The rise of the (modelling) bots: Towards assisted modelling via Social Networks

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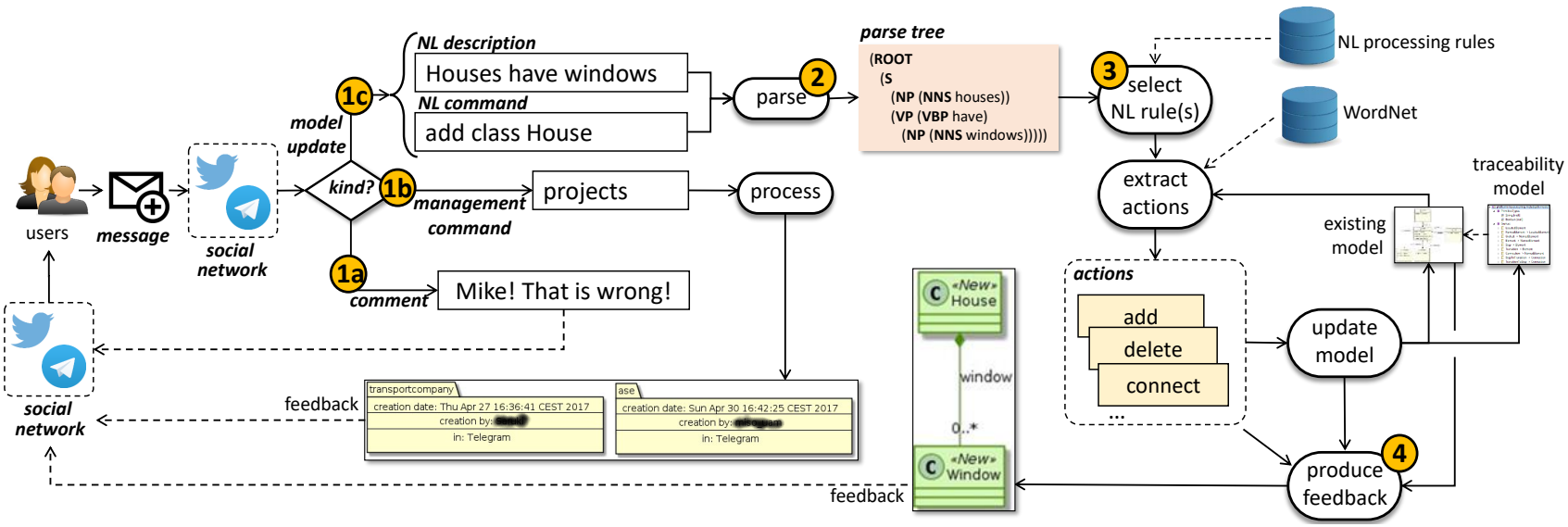
Motivation

- Modelling applications are heavyweight (desktop, diagramming)
- Social networks, like Twitter and Telegram:
  - increasingly used for work and leisure
  - agile and lightweight means for coordination and information sharing
- **Goal: exploit social networks for collaborative modelling**
  - social networks as front-end for modelling
  - domain requirements as short messages in natural language
  - a bot interprets the messages and derives a domain model

Approach

Interaction via messages

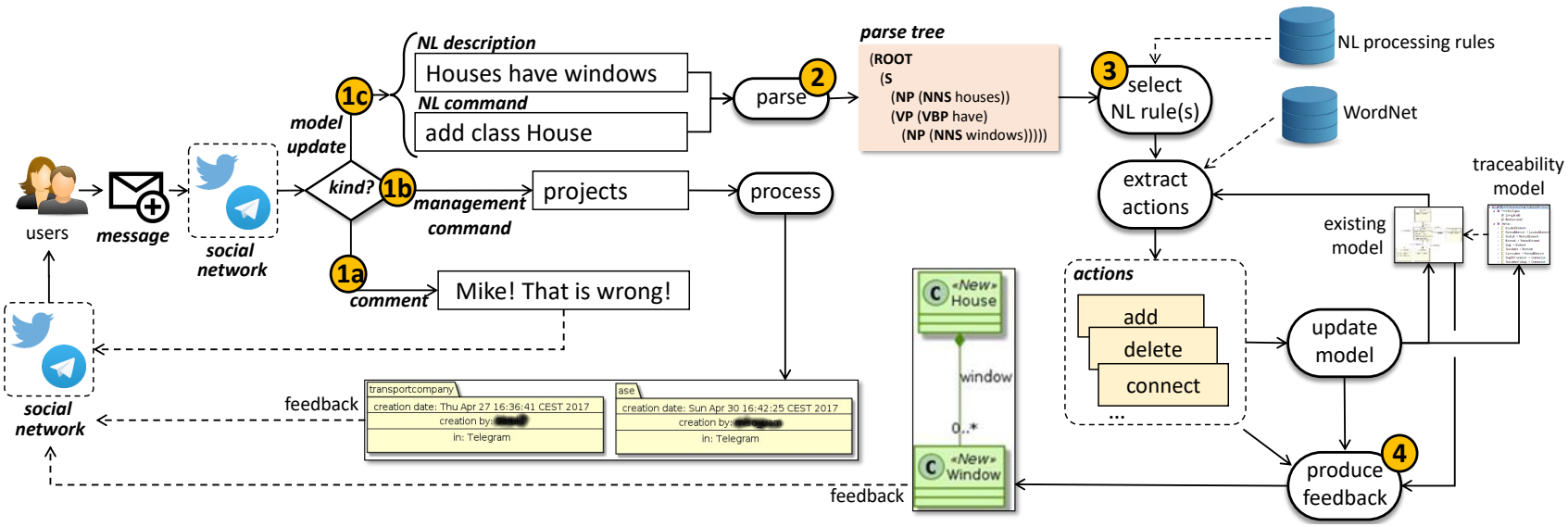


Users interact by sending messages to social network of choice.

- Discussion and coordination via regular messages
- Project management commands (e.g., projects)
- Domain requirements in natural language:
  - descriptions: “houses have windows”
  - flexible commands: “add class house”, “create class house”

Approach

Processing of messages in natural language

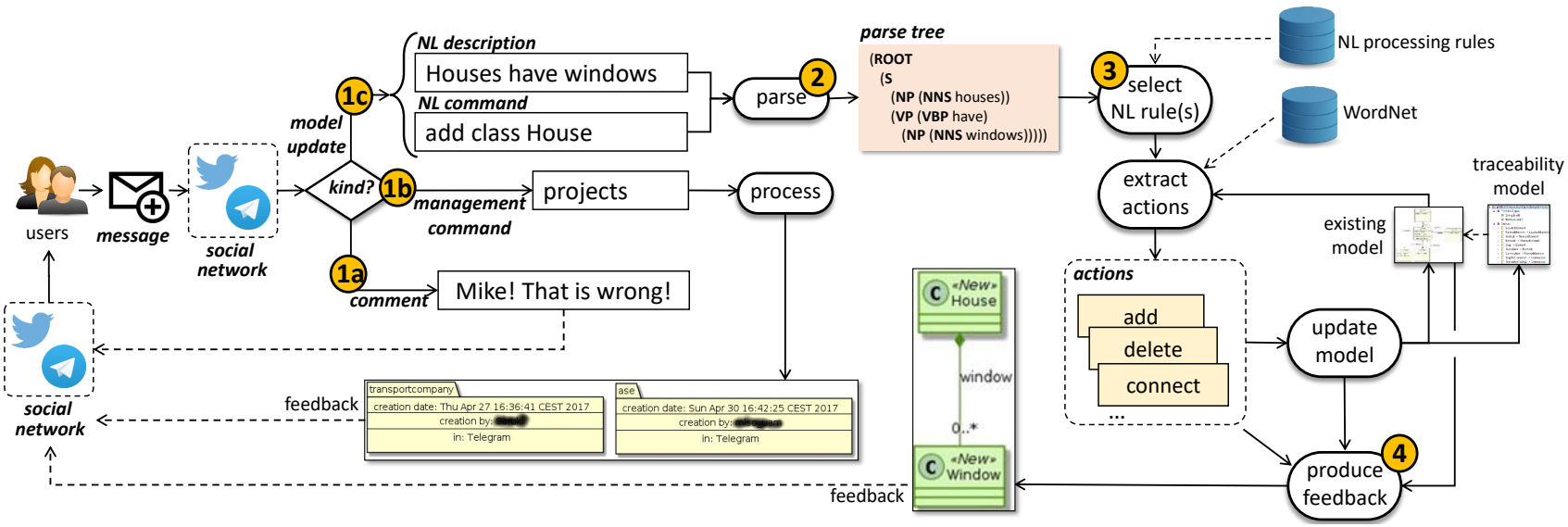


- Bot parses the message (Stanford parser)
- Rules[a] to interpret parse tree and trigger model update actions
- A picture of the updated model is sent to users

[a] "*Extracting domain models from NL requirements: approach and industrial evaluation*", Arora et al., MODELS 2016.

Approach

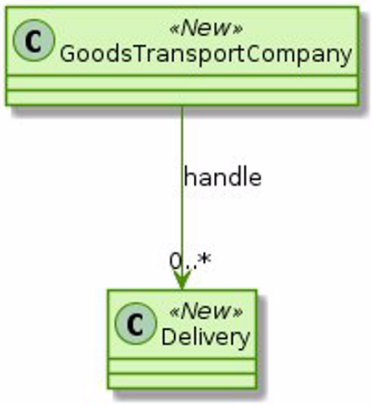
Feedback and traceability



- Model validation
- Exporter to Ecore/EMF
- Trace model

Example

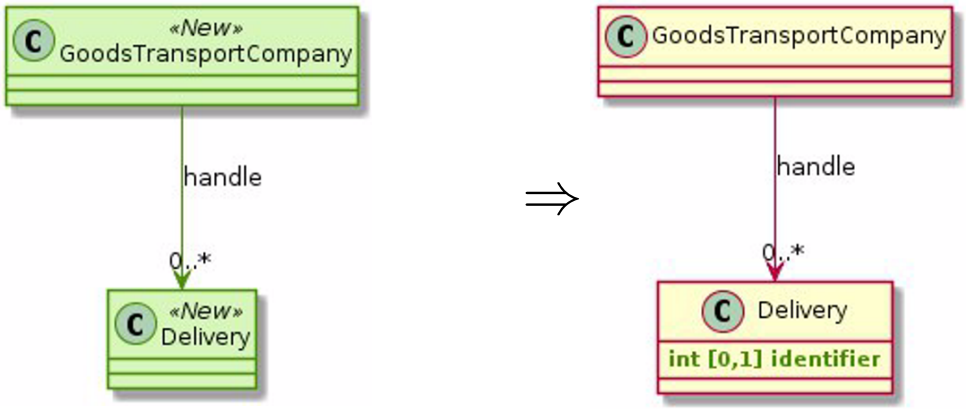
a goods transport company handles deliveries



Example

a goods transport company handles deliveries

a delivery has a numeric identifier

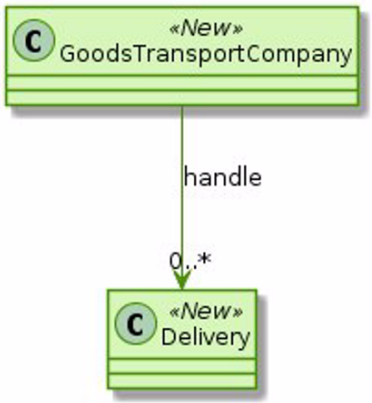


Example

a goods transport company handles deliveries

a delivery has a numeric identifier

a delivery is made of packages. Packets can be bulky, heavy or fragile



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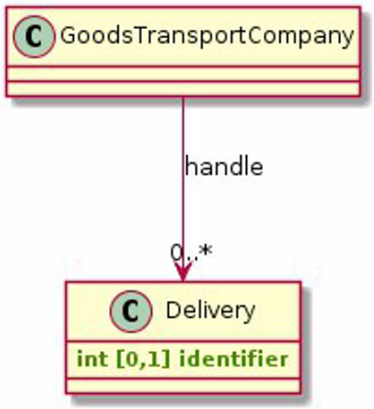

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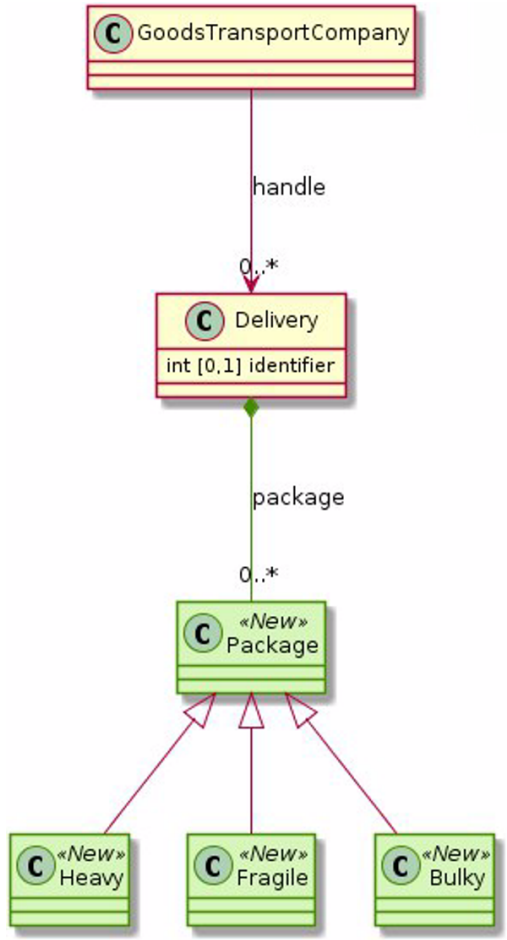


Key points

Benefits

- Social networks are ubiquitous (low learning curve)
- Use in mobility, no need to install new applications
- Lightweight front-end
- Interaction via short messages can be easier/faster
- Requirements in natural language (suitable for non-modelling experts)
- A bot interprets the messages and derives a model
- Seamless integration of modelling and discussion mechanisms
- Message history provides trace information

Key points

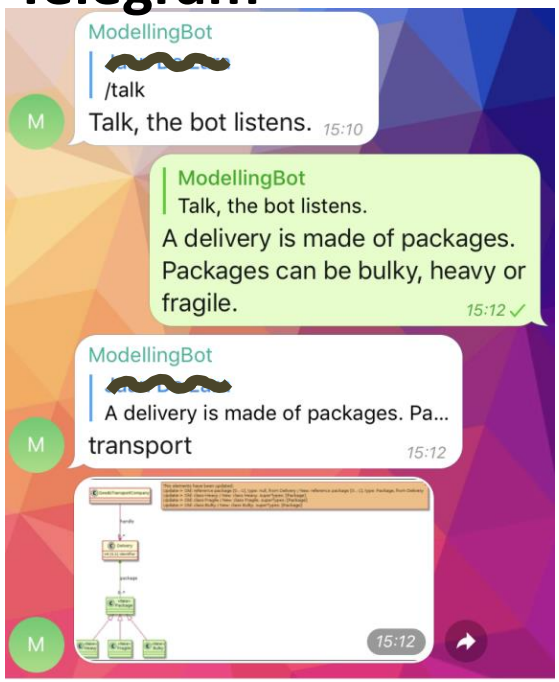
Scenarios

- Quick prototyping of models *when* and *where* needed
- Sw projects: foster collaboration of engineers and domain experts
- Education: collaborative resolution of exercises
- Crowdsourcing of modelling decisions

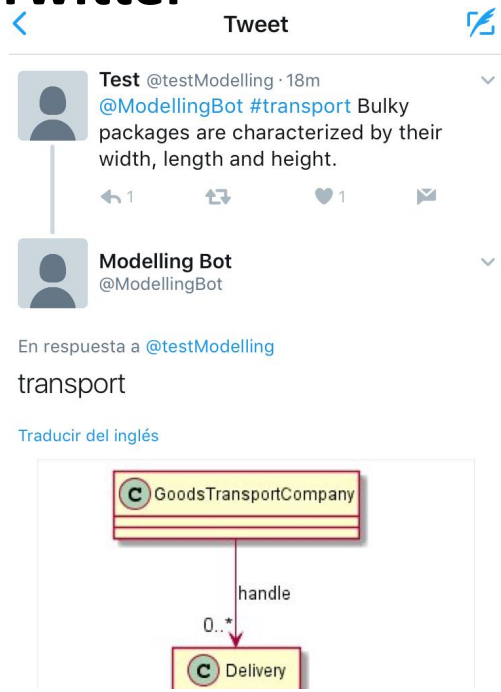
Tool support

- SOCIO is a bot for assisted modelling over social networks
- It works over Telegram and Twitter (@modellingBot)
- It uses the Stanford parser (parsing) and Wordnet (synonyms)
- Video and URL: `https://saraperezsoler.github.io/ModellingBot`

Telegram



Twitter



Evaluation

- Participants: 10 post-graduate or last-year degree students of CS
- Configuration: 4 Telegram groups (2-3 people/group)
- Task: building model for e-commerce, answering questionnaire

- Results:
  - good usability (74%)
  - natural language is suitable to build models (75%)
  - social networks are useful for collaboration (76%)
  - easy-to-use, quicker than other modelling tools

Summary and next steps

- Novel approach to collaborative modelling via social networks
- Tooling and promising initial evaluation
- What's next?
  - improve natural processing, extend command set of tool
  - define collaboration protocols (e.g., roles, voting)
  - other bots (e.g., quality assurance bots, gamification bots)
  - other social networks (e.g., Slack) and communication mechanisms (e.g., speech recognition using Skype bots)

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Questions?