Design of Telegram Bots for Campus Information Sharing

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Design of Telegram Bots for Campus Information Sharing

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Abstract. This paper presents a design of Telegram bot to support Campus information sharing. The communication method used is Webhooks. Webhooks is able to provide zero latency and handle multiple requests concurrently during communication within the Telegram bot. Such bot serves the information via specific commands. The Telegram bot prototype shows that even though Webhooks is able to provide information as requested, Webhooks setting is difficult and trickier.

Keyword: telegram, telegram bot, webhooks, telegram command

1. Introduction

Technology-enabled campuses are critical to a university's survival. Aside from the obvious reasons of the students and staff using technology on a daily basis, handheld and mobile devices have also redefined traditional higher education culture. With mobile devices in hand, any student can find the answers to almost any of life's questions within seconds.

One of the most helpful features in the mobile devices is messenger. It becomes the main tool to communicate each other, to share information and to interact. As Short Message Service (SMS) becomes old-fashioned, people normally use messenger application such as WhatsApp, Blackberry Messenger (BBM), and Telegram to perform direct communication. BBM was very popular in the late 2000s and after a decade, it started to lose out to WhatsApp. WhatsApp was incorporated in 2009 and becomes a top chat app in 109 countries. Facebook then acquired WhatsApp in 2014 to make a bigger play in the rapidly-growing messaging market, along with its own messenger platform. Recent apps called Telegram works much like the WhatsApp, using end-to-end encryption to protect shared information (Pinto, 2014) (Hamburger, 2014). The company claims to have over 100 million users, and offers features like self-destructing messages to ensure greater privacy. Users can communicate directly, either in private groups or on channels.

Latest additional feature in Telegram is Chat bots. It is a piece of program, which is based on AI and machine learning in small level. User can interact with bots by sending commands and they will reply with exactly what user needs as chatting with a knowledgeable friend. Such bots are customizable depending on user requirements and integrated into various services to, such as, controlling smart home, customized tools and other social services. In this paper, a Telegram bot to support campus information sharing is presented.

The paper is organized as follows. Section 2 presents the related work that studied telegram in the past. The case study and the system requirements are provided in the section 3. The telegram bot design can be seen in section 4. In section 5, simulation is shown. Preliminary findings based on the simulation are presented in section 6 and lastly, section 7 provides the summary of the paper.

2. Related Word

There are several previous studies on the use of Telegram. Jakobsen (2015) performed cryptanalysis on the Telegram communication. The author was able to analyse and depicts the security and encryption protocol in the Telegram. Sutikno et al. (2016) compared WhatsApp, Viber and Telegram. The result shows that Telegram offers better back-up feature and security then WhatsApp and Viber. The authors added that Telegram is the best messenger platform among those three apps. In the area e-learning, Hafiz (2015) integrates LMS e-learning and Moodle platform using MTProto open protocol. The Telegram bot, namely ELISA (E-learning integrated short announcement) will then reply to any request from students who need feedback of their work. In addition, the MTProto is able to support real-time online class discussion. One more work on Telegram bot was done by Rohim (2016). The author developed a chat bot using long polling method to share information on any offers and events from student outlet in a campus. However, with the increasing number of request that is sent to the bots, latency becomes an issue in that work. In our work, different communication method, namely Webhooks method, is used within a Telegram bot to overcome the latency issue when sharing information in campus.

3. Case Study and Requirements

Informatics Department in Islamic University of Indonesia (TF UII) takes the advantage of IT development to deliver the information to all academics staff and students. They use web portal and Facebook timeline as the main information sharing media. The main drawback is users do not frequently check such media to obtain real-time info. The proposed Telegram bot will be implemented in TF UII to provide better campus services.

The Telegram bot is required to provide information such as: TF UII profile, upcoming events, and class or mentoring timetable. The bot will broadcast information to the registered accounts regularly. Figure 1 shows the general framework of the telegram bot. A staff from TF UII will regularly share the information gathered from portals and FB page to the students, staffs, and lecturers in the campus via the Telegram bot.

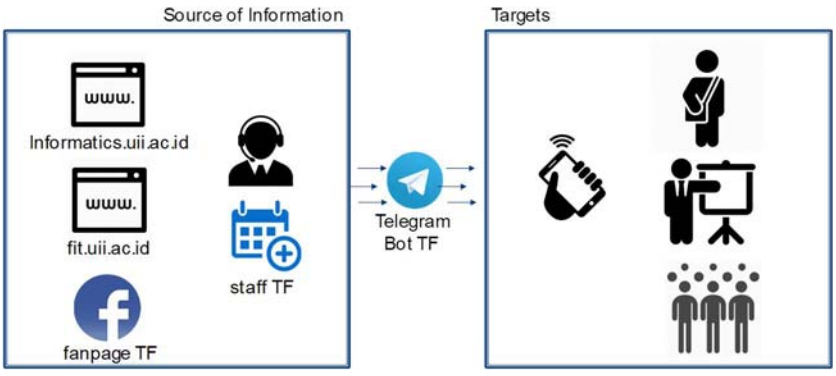

Figure 1. General Framework of Telegram bot

4. Proposed Design of the Telegram Bot

Based on the aforementioned framework, a use case is developed as shown in Figure 2. Both telegram users (student and teacher) will have to initially type the command in order to get the response from the bot. The bot obtains the information from the available source and log activity. To check if the request

sender is authorized, the bot will refer to group and user management. Figure 3 illustrates how the system prototype is developed. MySQL as the database system, Python as the programming language and protection mechanism have incorporated within the bot to perform the information dissemination via Telegram.

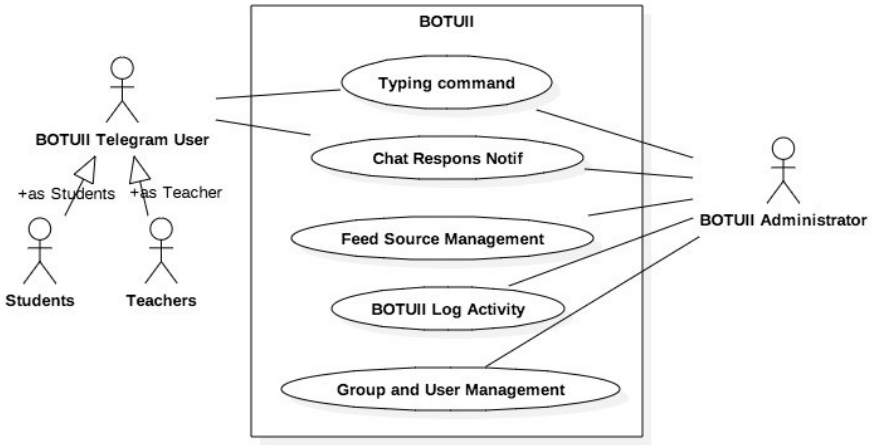

Figure 2. Bot UII use case diagram

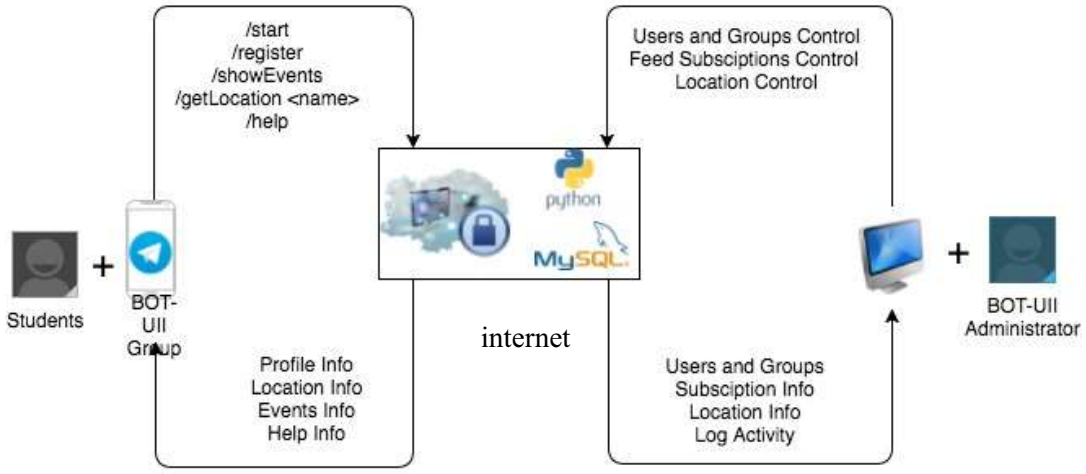

Figure 3. Telegram bot prototype

There are two (2) communication methods for communication within Telegram bot, they are Webhooks (7) and Long polling (8). Basically, Webhooks method is easier to be developed, HTTP based request and fast when responding to a request. However, it needs a dedicated server with public IP while long polling needs no dedicated server. Long polling method reduces the cost of creating home automation. It can support large number of updates without necessarily having an API call for every update. Such home automation can be more secure with additional devices. In this implementation, Webhooks is then chosen because the requested information must be fast responded and live 24/7.

5. Simulation

The telegram bot works in two ways: 1) as an information media and 2) as a position tracker. As the information media, the bot will reply any commands from users in the campus. The bot will automatically validate the information gathered from each URLs given. Figure 4 shows one simulation of command and replied message. As the position tracker, the bot can also keep the location given by the lecturer and forward the position to the students who want to meet the lecturer. Figure 5 and 6 depicts the simulation of inquiring a position using chat-bot telegram. Figure 7 shows the web-based platform for the system administrator to manage the bot.

```
Command : /showEvents

Bot: Informatika Berprestasi, waktu dan tempat dll….
(sumber: informatics.uii.ac.id)
```

Figure 4. Simulation of bot as the information media

```
Mahasiswa : /getlocation Setiaji

Chat bot : Ini lokasi terakhir dari Setiaji
https://www.google.com/maps?q=-7.743144,110.451113&ll=-7.743144,110.451113
```

Figure 5. Simulation of bot as the position tracker

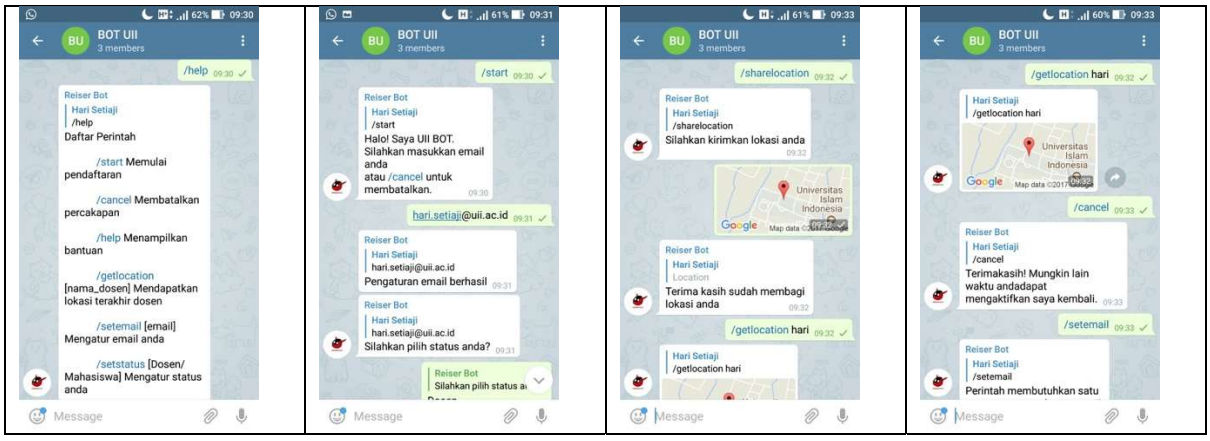

Figure 6. Full Chat bot telegram platform

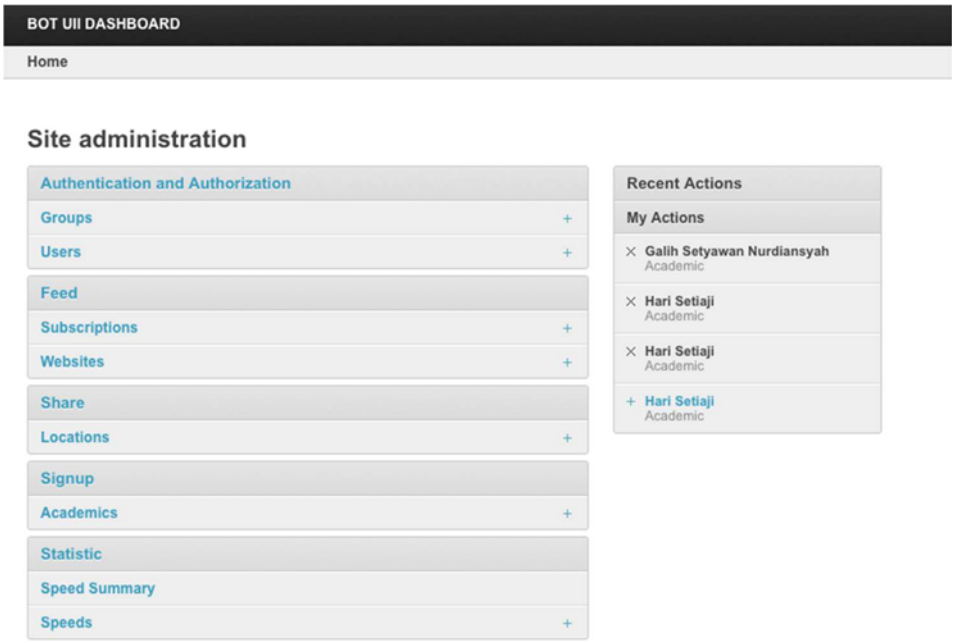

Figure 7. Web-based bot dashboard

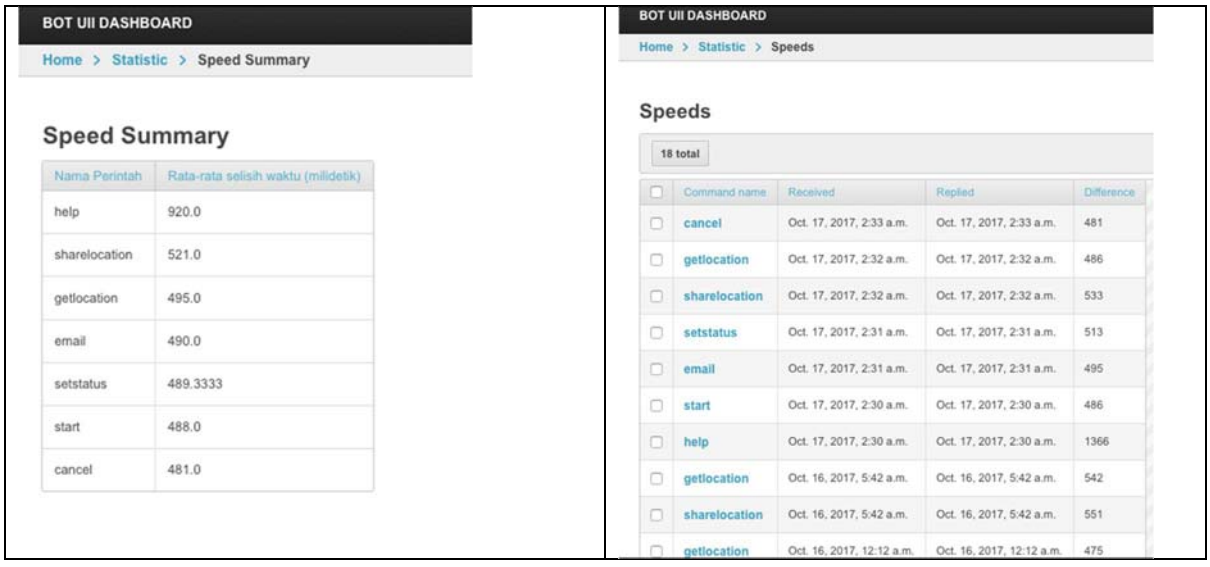

Figure 8. Response time measurement on several requests

6. Findings

There are some preliminary findings after the simulation of Telegram bot prototype. Telegram bot is able to aggregate all the information stored in the database and deliver such information to the users as requested. With some extension during code development, location can also be collected by the bot from the users and visualised clearly to the users. Analysis on the bot performance has also been conducted as shown in Figure 8. Response time was measured on different cases to see how fast the bot is responding to the requests. Bot is able to respond most of the requests in less than 0.5 seconds which is considerably satisfactory.

7. Summary

In this paper, design and prototype of Telegram bot is presented. The bot is able to perform repeated simple and complicated tasks, such as invoking and validating the information available in the database. Communication with the bot uses very simple commands and is supported by Webhooks method. Using such method, visual interface can also be developed. The development of visual interface for the chat-bot becomes the future work.

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