Exploring the Conversations Around Trust in Software Development

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“TRUST, not technology is the issue of the decade” - Tom Peters

INTRO

Overview

- This presentation will explore how developers talk about and approach the issue of trust in the software development community

Why is this important?

- Trust in software is essential to ensuring its safe and effective use, and developers hold the key to building and maintaining that trust.

Aim and Purpose

Shed light onto the crucial conversations within the developer community about trust

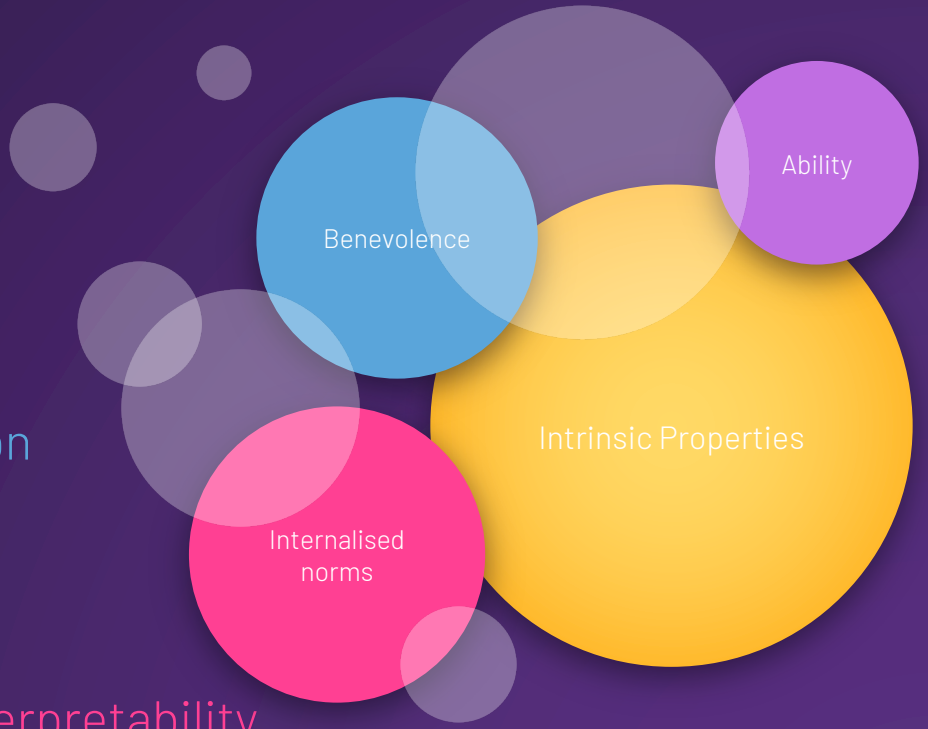
Lit review

Lit Review

- Kelly and colleagues conducted a literature review on the characteristics and properties of trust in technology
- Uncovered 16 factors that shape trust

Intrinsic Properties

- Accuracy and correctness
- Trialability
- Autonomy
- Visual appearance and usability
- Collaboration and communication
- Sociability and bonding
- Security and privacy
- Reliability and dependability
- Transparency, explainability, interpretability
- Familiarity
- Fairness



Extrinsic properties

- Trust of the tech creators
- Reviews of tech product
- Users' perceptions of
  - tech/AI in general
  - how decisions are made
  - capabilities
  - goal congruence
  - reputation
- Accountability
- Concerns over job loss

We know what users are thinking about

But what are developers talking about in terms of trust?

Method

Methodology

Research and Planning

- Researched other literature
- Chose stack overflow
- Focus on comments

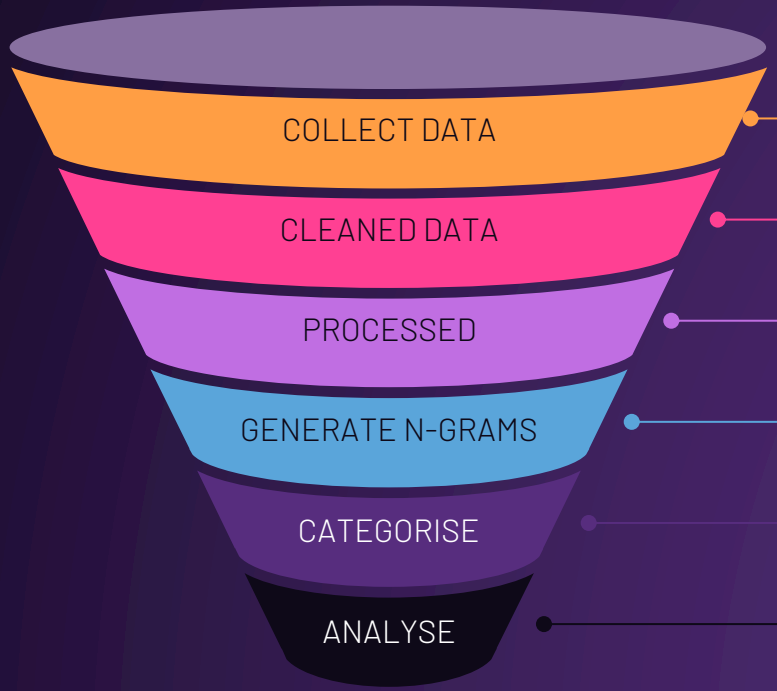
Data Collection

- Use Stack Exchange data dump with SQL & Bigquery to get necessary information

Analysis and Results

- Break down each comment into multiple n-grams and analysed them

Data Collection



- Collect all comments about trust from stack overflow
- We removed all unnecessary words within each comment
- Used NLP techniques to further process and simplify the data
- Generated N-grams based on the cleaned data
- Categorised the data into the factors determined by Kelly and her colleagues' lit review
- Analysed our results by determining frequency of n grams for each category

Example

Collected → Cleaned → Processed

```
In my case this error was caused by IP addresses forwarding.
```

Untitled-1

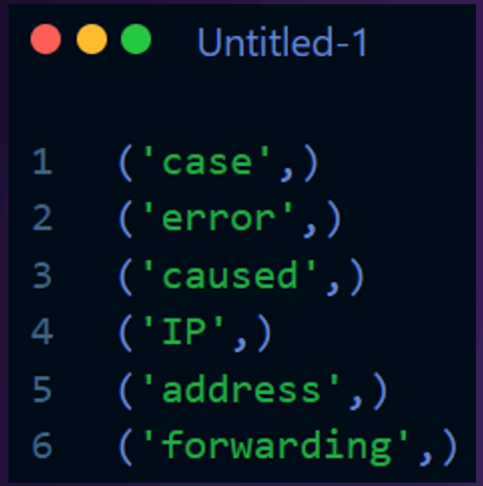
```
1  ['case', 'error', 'caused', 'IP',
2  'addresses', 'forwarding']
```

Untitled-1

```
1  ['case', 'error', 'caused', 'IP',
2  'address', 'forwarding']
```

Example

N-gram Generation → Categorise → Analyse



- Categorise the ngrams, eg error would go under ‘Accuracy and Correctness’
- Counting number of n grams in each category

Categorisation Cont

- Manually categorising them
- Script which found similarity scores between two words/phrases

Categorisation Safeguards

Semantic Heavy

- Context not taken into account

Analysis

- Only counted words/phrases with >70% similarity score
- Weighted manual totals more heavily

Analysis & Results

9767 Ngrams

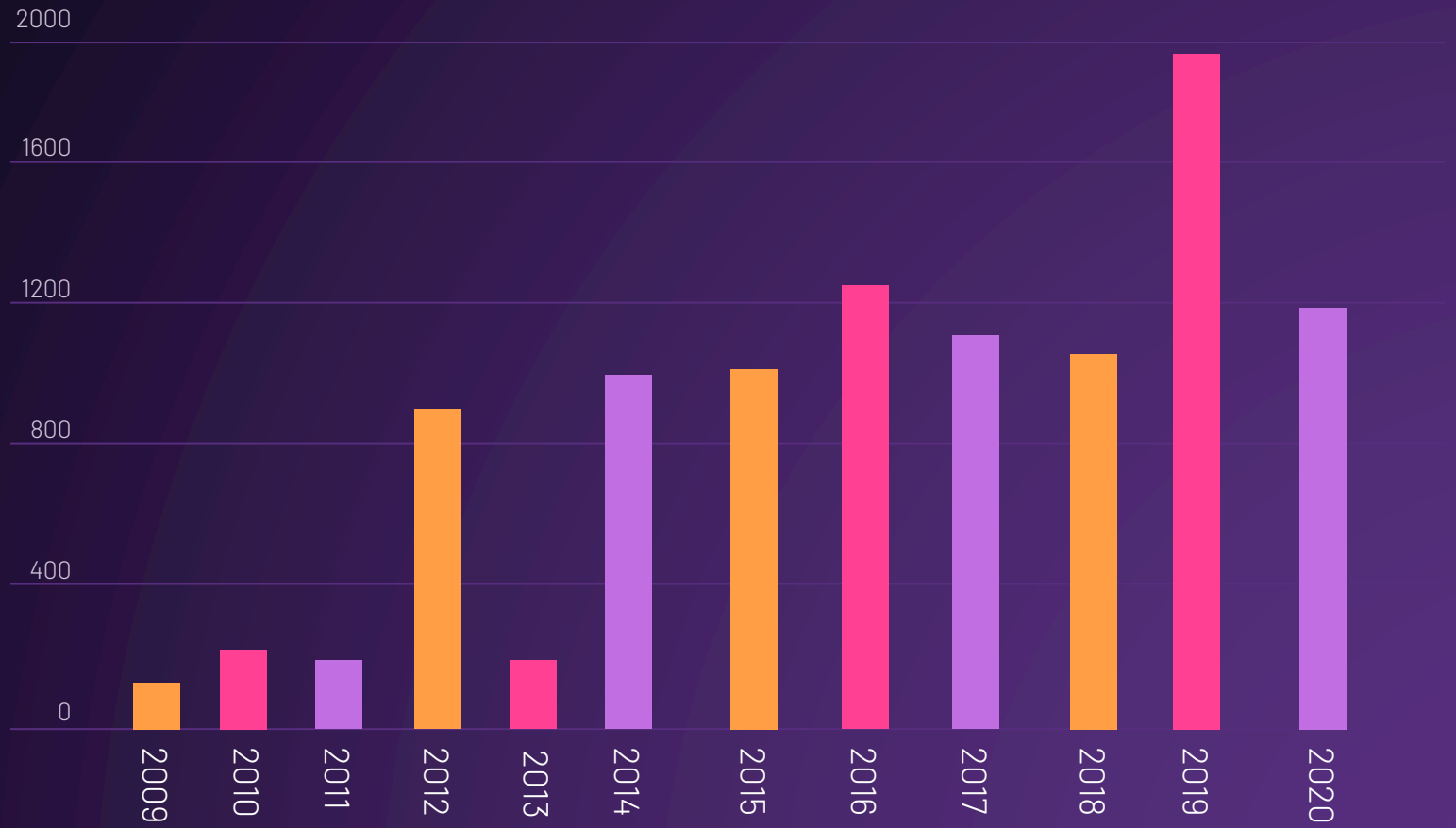
Put the actual category

	Manual	Script	Overall
First	**Security & Privacy**	**Familiarity**	**Security & Privacy**
Second	**Reliability & Dependability**	**Visual Appearance**	**Reliability & Dependability**
Third	**User Perception**	**Sociability**	**User Perception**

592
Security and Privacy

420
Reliability and Dependability

362
User Perception


2000
1600
1200
800
400
0
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020

Limitations and Future Work

Limitations in analysis and research

Data Collection

- Only looked at stack overflow, not other sources
- Only looked through posts explicitly tagged under trust

Analysis

- Script didn't take into account context of the ngrams
- Potential bias on my end when categorising the ngrams
- Subjectivity of manual analysis

Areas of Improvement

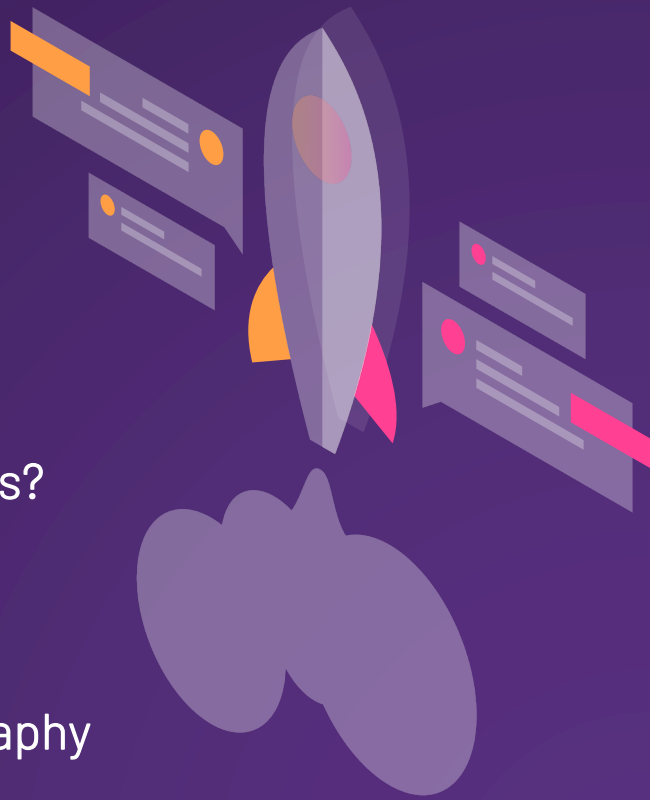
- Have multiple sources categorise the N-grams to minimise bias and errors
- Find posts relating to trust that weren't correctly tagged
- Choose other platforms to research

Future Questions

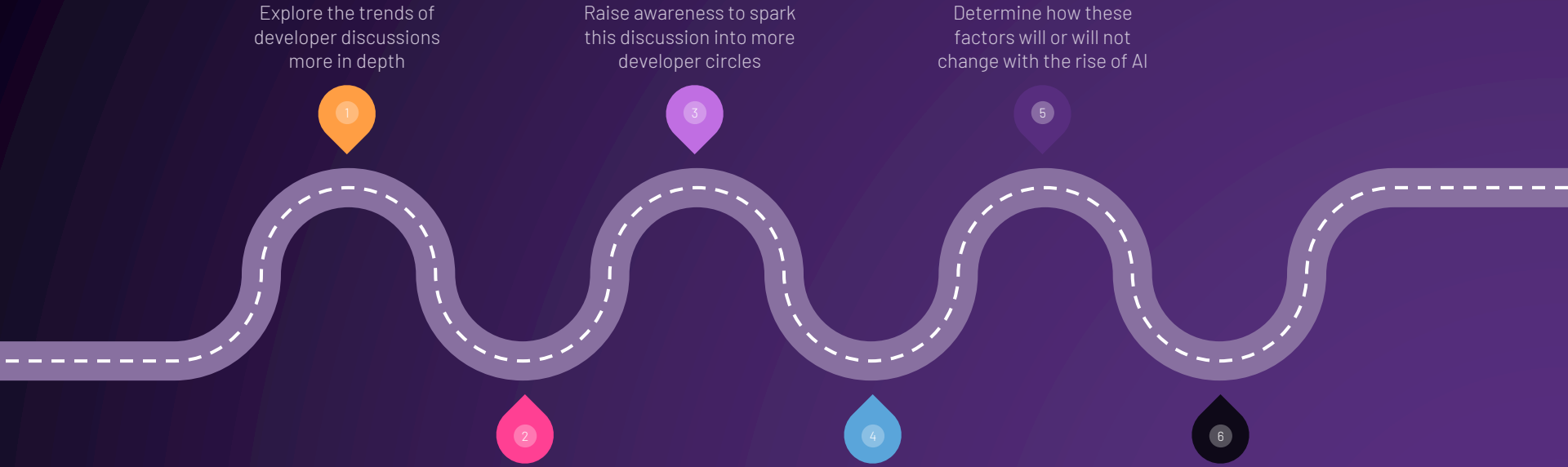
- How has the conversation about trust shifted between developers over time?

- Do our findings match with other developer discussion platforms like Github script reviews?

- Is this a common theme between developers across the world or do language and/or geography influence this?



ROADMAP OF FUTURE RESEARCH



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Assisted with the ngram generation

CREDITS

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I will now take any questions