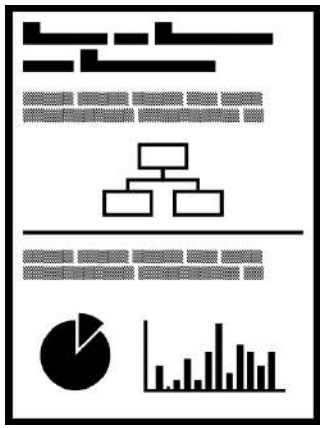
Lightning Talks

Michael Elliott
on behalf of the PRAGMA Students Steering Committee

The 37th PRAGMA Students Session, San Diego, California, USA

Sep. 12th 2019

Student Activity Overview @ PRAGMA37



Poster
(23 Posters)

Lightning Talks
(21 Presenters)

Presentation
(7 Presenters)

Sessions

- Student Presentation Session
  - 13:00~16:00, 11th Sep. 2019
- Lightning Talks Session
  - 16:00~16:25, 12th Sep. 2019
- Poster Session
  - 16:25~18:00, 12th Sep. 2019
- Award Session
  - 17:30~17:45, 13th Sep. 2019

Poster Voting

- There will be 3 awards for best 3 posters
- Please vote for your favorite poster
  - Paste a sticker on the poster
- The poster voting will end at 6PM

Lightning Talks

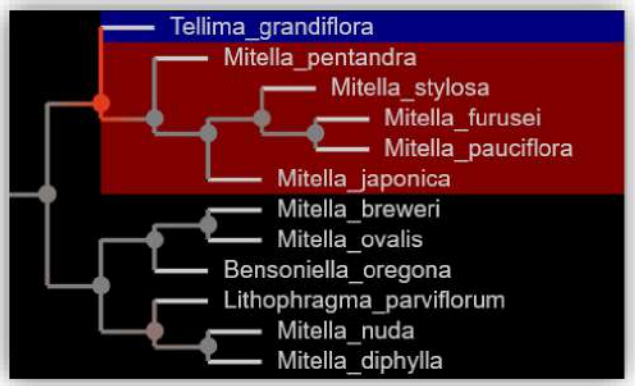
Lightning Talk

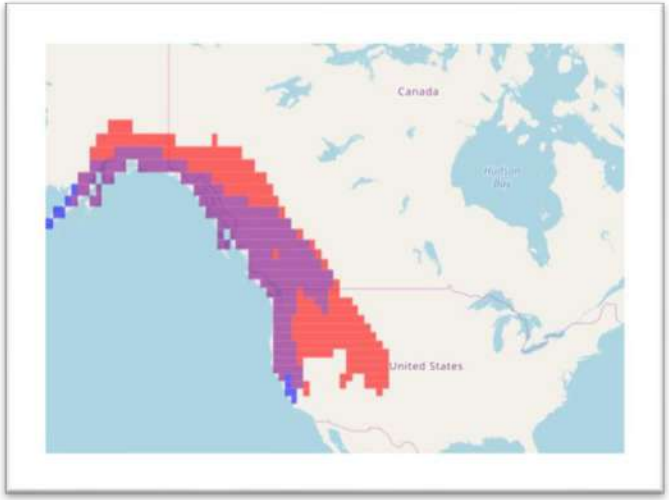
- Introduce your poster
- 1-minute talk
  - First bell for 45 seconds
  - Second bell for 1 minute

Lifemapper on Sage2

Michael Elliott, James Beach, CJ Grady, Aimee Stewart, José AB Fortes

- **Lifemapper:**
  - A geographic information system that aggregates biodiversity data and runs predictive species distribution models
- **Lifemapper on SAGE2:**
  - A SAGE2 adaptation of the existing Lifemapper results interface
- **What it does:**
  - Interactively displays species occurrence data and predictions provided by Lifemapper





This work is funded in part by grants (NSF ACI 1550126 and NSF ACI 1234983) from the National Science Foundation.

Compressing Recurrent Neural Network Model using Vector Quantization

Kundjanasith Thonglek, Kohei Ichikawa, Keichi Takahashi, Chawanat Nakasan, Hajimu Iida

Laboratory for Software Design & Analysis
established in 2005

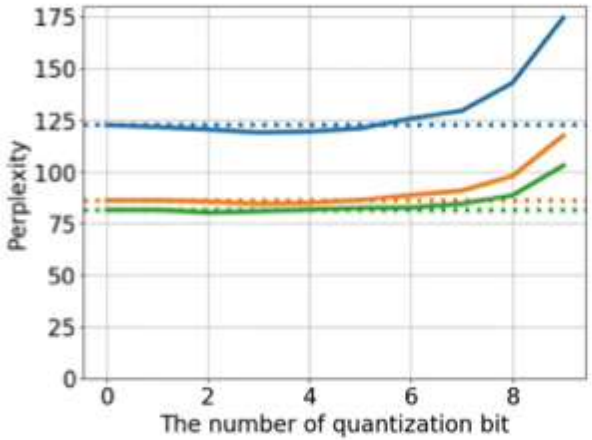
Goal: Reduce the RNN model's size without significant accuracy loss

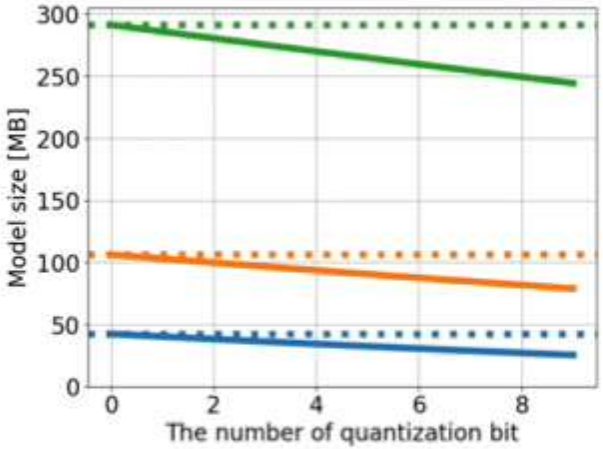
Methodology:

- Analyze RNN model's structure using hierarchical data format extractor to know how the model store their weight and their structure.
- Implement the vector quantizer to quantize the weights for reducing the number of weights in the model.

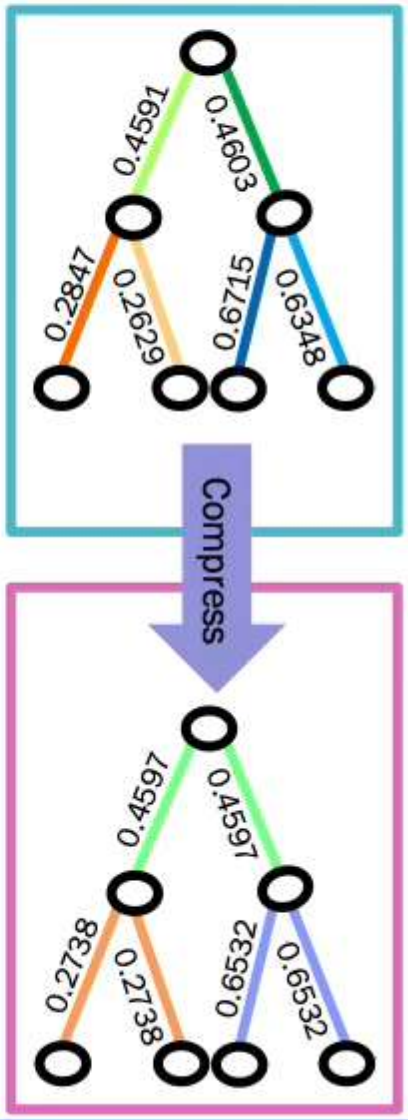
Evaluation:

- Compressed model is evaluated by the model size and the model accuracy
- We reduced the RNN model's size by 15% without significant accuracy loss





Quantization (small) — Original (small)
Quantization (medium) — Original (medium)
Quantization (large) — Original (large)

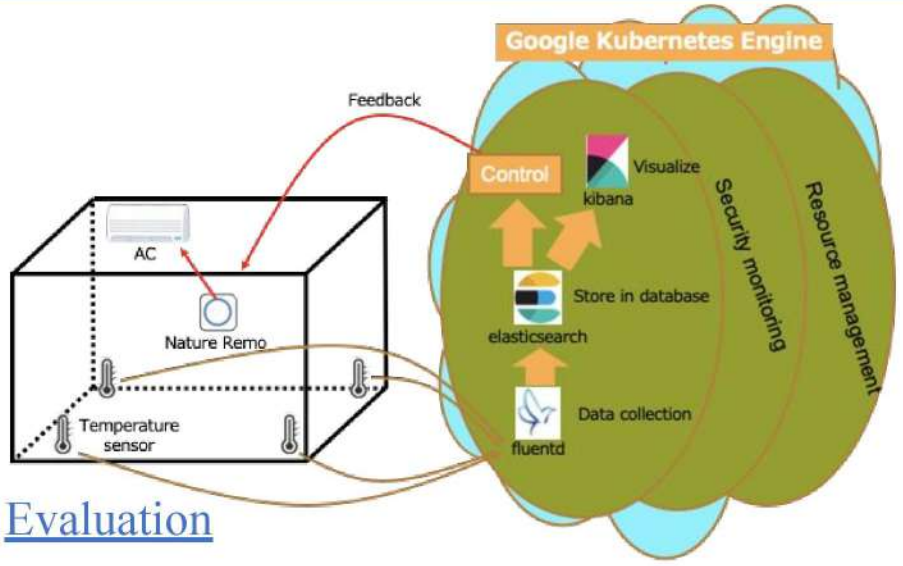


Realizing robust and secure IoT service with microervices

Miyagoshi Kazuki[1], Shimojo Shinji[2]
Graduate School of Information Science and Technology[1], Osaka University, Japan
Cybermedia Center[2], Osaka University, Japan

Collect and analyze data from IoT devices in real time, and develop a platform for optimal control of ACs on Kubernetes.

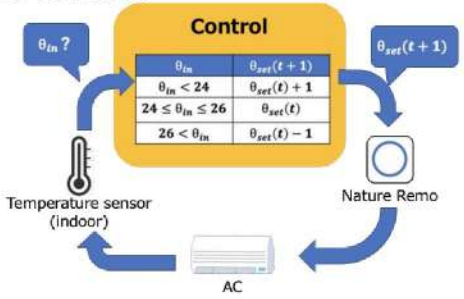
The aim is to build a robust system that can cope with security and load imbalances.



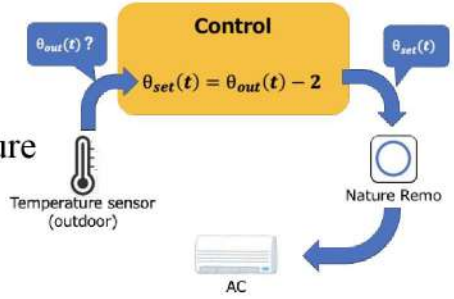
AC Controls

As PoC, two types of AC control

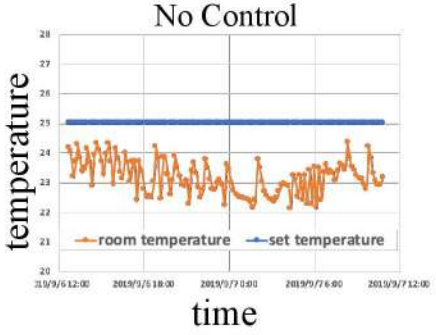
1. Maintain the indoor temperature where there are people located.

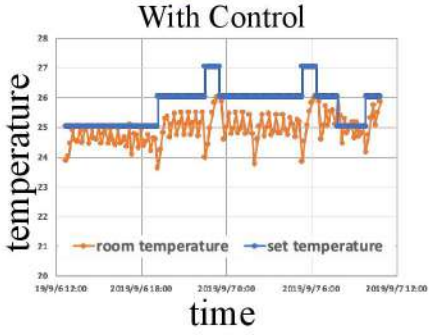


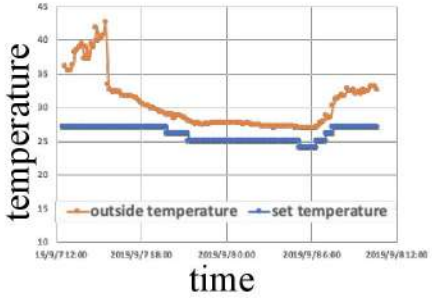
2. Maintain the difference between outside temperature and room temperature.



Evaluation







Cybermedia Center
Osaka University


130th Anniversary of
Japan-Thailand Diplomatic Relations
2017
MARU
Mahidol AIST Research Unit
AIST-Thailand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Mahidol AIST Research Unit
AIST-Thailand
130th Anniversary of
Japan-Thailand Diplomatic Relations
2017


MARU
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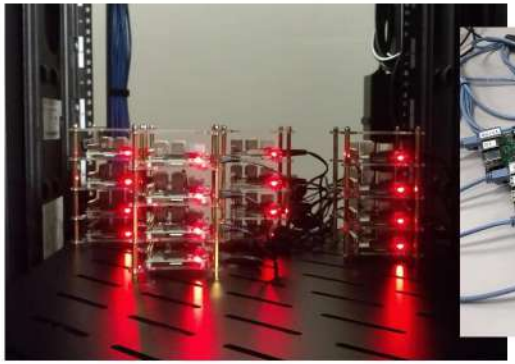
AIST Thailand
2017

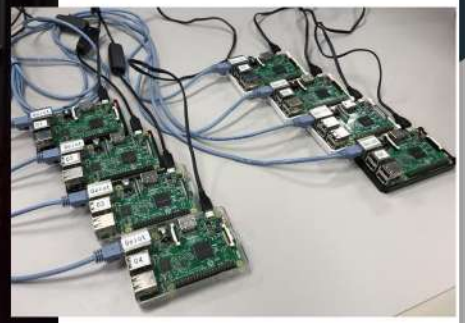
Distributed Testbed for Edge Computing

UF UNIVERSITY of FLORIDA

Nara Institute of Science and Technology NAIST

- Cluster Size:
  - UF: 16 Raspberry Pi 3B+ Nodes
  - NAIST: 8 Raspberry Pi 3B+ Nodes
- Virtualization and Orchestration:
  - Docker, Kubernetes
- Overlay Network: IPOP VPN





Investigating the Performance and Scalability of Kubernetes on Distributed Cluster of Resource-Constrained Edge Devices

- Benchmarking Tool: kbench (https://github.com/keichi/kbench)

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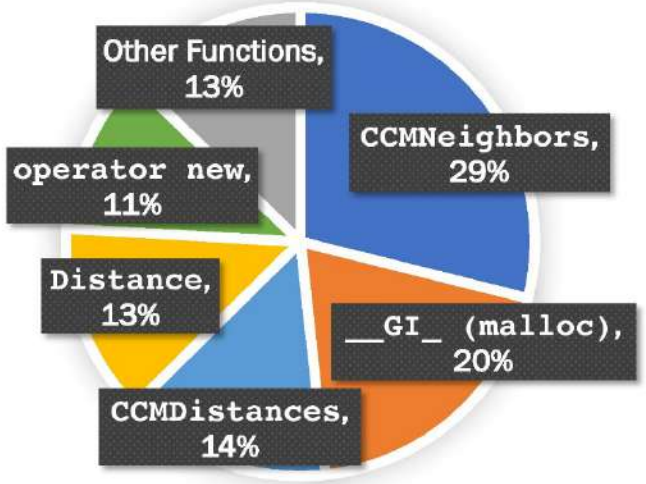
2017

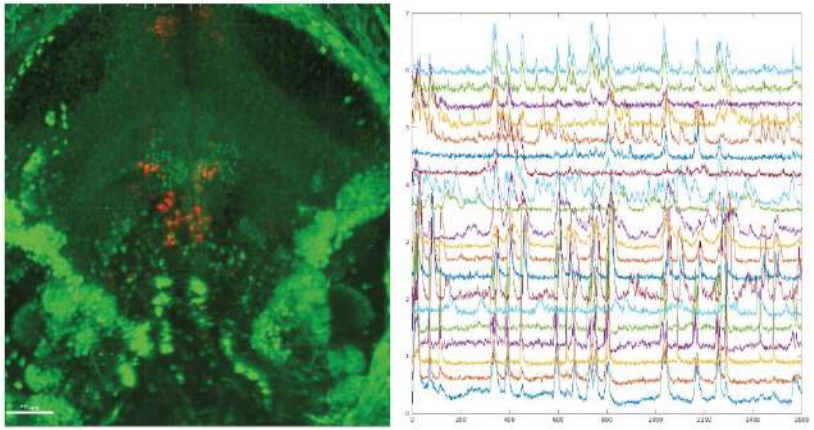
Modeling of Complete Zebrafish Brain Neural Activities on ABCI

Wassapon Watanakeesuntorn, Kohei Ichikawa, Keichi Takahashi, Jason Haga, Gerald Pao

- "Zebrafish Neural Activity Maps for Novel Neuromorphic Deep Learning Architectures" from UCSD
  - Collects and analyzes Zebrafish neural activity for use with Convergent Cross Mapping (CCM) from Empirical Dynamical Modeling (EDM)
  - Find the relationships within the neural activity network of the Zebrafish brain
  - Uses EDM library for CCM calculation on ABCI
- CUDA enabling and optimizing EDM library for ABCI

Breakdown CPU Time (cppEDM)





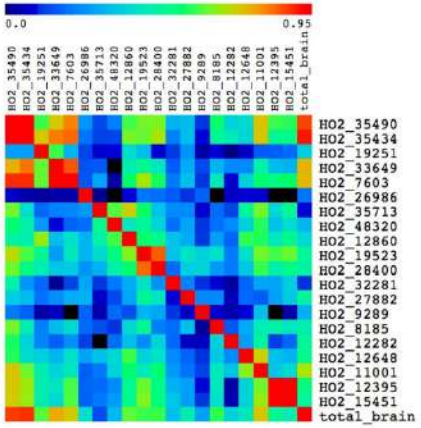
Zebrafish Neural Activity
(Data size up to Petabytes)

rEDM

NVIDIA CUDA

ABCI
AI Bridging Cloud Infrastructure

Calculate CCM on ABCI



Causal Relationships
Determined by CCM

Integrated Application and Performance Monitoring at the IoT Edge

Yutthana Boonpalit , Siwakorn Suwanjinda , Jason Haga , Shava Smallen , Prapaporn Rattanatamrong , Vahid Daneshmand , Kensworth Subratie

Aims & Challenges

- Build an integrated solution for IoT infrastructures and applications.
- The system must be flexible enough to work with various kinds of generally used IoT sensors and devices.
- The system must be scalable and power-efficient.

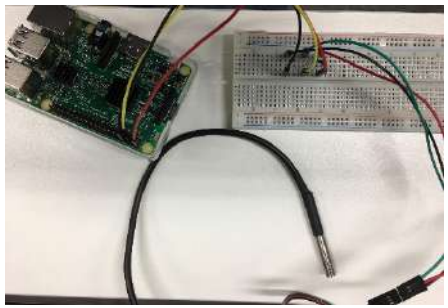


Figure 1 : IoT gateway with temperature sensor

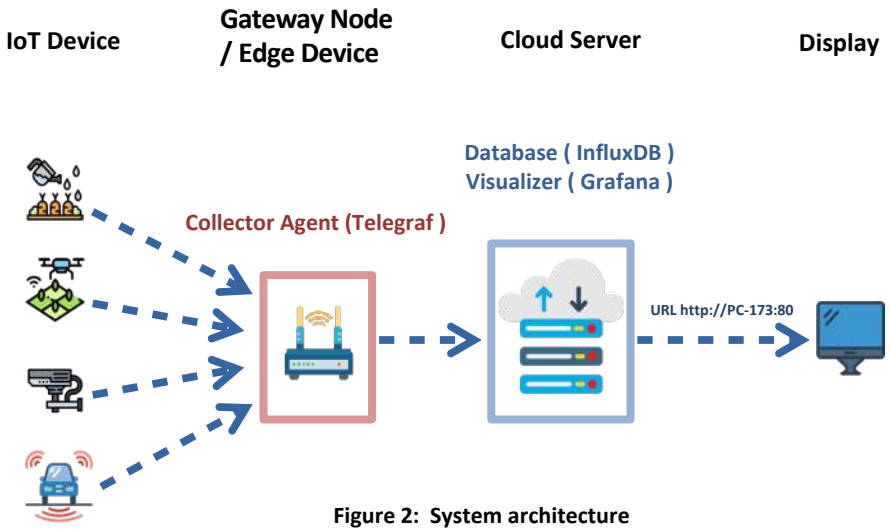


Figure 2: System architecture

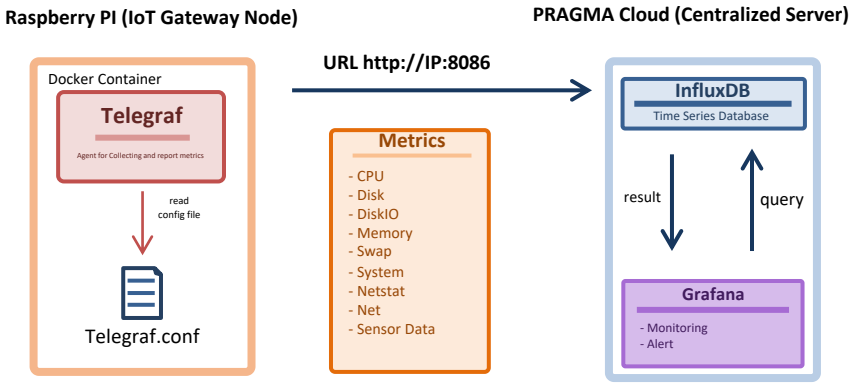


Figure 3: TIC Stack architecture

Digital Object Architecture data layer over a network storage system

Research Data Alliance (RDA) community is exploring a global Digital Object Architecture (DOA) for FAIR data (data that is findable, accessible, interoperable, and reusable). FAIR data will reside in databases, in large scale data centers, and in trusted repositories. Data can be universally discoverable through the DOA.

A novel data storage approach is the network storage system, used by applications like Named Data Networking.

We explore how a network storage system (UNIS of Martin Swany) will interoperate with the DOA layer and take advantage of the PID Kernel Information (Beth Plale), and the E-RPID testbed (Rob Quick).

Our research is:

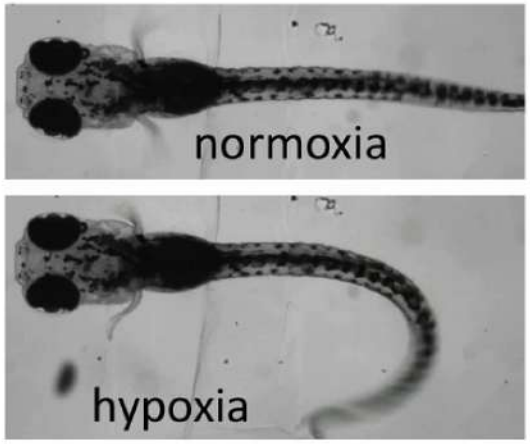
1. developing a ***Lakes Integrative Digital Object*** (***LIDO***) that delivers to an application a set of logical objects in the DOA space, while managing the raw data in Unis, and
2. LIDO's ability to contribute to trust at the local level.

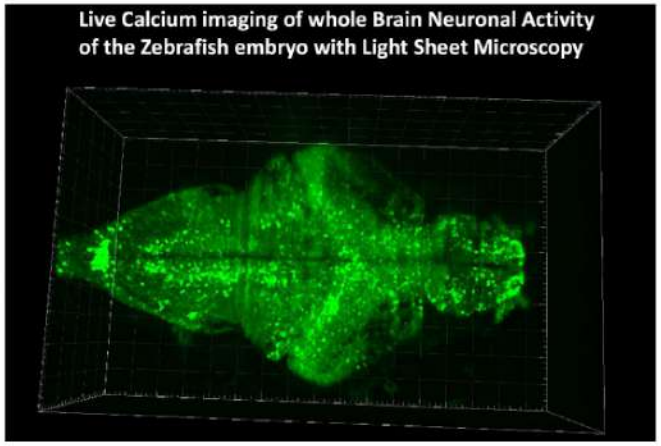
salk

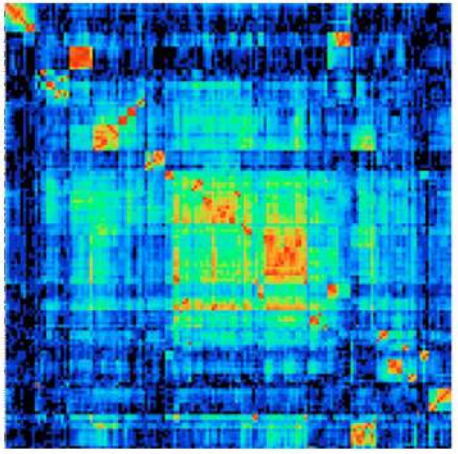
AIST
NATIONAL INSTITUTE OF
ADVANCED INDUSTRIAL SCIENCE AND TECHNOLOGY (AIST)

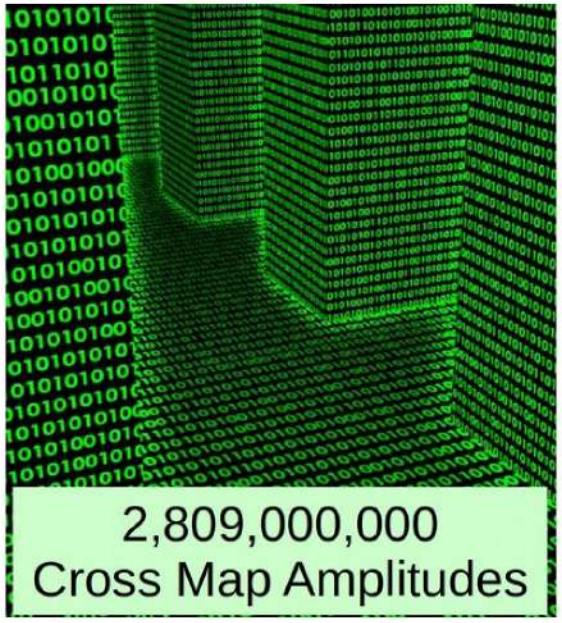
Sugihara Lab
Quantitative Ecology and Data-Driven Theory

Massively Parallel Empirical Dynamic Cross Mapping

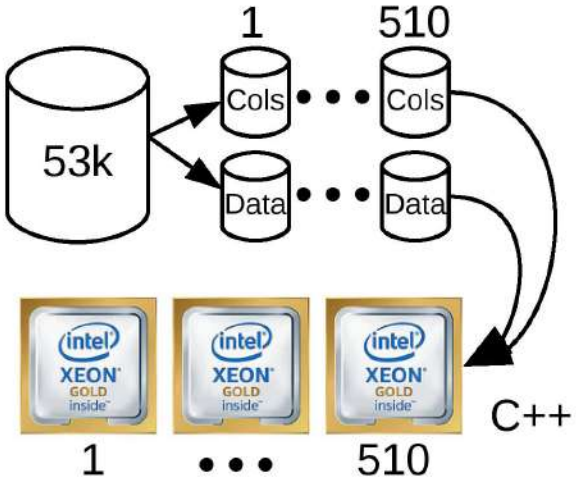




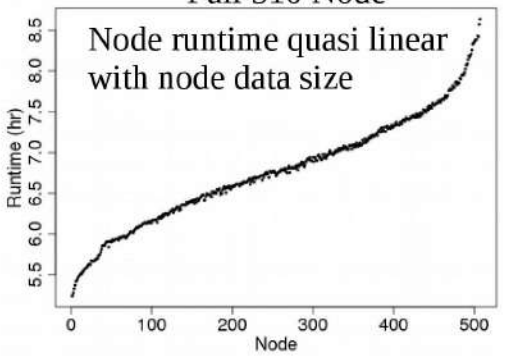




Decompose 53K time series
Across 510 compute nodes



Full 510 Node



53,052 20-Dimensional Embeddings with Dimension Estimate and 2.81E9 EDM Cross Maps in 8.5 hours.

A Comparison of Greedy and Most Forward Routing Protocol on FANET for Fire-Fighting

Muhammad Alfian Nugraha[1)], Sri Chusri Haryanti[2)], Heri Yugaswara[3)]
[1]muhammad.alfian@students.yarsi.ac.id, [2]sri.chusri@yarsi.ac.id, [3]heri.yugaswara@yarsi.ac.id,
Informatics Department, Faculty of Information Technology, Universitas YARSI

Motivation

In Indonesia, eleven provinces are vulnerable to forest and plantation fires. The firefighting process faces many challenges as the condition and extensive area of the disaster. Flying ad-hoc network (FANET) is a promising solution for rescue teams in turning off the flame or evacuating victims. In this research, we simulate and compare the performances of FANET using greedy and most forward routing (MFR) protocol to get more suitable routing protocol applied in the environment.

Environment

There occurs a forest/plantation fire. Rescue team employs FANET in overcoming the fire. Unmanned aerial vehicle (UAV) within FANET move in coordination within three-dimensional space

Figure 1. Illustration of FANET in the land fire area

Simulation

We conduct an NS2 simulation of forest/plantation fire-fighting using FANET. The movement of the nodes is manually generated. The nodes move in a coordinated fashion through four stages of movement, starting from covering area, scanning area, rescue, and rescue 2.

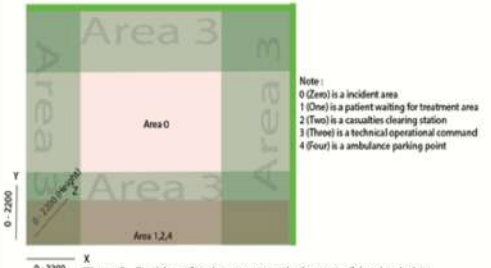


Figure 2. Partition of nodes movement in the area of the simulation

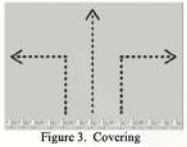


Figure 3. Covering

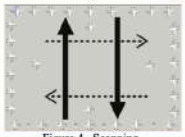


Figure 4. Scanning

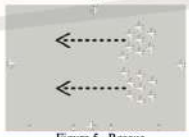


Figure 5. Rescue

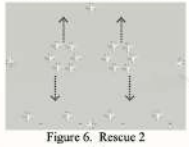


Figure 6. Rescue 2

Table 1. Simulation parameters

Parameter	Value
NS 2 simulator	2.35
MAC type	IEEE 802.11g
Propagation model	Freespace
Simulation area	2200 x 2100 x 300 m
Simulation environment	Plantation fires
Transmission range	200
Traffic type	CBR
Data packet size	512 bytes
Queue type	Drop tail
Simulation time	100 second
Number of nodes	48
Speed of nodes	100, 200, 300, 400 m/dt
Simulation protocol	GEO / position based
Node mobility	Disaster area model

Result

We examine end-to-end delay, throughput, packet delivery ratio, and routing overhead for different speed of the nodes. We compare performances of FANET using greedy and most forward routing (MFR) protocol.

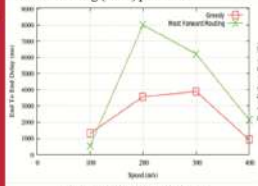


Figure 7. End to end delay

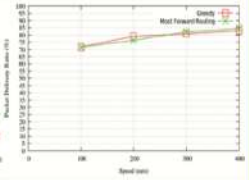


Figure 8. Packet delivery ratio

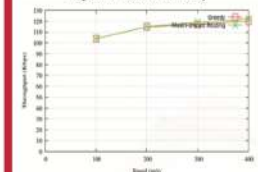


Figure 9. Throughput

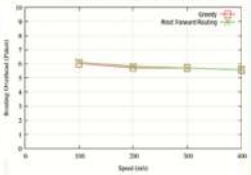


Figure 10. Routing overhead

Conclusion

Based on the simulation results, we recommend greedy routing protocol for FANET on Fire-Fighting, as Greedy provides a lesser end to end delay, while other performance parameters are approximately comparable to MFR.

Reference

- A. Bujari, C. E. Palazzi, and D. Ronzani, "A Comparison of Stateless Position-based Packet Routing Algorithms for FANETs," IEEE Trans. Mob. Comput., vol. 17, no. 11, pp. 2468–2482, 2018.
- A. E. Abdallah, T. Fevens, and J. Opatrny, "High delivery rate position-based routing algorithms for 3D ad hoc networks," Comput. Commun., vol. 31, no. 4, pp. 807–817, 2008.
- A. Nayyar, "Flying Adhoc Network (FANETs): Simulation Based Performance Comparison of Routing Protocols: AODV, DSDV, DSR, OLSR, AOMDV and HWMP," 2018 Int. Conf. Adv. Big Data, Comput. Data Commun. Syst. icABCD 2018, no. October, pp. 1–9, 2018.
- BonnMotion (2015) A Mobility Scenario Generation and Analysis Tool. February 1. University of Osnabruck. Available: http://bonnmotion.net/.
- I. Bekmezci, O. K. Sahingoz, and Ş. Temel, "Flying Ad-Hoc Networks (FANETs): A survey," Ad Hoc Networks, vol. 11, no. 3, pp. 1254–1270, 2013.
- K. Singh and A. K. Verma, "Experimental analysis of AODV, DSDV and OLSR routing protocol for flying adhoc networks (FANETs)," Proc. 2015 IEEE Int. Conf. Electr. Comput. Commun. Technol. ICECCT 2015, pp. 1–4, 2015.
- M. Arnani, "11 Provinsi Paling Rawan Kebakaran Hutan dan Lahan di Indonesia," Kompas.com, 2018. [Online]. Available: https://rasional.kompas.com/read/2018/08/24/17291701/11-provinsi-paling rawankebakaran-hutan-dan-lahan-diindonesia?page=1. [Accessed: 03-Jul2019].

Mobile Apps Gamification for Mental Health

Farhan Adli Darmawanto, Ummi Azizah Rachmawati, Nova Eka Diana, Octviani Indrasari Ranakusuma
farhanadli14@gmail.com, ummi.azizah@yarsi.ac.id; nova.diana@yarsi.ac.id; octaviani@yarsi.ac.id;
Universitas YARSI Jakarta Indonesia

ABSTRAK

Gamification is the use of game and design elements in a non-game context. The method of gamification involves the use of game elements such as leaderboards, difficulty levels, and prizes. In this research, the gamification approach is used to obtain the user's mental health data to facilitate data retrieval. This study uses Data of Depression, Anxiety, Stress Scale (DASS) as a reference to make gamification for obtaining data from user easily, efficiently, and pleasantly. We use gamification for data collection. Scenarios are made to represent each question in DASS using actors. We use the User Experience Questioner (UEQ) to determine the user's impression when running the application. The results of this test found that users feel fun, efficient, and easy when running this application.

Keyword : *Gamification, Mental Health, Mobile Apps*

INTRODUCTION

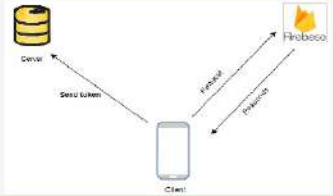
Game and gamification have different meanings. Games are games that were developed to provide additional benefits besides entertainment. The use of games for recreation itself is primary, and other aspects as secondary excellence, perhaps in the form of employee education and orientation. Whereas gamification only involves the use of game elements such as leaderboards, difficulty levels, and prizes. In this study, the gamification approach is used to obtain the user's mental health data. The use of the gamification method approach in this study can facilitate data retrieval. With this research, variations in data collection methods are increasing, not only interviews, questionnaires, or observations. The data obtained will be visualized into tables and pie charts through the website platform.

METHODS

First, researchers conducted data collection using the FGD (Forum Group Discussion) method involving six students and six students at SMKN 31 Jakarta. The FGD run into two sessions. Each session is 30 minutes long. The topics discussed in the FGD are mental health disorders that are often experienced by adolescents.After collecting data, the researcher makes a scenario or a picture of the situation. Scenarios are made to represent each question in DASS. Researchers also create actors who can represent the object of research or FGD participants. We create two actors called Sutono and Sutini. Sutini is an actor who represents a woman who has a cheerful nature, but when she is in a bad mood, she can become an angry person, and be a little sensitive. Sutono is an actor who represents an ordinary man. He is a passionate figure. Sometimes he can lose his enthusiasm and become someone who loses his enthusiasm to do an activity.The next stage is the implementation of all the previous stages into the application. Implementation begins with designing the Galaw application. Then proceed with creating a database. Then create a website to see the user's mental health results.

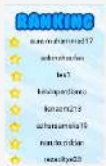


SYSTEM ARCHITECTURE



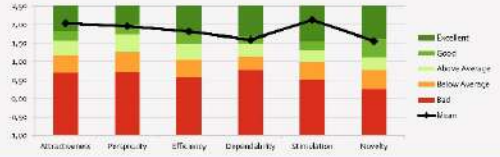
Results from user input on the mobile application will only display general results for young people. Detailed results in the form of scores for Stress, Anxiety, and Depressive is on the web where only admins can access. Admin can be counseling teachers in schools who need mental health data of their students.

RESULTS

TESTING

User Experience Questionnaire with 30 teenagers revealed that the application had an excellent level on the scale of attractiveness, perspicuity, efficiency, and stimulation, toward the general benchmarked products in the market. This result suggested that most of the respondents were impressed by the product along with its easiness to learn and to get familiar with. The easiness of user control, less difficulties on solving the given tasks, and the embedded gamification aspects, stimulated the high interest and motivation of respondents to use the application.



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Role Based Access Control Design for Indonesian E-Health Cloud

Moh. Kresna Widyahanto
Sri Chusri Haryanti
Sri Puji Utami
Rosini Rosini

Punica Granatum Floral Pattern Vector Graphics Synthesis

營造法式海石榴華圖樣生成

Shih-Hao Liu, Pin-Yi Wu & Tung-Ju Hsieh

National Taipei University of Technology

(a) user hand painting (b) convert to Bézier curve (c) generate stem and flower (d) generate leaves (e) generate random leafs (f) Markov matrix relaxing

Figure 1: The sequence of generating Chinese Sea Punica Floral Pattern.

Abstract

Architectural decorative painting of floral patterns on the surface of the Chinese traditional palace buildings is a sophisticated and time-consuming process. An ancient Chinese building code, titled "Yingzao Fashi", describes a variety of decorative floral patterns in the Song Dynasty (960-1279 AD). It is difficult to draw those floral patterns using existing digital vector graphics software because of their complexity. We developed a floral pattern synthesis system to ease the drawing process of decorative floral patterns. In this paper, a case study is presented to demonstrate that the proposed system is used to automatically draw the traditional Sea Punica Granatum architectural decorative patterns. The user moves the mouse cursor to draw the path of a stem. Then the leaves and flowers are synthesized. In addition, collision detection is implemented to control leaf density. Vector graphics pre-loading and threading techniques are used to achieve 0.3 ms rendering speed for user interaction.

Introduction

Decorated patterns are difficult to draw by hand using vector graphics software because of its complicated features. For example, filling the space with a floral pattern. Untrained users tend to make mistakes during the painting. Decorated patterns have typically been used in traditional Chinese palace building painting. It is important for people to understand those decorative paintings and to appreciate the significance of that aspect of the culture. In this paper, we present an interactive system using HTML5 for fast synthesis of Chinese architectural decorative patterns described in the Yingzao Fashi building codes. In order to generate the decorative patterns in a variety of display resolutions, we use SVG (Scalable Vector Graphics) for our rendering results. Controlled by parameters, the proposed system can automatically grow vines and leaves following a curve defined by the mouse movements input of a user. Then, the synthesized decorative patterns can be further adjusted in terms of leaf density and parameters that control the sizes and the orientations of leaves and flower components.

The pipeline of the proposed system is shown in Figure 1. Inspired by the decorative patterns generation method DecoBrush [2], the proposed system allows the user to hand draw and define the stem curve, then flowers and leaves are attached to the stem. We implemented a Magnetic Curves [3] to fill the space between the flowers and boundary of the HTML5 canvas. Magnetic Curves are tracks of the electric charge in a constant magnetic field. Dynamically changing the number of charges can form different curve trajectories. Adjusting parameters can obtain different curve tracks. During the electric charge movements, the opposite charges can be grown on both side of the stem. The parameters determine the length of the curves. Figure 2 shows the initial layout with overgrowth branches. To solve this problem, we add new leaves to a queue waiting to grow later when a collision has occurred. As a result, we relax the density of the leaves as shown in Figure 3.

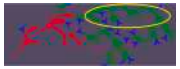

Figure 2: Comparison of overgrowth leaves and queuing. Yellow ellipse indicates overgrowth leaves.

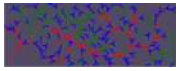

Figure 3: Relaxing of leaves density using Markov matrix.

Results and Conclusion

Table 1 shows the comparison of different synthesizing parameters. When the density parameter d increases, the leaves become more crowded. In contrast, the stem length parameter T controls the space between stems. The proposed system allows users to define the shape of the canvas boundary. A user can adjust the space filling parameters to modify the synthesized patterns. The color settings of the result patterns can be described using CSS style sheets. Figure 4 shows the result generated by our system and the original patterns in " Yingzao Fashi" [1] as shown in Figure 5. If the angle parameter is small, the first layer of the stem branch will be almost parallel to the stem trunk. Which makes the second layer of branches collides with the first layer branches. That impedes the space filling process and results in a non-uniform distribution layout of leaves. In addition, leaves are impeded by flowers, resulting in blank space. By changing the leaves density parameter d, We can adjust the blank space manually. We achieved an interactive rendering speed of 0.3 ms using a iMac with an Intel i5 CPU, 8GB DDR3, and NVIDIA GeForce GTX 660M graphics. We used MacOS 10.11.6 and Chrome 59.

Figure 4: Comparison of the Chinese Sea Punica Granatum Floral Pattern. The proposed system.

Figure 5: Comparison of the Chinese Sea Punica Granatum Floral Pattern. The original painting [1].

Conclusion

We present a system to assist users in drawing the Chinese Sea Punica Granatum Floral Pattern described in in the building codes "Yingzao Fashi" using "space filling" and "path following". The proposed system converts a user's hand-drawing curve into a Bezier curve, followed by thickening the curve to produce a stem. We implemented magnetic curves method to fill the space between the stem and the boundary of the HTML5 canvas. This allows us to automatically generate the Chinese Sea Punica Granatum Floral Pattern. Acceleration techniques are used to improve performance such as preloading SVG vector data, collision detection filtering, and multi-threading.

Acknowledgements

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References

[1] Luke Li. *Studies on the Rules for Color Painted Works in Yingzao Fashi*. Southeast University Press, 2011.

[2] Jingwan Lu, Connelly Barnes, Connie Wan, Paul Asente, Radomir Mech, and Adam Finkelstein. Decobrush: Drawing structured decorative patterns by example. *ACM Transactions on Graphics*, 33(4):90:1–90:9, 2014.

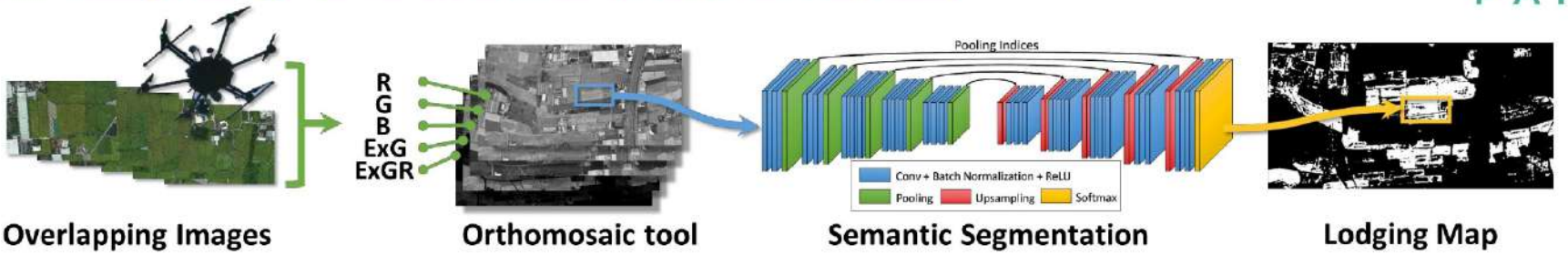
[3] Ling Xu and David Mould. Magnetic curves: Curvature-controlled aesthetic curves using magnetic fields. In *Proceedings of the Fifth Eurographics Conference on Computational Aesthetics in Graphics, Visualization and Imaging*, pages 1–8. Eurographics Association, 2009.

Table 1: Comparison of parameters: (i) leaves density d, and (ii) stem length T.

T	$d = 0.9$	$d = 1.0$	$d = 1.1$	$d = 1.2$
70				
75				
80				

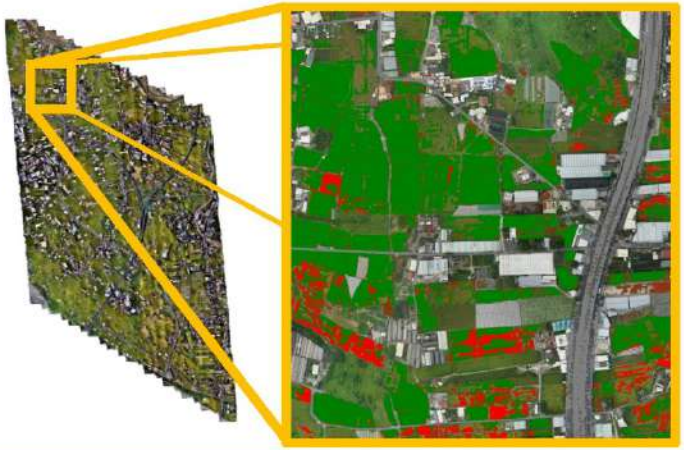
Application of Deep Learning Technique to Rice Lodging Identification

Hsin-Hung Tseng* & Yu-Chun Hsu (NCHU & PAIR Lab)



Overlapping Images | Orthomosaic tool | Semantic Segmentation | Lodging Map

2600 ha area
Investigation & Process within 1 day



80ha for 2 min

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- All of the PRAGMA Senior members
  - Who cares students, support students' research and be a good model for students