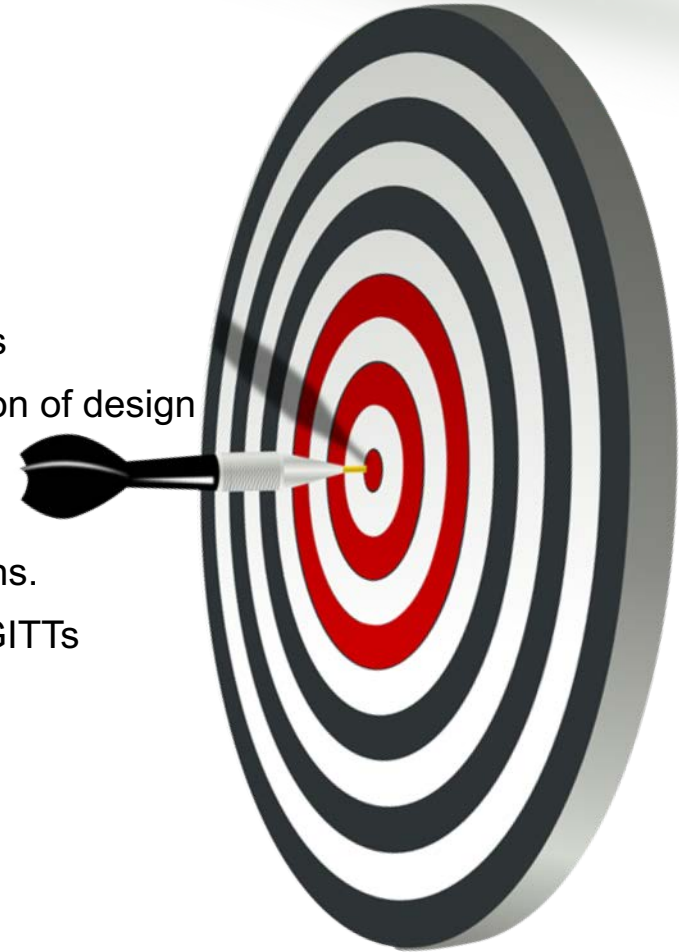
Value-Design Hub (VDH)
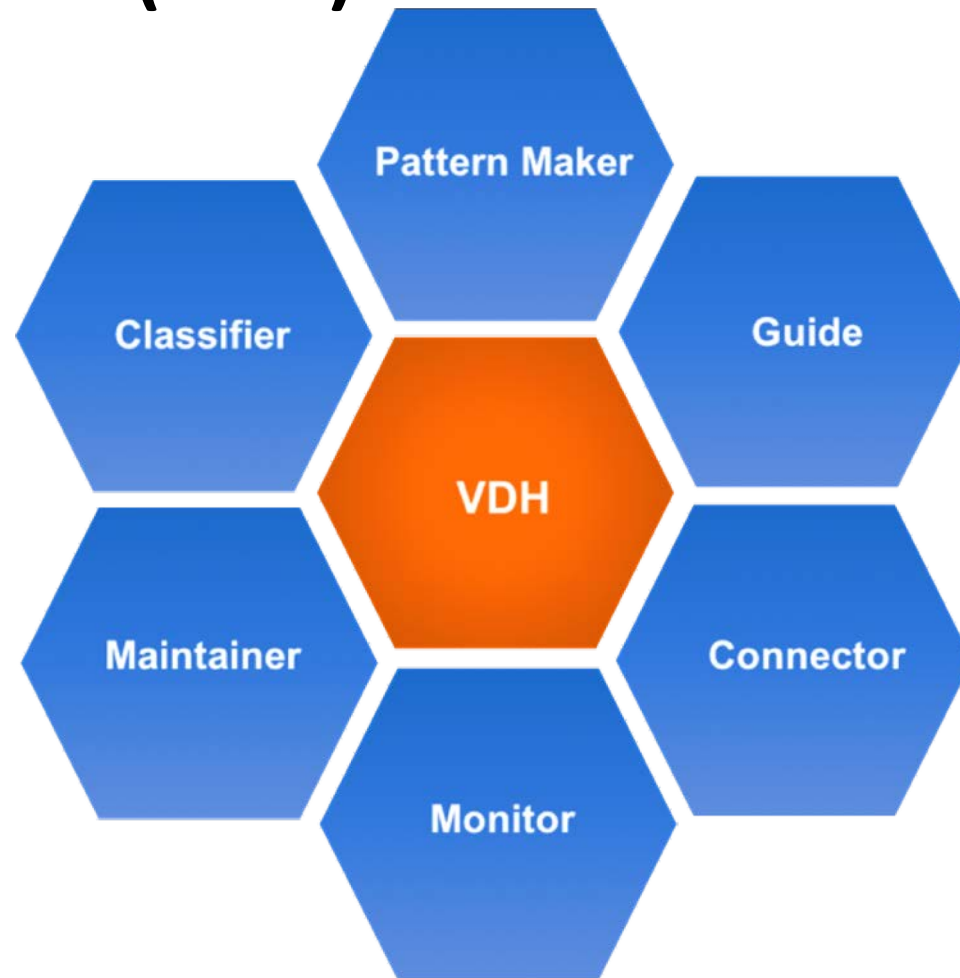
Some Examples

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

www.networkworld.com
www.conceptdraw.com

Example: UI Design Patterns and Value Manifestation

National park websites in US vs Costa Rican Park

Individualism

- Designed for **individual**s
- Aims at **individual** visitor's interest and actions

Collectivism

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

Marcus, Aaron, and Emilie West Gould. "Crosscurrents: cultural dimensions and global Web user-interface design." *interactions* 7.4 (2000): 32-46.

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

Pattern Maker extends the design pattern by making value implication explicit

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

Guide provides guidance on adoption of Design Patterns

Connector engages Practitioners and Value Experts for DP use and feedback

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

Pattern Maker

Classifier

Guide

VDH

Maintainer

Connector

Monitor

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Example:
Data Ownership

- More control of shared data
- freedom to use an invented identity

facebook. **Vs.** diaspora*

wiki.diasporafoundation.org

hsibv.com

Mr. Mark Zuckerberg

jerseyeveningpost.com

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Example:

Privacy Design Patterns – Location granularity

- A collaborative effort *"Privacy-by-design"*
- 53 Design patterns
- https://privacypatterns.org/patterns/

Editing Settings for Dopplr

Read Level?

no information about my location
✓ my exact location
my current neighborhood
my current city
my current region or county
my current state
my current country

Can set your location?

✓ Confirm   ✗ Cancel
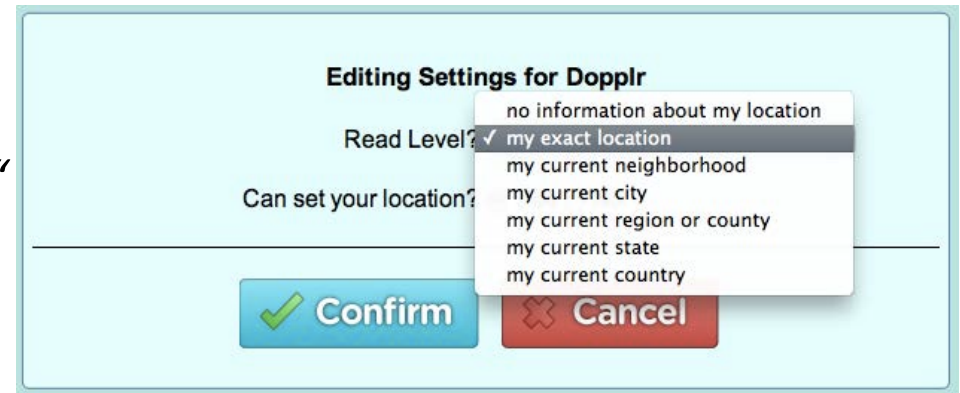
Location Granularity design pattern example

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

info.umkc.edu

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Example:

Value - *Enjoying life*

also requires our attention

Vacation

17
remaining
days

○ Annual entitlement: 25 days
▢ Used: 8 days
▮ Scheduled: 0 days
▮ Remains: **17 days**
Current entitlement: **9 days**
Liability: $***

Sick Time

4.4
days used

Used: **4.4 days**
Scheduled: 0 days
Bradford Factor: 214 days

qph.fs.quoracdn.net

cedarandco.co.uk
worklifebalancefoundation.com/

Most HR systems make Work-life balance harder to achieve

over emphasise work over the values of well being and enjoying life

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What we plan to achieve!

- **Promote a Valuefied approach of developing software**

- **Catalogue of Valuefied Design Patterns**

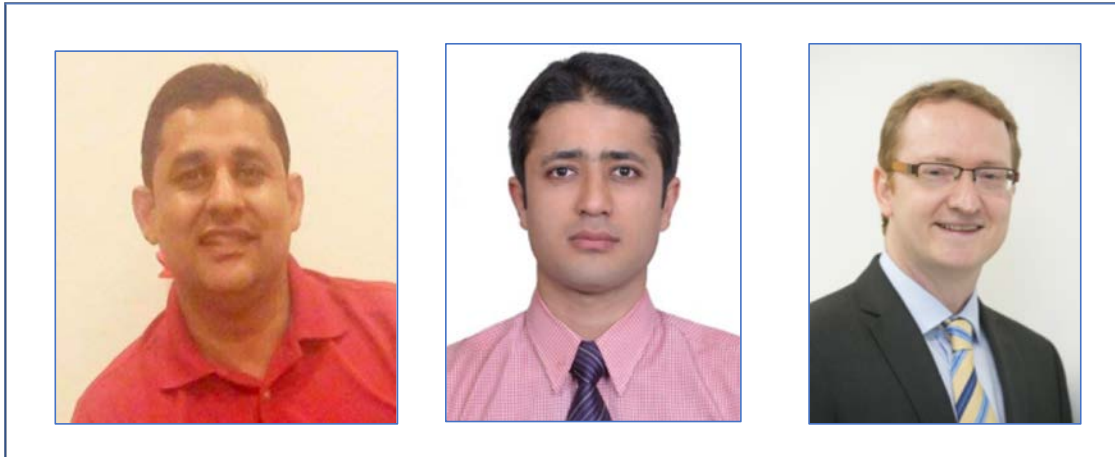- **Value certification for software**
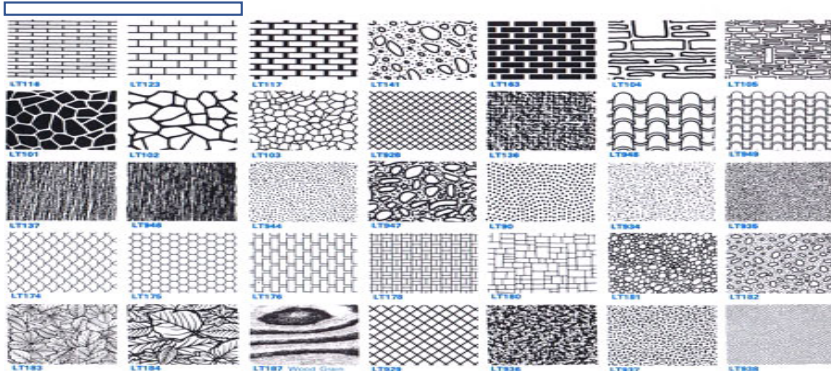
Design Pattern – Added Dimension of Value Implication

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)**

Thank you!

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Q & A