Industry Collaboration / Projects

Name: <u>Marat Zhanikeev</u>, 2021-06-10

2006—2007   Waseda University + KDDI (joint research),<u>Y.Tanaka</u>, M.Zhanikeev   (∼10K USD)

Modeling User Behavior from Large Volumes of Aggregate Traffic

Using backbone-level packet traffic aggregates, this research developed methods for online capture of one-to-many and many-to-many communication patterns.   On the practical side, these patterns are useful in network security when identifying both malicious attacks and benevolent high-impact artifacts (like DDoS).

2009—2010   Waseda University Grant, <u>M.Zhanikeev</u>   (4K USD)

Analysis of Throughput in Web Multimedia Applications

Under HTML5, browsers gained substantial processing power. This project modeled and measured throughput in browser-side applications which use advanced HTML5 features such as WebSockets for streaming data, Workers for parallel multicore processing, handling binary data in Javascript, and others.

2009—2010   NTT + Waseda University Joint Project, <u>Y.Tanaka</u>, M.Zhanikeev (∼40K USD)

Analysis of Network Performance with Large-Scale Active Probing

This project gave practical implementations to several of the theoretical performance measurement methods proposed in my doctor thesis.   Specifically, probing network performance with packet trains, visualizations of traffic at data centers, etc., were implemented.

2010—2011   NTT + Waseda University Joint Project, <u>Y.Tanaka</u>, M.Zhanikeev (∼40K USD)

Efficient Billing Estimation in Large Aggregates of Packet Traffic

With the practical target of "accurate billing" in mind, this project implemented and tested in practice several packet sampling methods.   Several methods were selected as better alternatives to the random sampling used in existing systems.   The concept of bursty traffic was also extensively studied.

2011—2012   NTT + Waseda University Joint Project, <u>Y.Tanaka</u>, M.Zhanikeev (∼40K USD)

Various Billing Applications of Packet Traffic Analysis

With the need to sample flow at several locations in the network, this research looked into sampling methods which would better capture "trajectories" or packet flows as they traverse a given domain.   Based on previous outcomes in terms of effective sampling techniques, this project focused mostly on the distributed logic.

2012—2013   NTT + Waseda University Joint Project, <u>Y.Tanaka</u>, M.Zhanikeev (∼40K USD)

Packet Traffic Analysis at Sub-Flow Level at Line Rate

The new research topic of "data streaming" was implemented in practice by capturing complex traffic patterns in realtime.   Aggregating traffic into origin-destination pairs, triangles, one-to-many patters, and others, were implemented and tested in real network settings.

2018—2019 : Tokyo Univ. of Science + Transcosmos Joint Project、 <u>M.Zhanikeev</u> (∼3K USD)

Detection, Analysis and Visualization of Hotspots in Workflows of Large Companies

Outsourcing a portion of one company's workflow to a more efficient outside subconstractorhas become commonplace.   This project looked into practical methods for identifying and visualizing "hotspots" in large workflows, optimizing for, among many others, on the cost incurred when delegating a portion of the workflow to an outside company. Given the high-dimensional data, the project paid special attention to dimension reduction techniques.

2019—2020 : Tokyo Univ. of Science + Transcosmos Joint Project、<u>M.Zhanikeev</u>（～5K USD）

Developing the Next Generation of Chatbots using Context and Flexible Decision Making
Chatbots today are based on hard-coded decision trees and are therefore completely inflexible.　This project proposes and implements a notion of "context" which allows the bot to "short-jump" between the otherwise distant nodes in a large knowledge graph.

2020—2021 : Ishikawa Prefecture IoT Platform Development Grant、<u>M.Zhanikeev</u>, B.P.Gautam, Y.Noda (～5K USD)

Developing Methods and Software Components for Blockchain-Based Infection Tracing Applications

With COVID-19, there is an urgent demand for platforms which would record locations and interactions among people while protecting privacy.　This project decouples people's identify and the underlying tracing data using blockchain.　Several practical methods for de-anonymizing data when necessary are also developed. The software is implemented in software and is currently used as the default "daily pass" applications by Kanazawa Gakuin University.