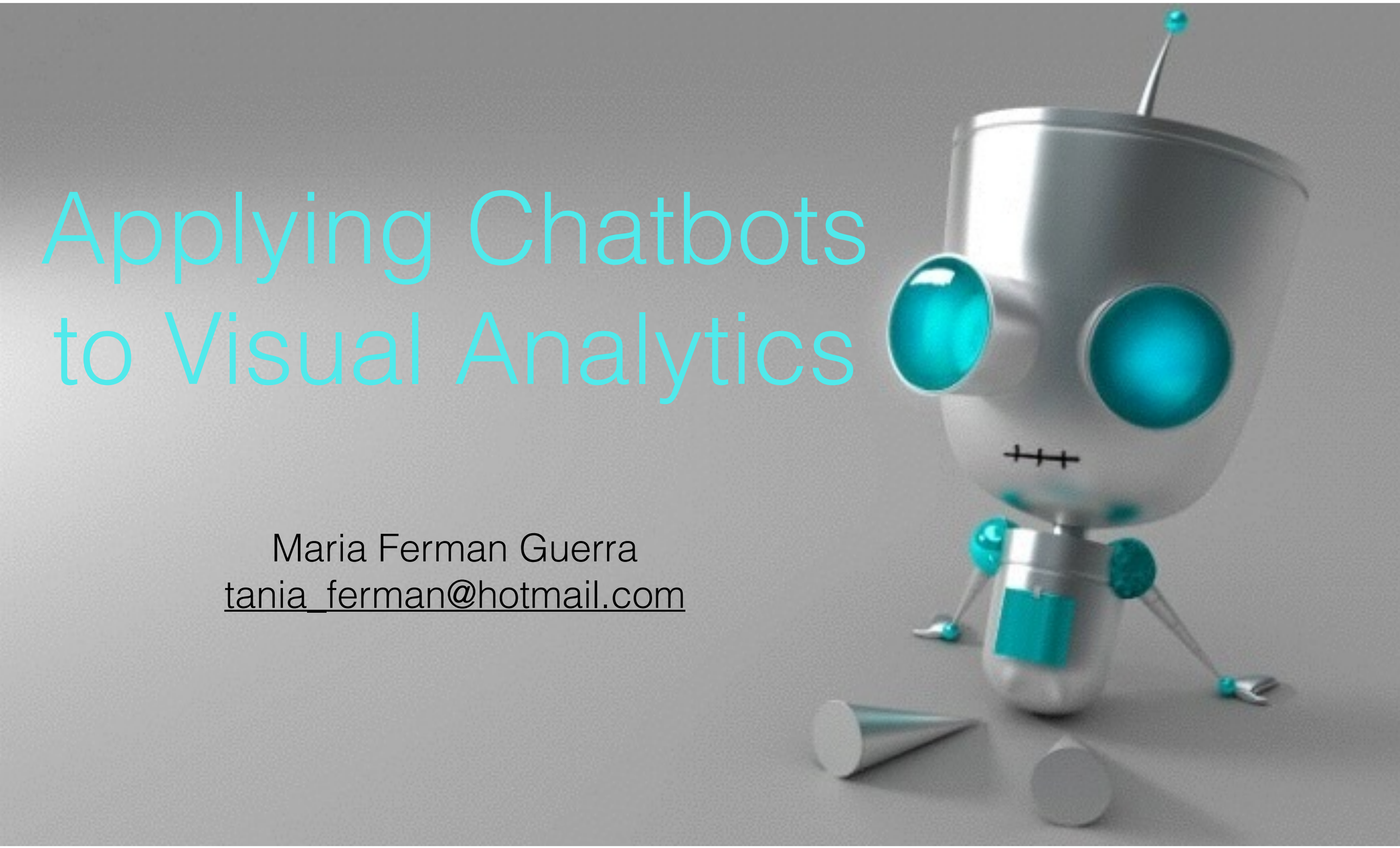
Applying Chatbots to Visual Analytics



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Problem

Fact: Effective visualizations allow users to reason about data and make efficient decisions

But: Data analysis tools may not create satisfactory visualizations

Bots may allow users to create more effective visualizations

“Match between system and the real world—The system should speak the users’ language, with words, phrases and concepts familiar to the user, rather than system-oriented terms.”(Jakob Nielsen, “Ten Heuristics”, 1990)

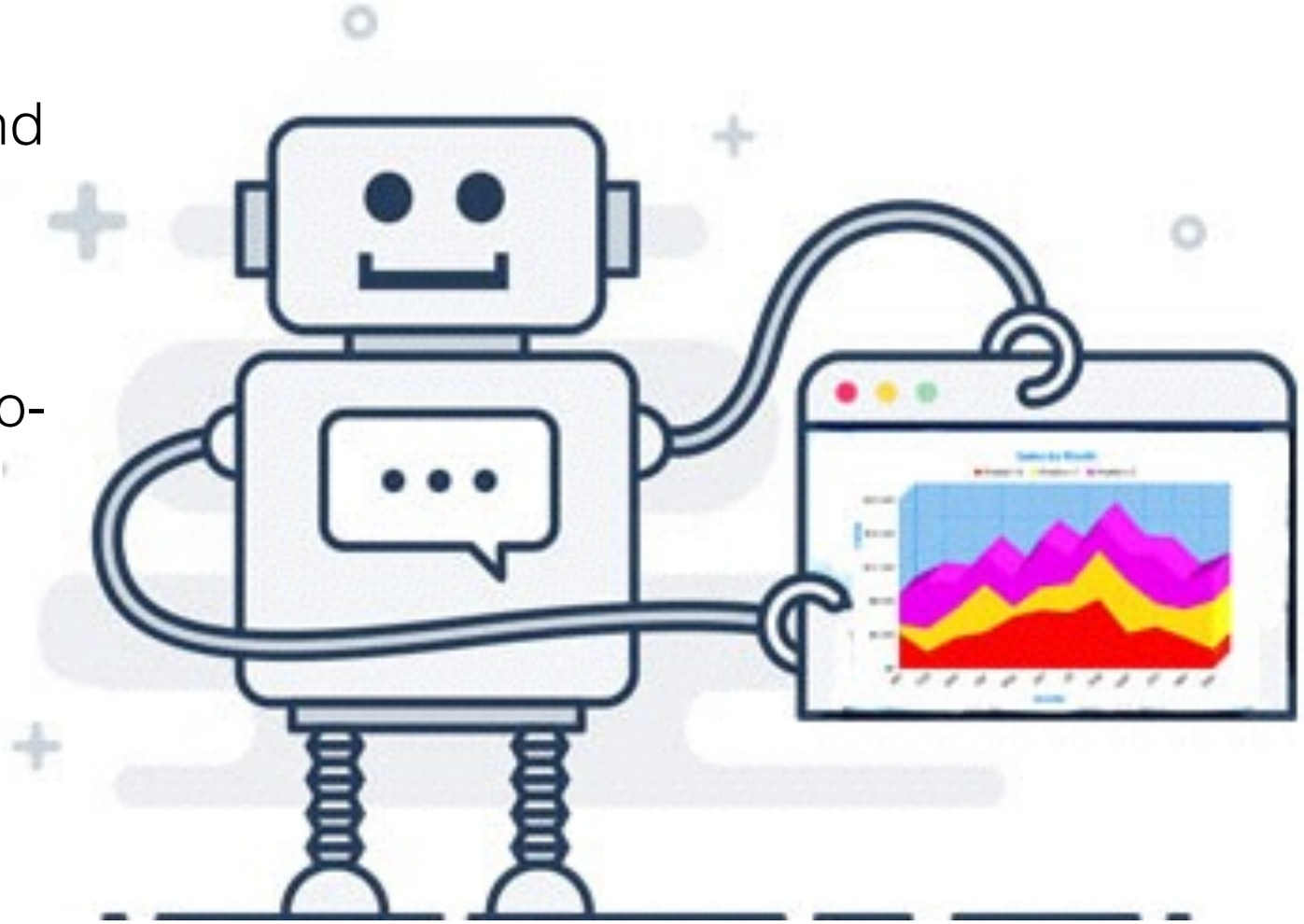
Project Idea

- Creating visualizations for novice can a complicated process

- With the help of a Chatbot, users can create better visualizations and have deeper insights about their data

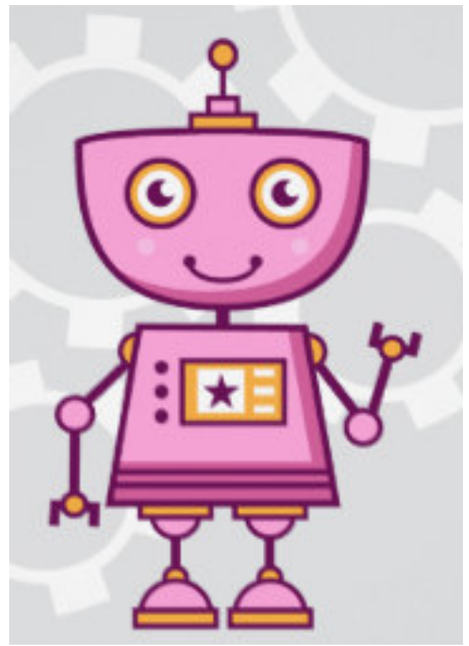
- Chatbots allow users to have a two-way conversation interface

★ Create Visual Analytic Bot prototype that help users to create visualizations



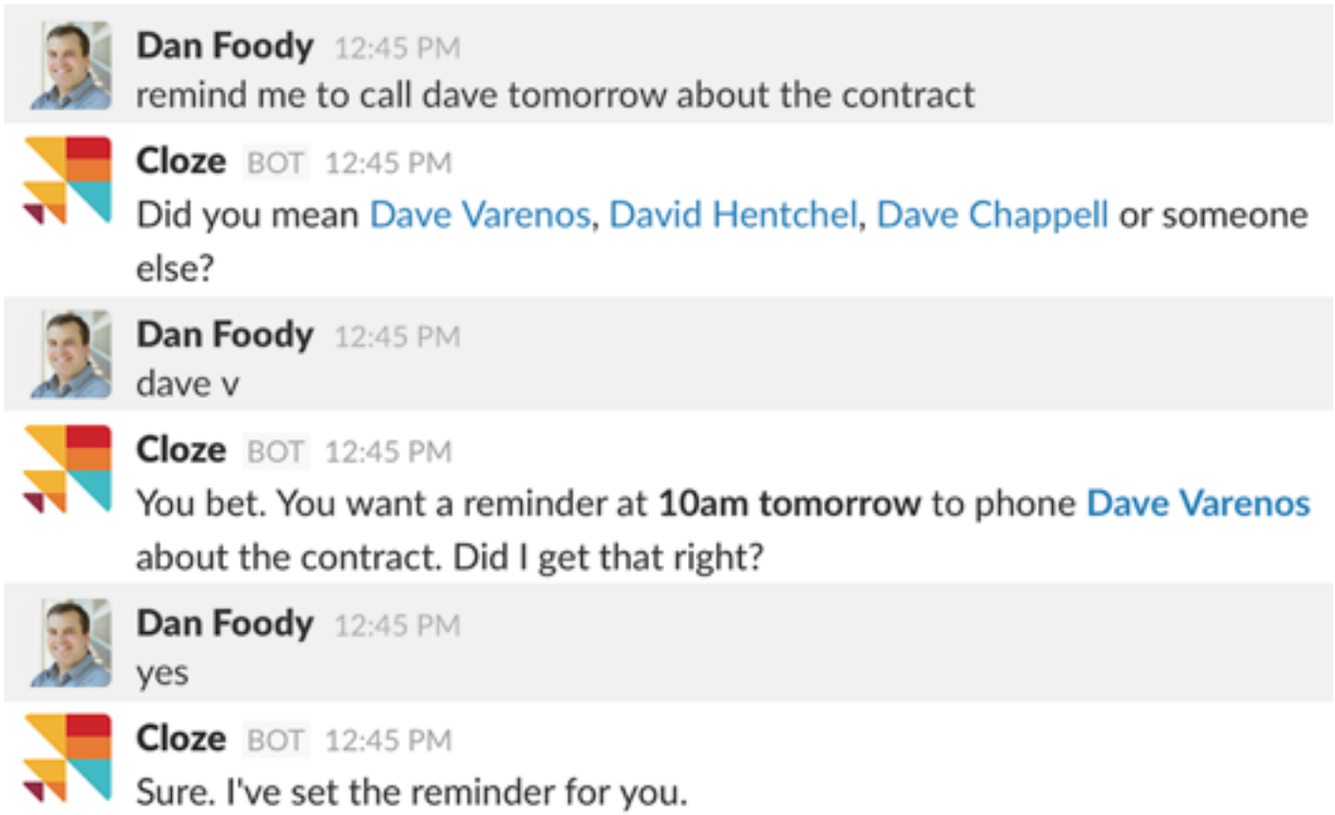
Project Idea (Cont)

- Ideally the Bot would:
  - Respond user's questions
  - Store previous user's interactions
  - Suggest Visualization
  - Provide information about Visualizations
  - Provide general insights of the data
  - Make changes about the created Visualization

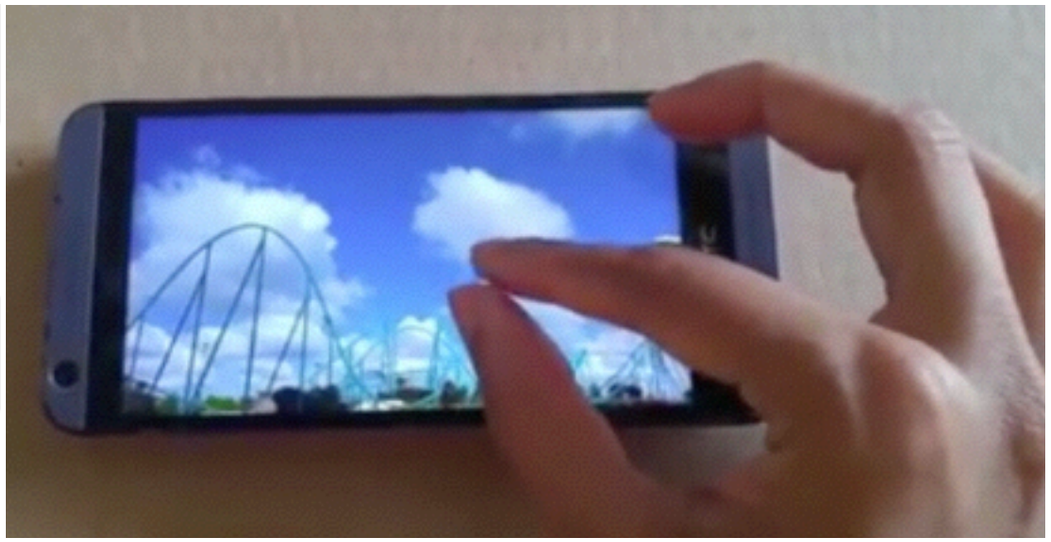


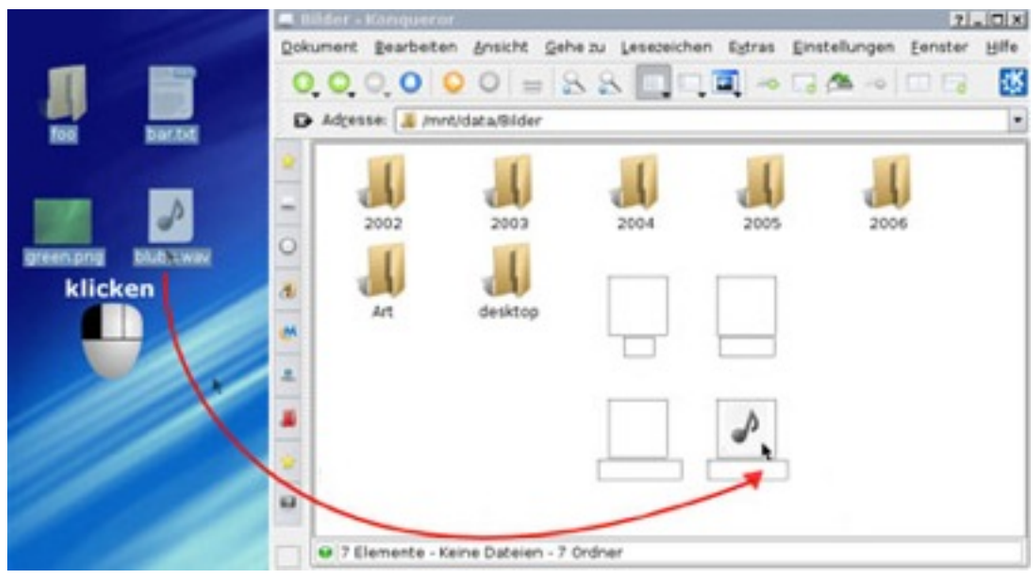
Bots Vs Direct Manipulation

- Bots



- Direct Manipulation:





Why Bots are a Better Option?

- Bots know the individual user's habits and preferences

- Reactive and Proactive = take initiative

- Make changes overtime

- Bots will act as an "extra eye" in the data analysis

- Proactively make recommendations to users

Shneiderman, B., & Maes, P. (1997). Direct manipulation vs. interface agents ACM. doi:10.1145/267505.267514

Ingredients

Natural Language Processing: is the ability of a computer program to understand human speech as it is spoken

Visual Analytics: is the science of analytical reasoning supported by interactive visual interfaces

Bots: is a conversational agent where a computer program is designed to simulate an intelligent conversation

Project Overview

(Grammel, Storey, Torv 2012)

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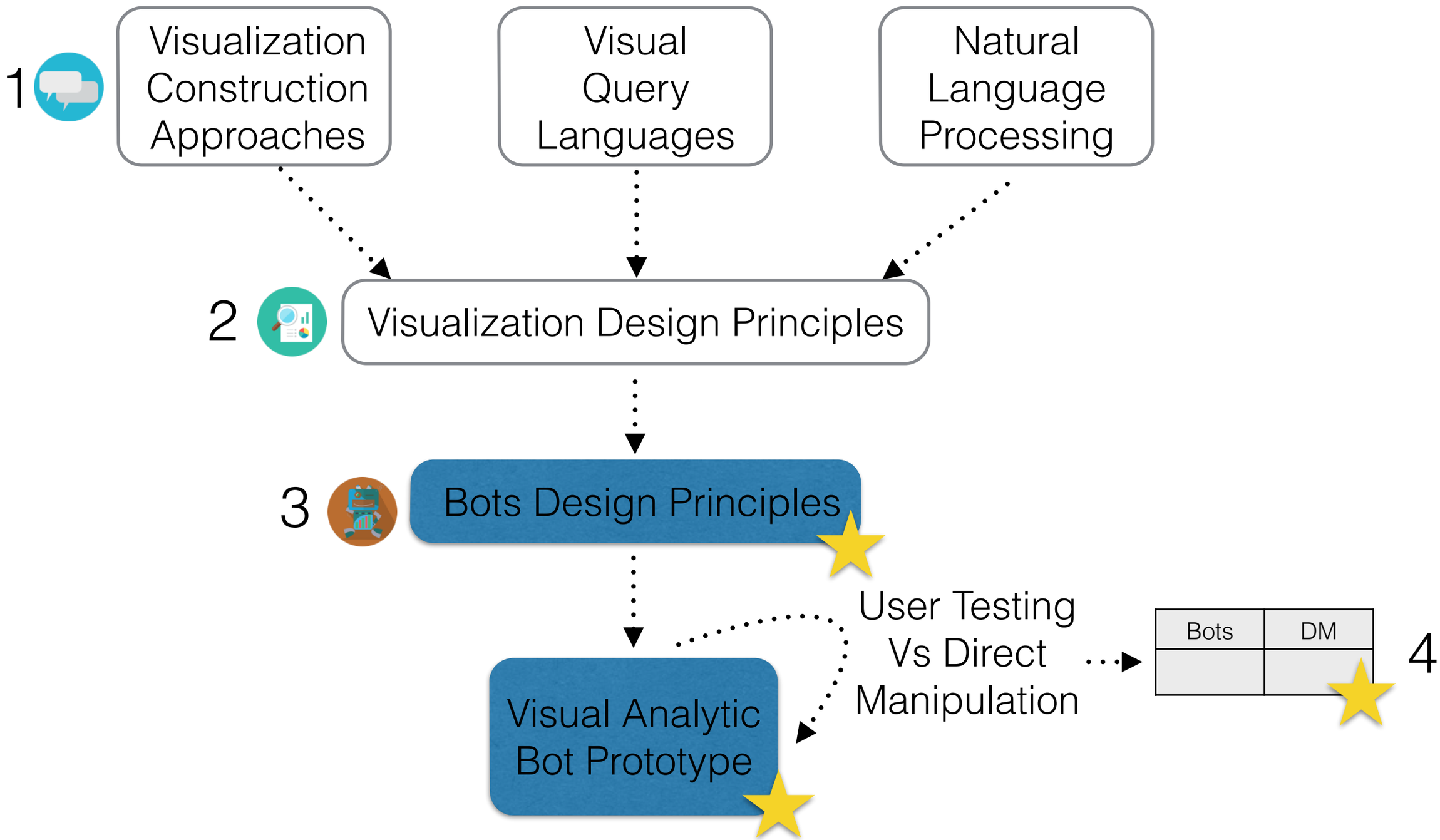
Natural Language Processing

Visualization Design Principles

Bots Designs Principles → Contribution 1

Visual Analytic Bot Prototype → Contribution 2

Project Task Description

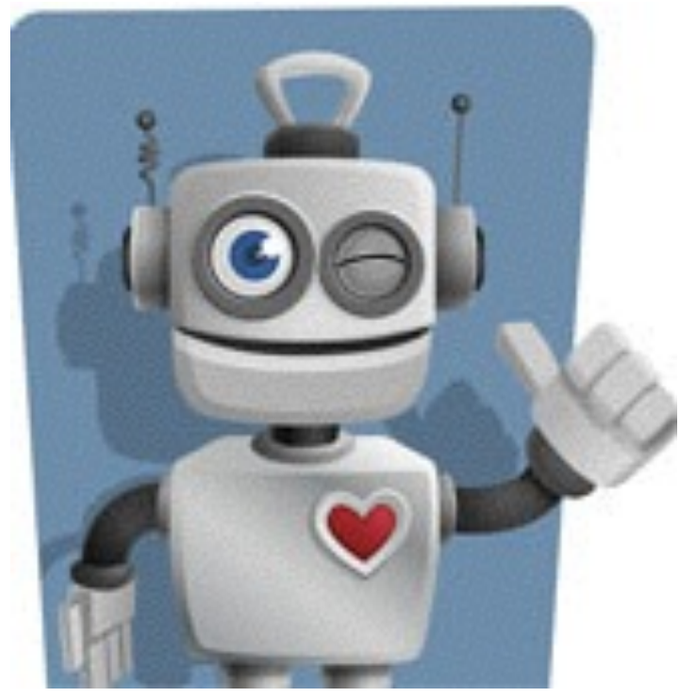


Design Time!


Creative Thinking
IDEAS
CONNECT
click
People
Friends
Share
cloud
CHECK LIST:
Inspiration
think?
good!

Two Roles (user-bot)

	Avg Anual Temperature	Coldest Month (January)	Warmest Month (July)
Victoria	9.7	3.8	16.4
Toronto	13.7	-6.3	20.8
Québec	4	-12.7	19.2
Vancouver	10.1	3.3	17.6
Montreal	6.5	-10.2	20.9



Bot
Role 2

Novice User
Role 1

Two Roles (user-bot)

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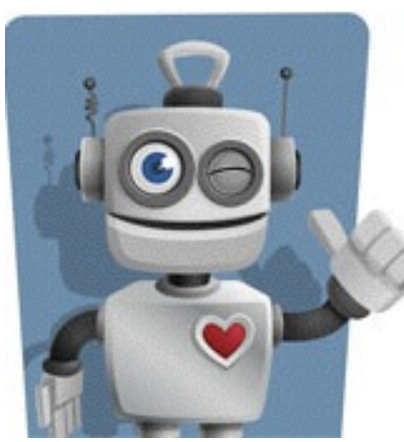
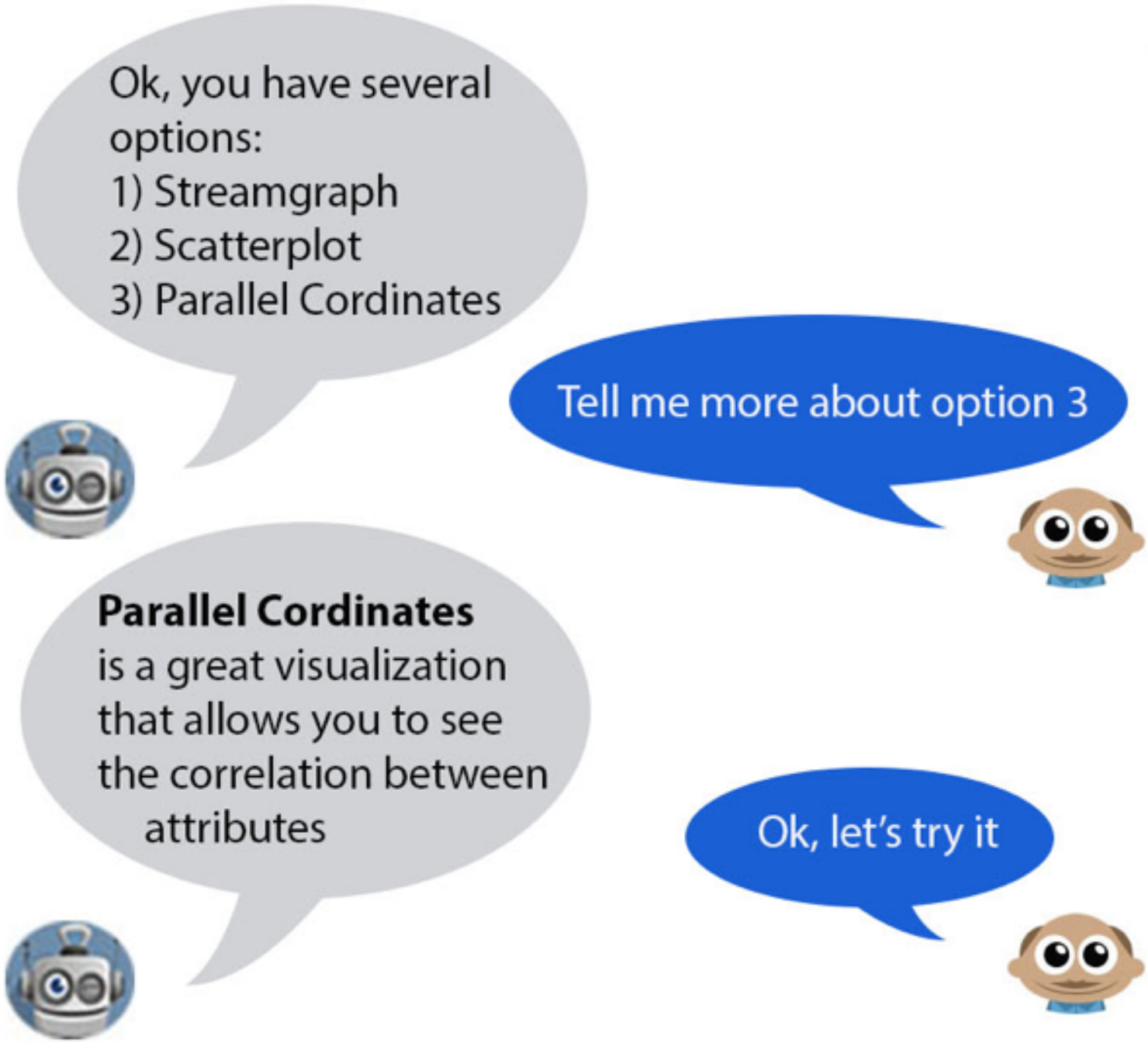
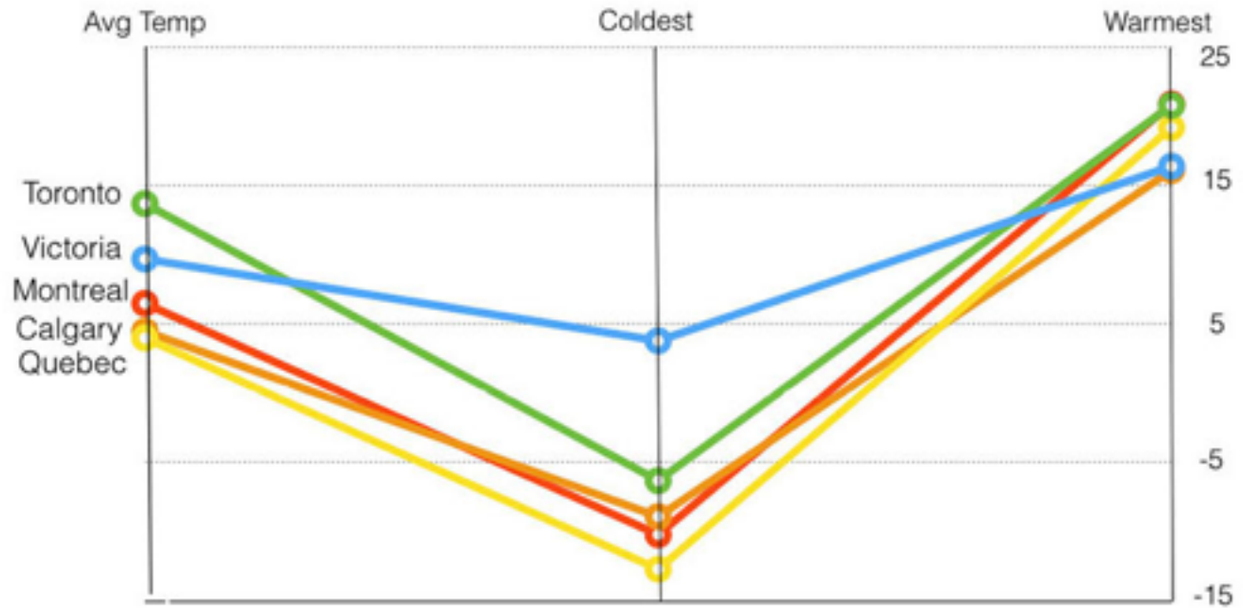


Script

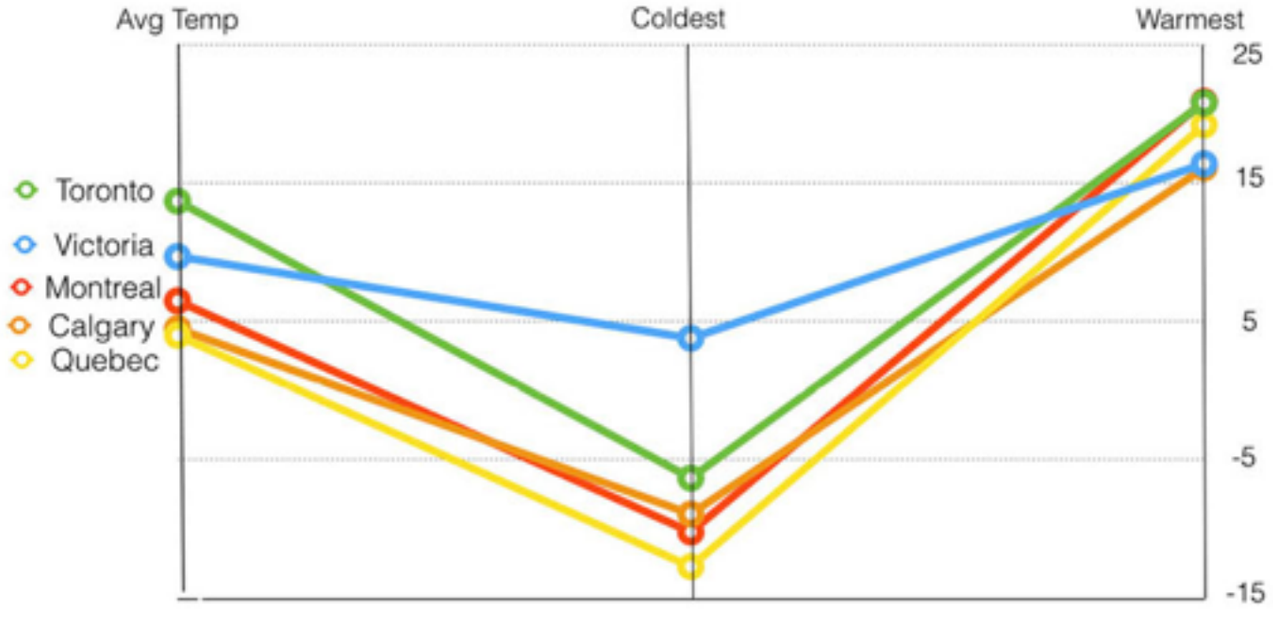

Hi, I need help to visualize my data
The visualization of your data will be used for exploration or presentation?
I want to explore the data
You can use a Choropleth Map
No, I don't want to use a Map What else do you have?


Ok, you have several options:
1) Streamgraph
2) Scatterplot
3) Parallel Cordinates
Tell me more about option 3
Parallel Cordinates is a great visualization that allows you to see the correlation between attributes
Ok, let's try it



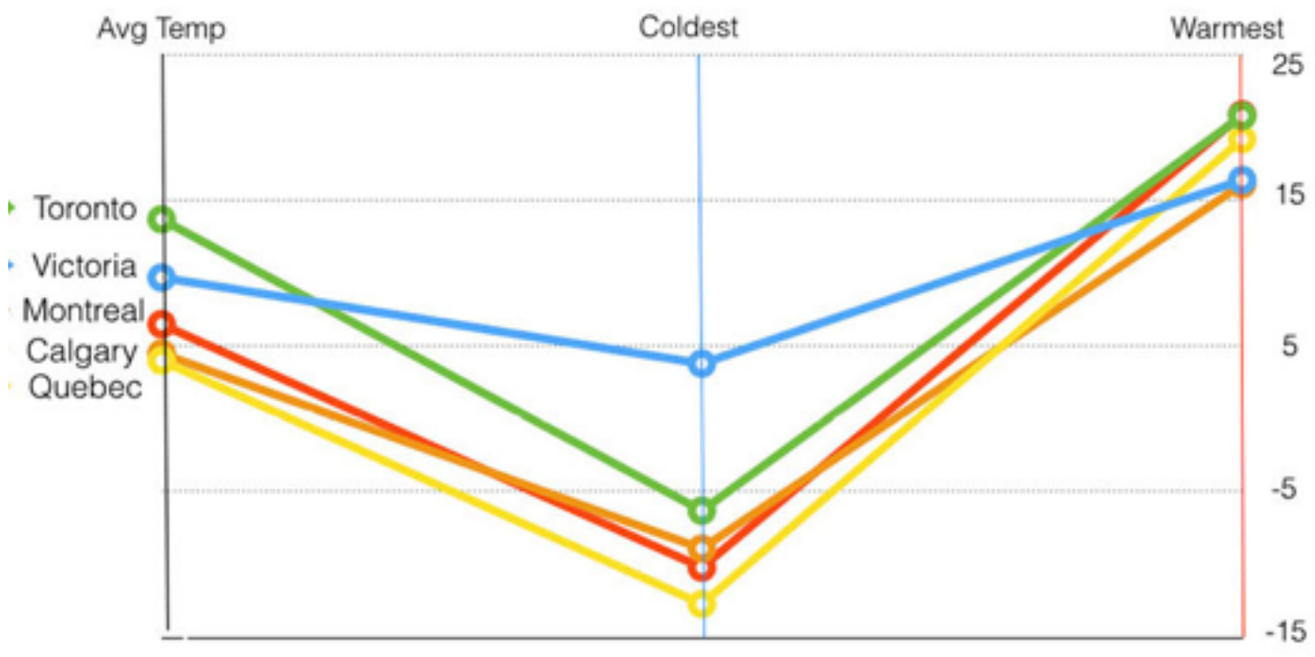
Would you like to make some changes

Yes, I would like to see a color guide next to the city's name



Would you like to make more changes?

Yes, I would like to have in blue the line of the coldest column, and in red the warmest column



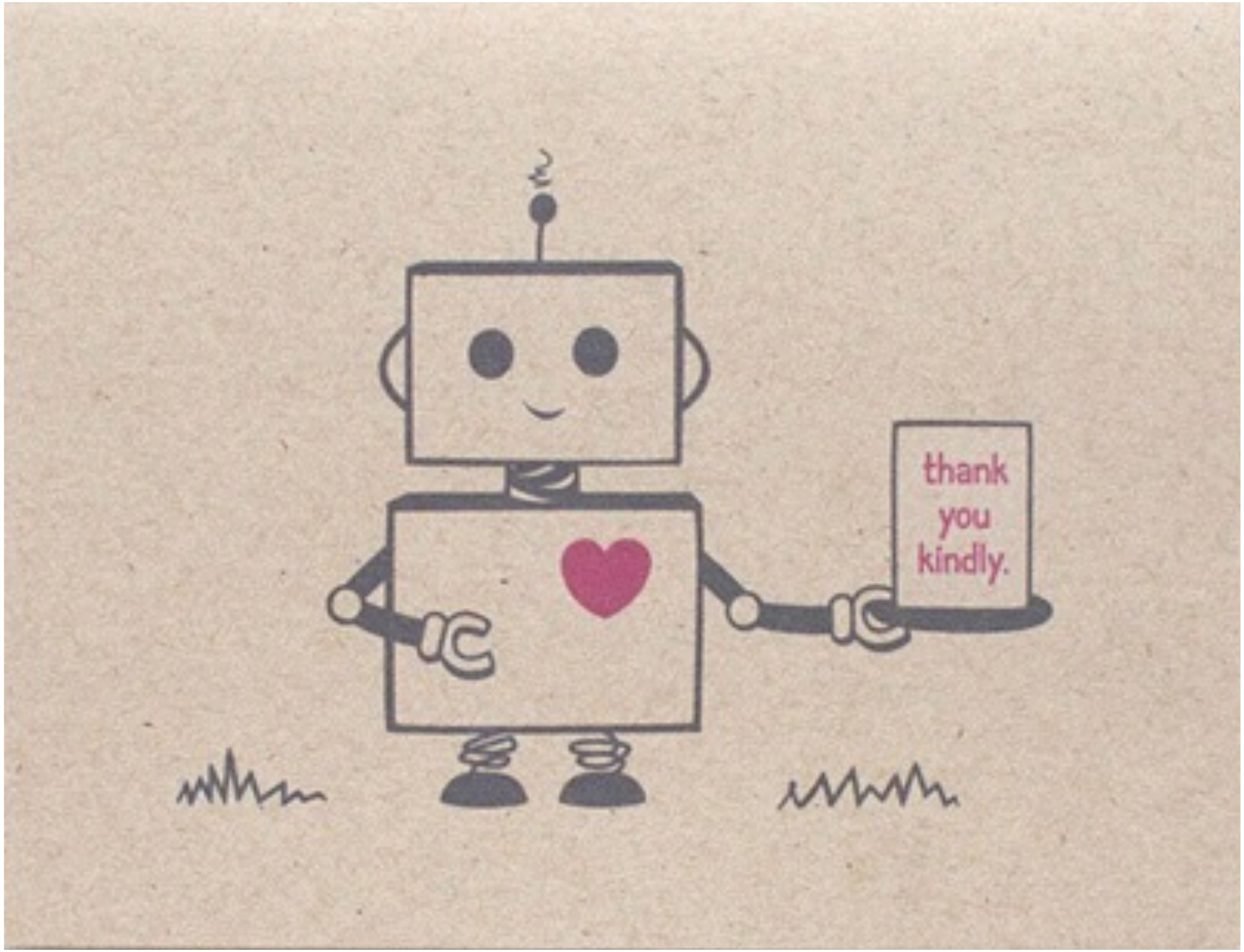
Would you like to make more changes?

No

Would you like to know some insights about your data?

Yes

Quebec has the coldest temperature, while Victoria has the warmest.


thank
you
kindly.