ECEN 5053-003 (S'19)

Assignment - 1

Submission Report

Project Details	*Description*
Created By:	**Rushi James Macwan**
Date	**17th Feb 2019**
Project Title	**Chat-Bot for easy translation in-app**
Class Name	**Developing Industrial IoT** **ECEN 5053-003 (Spring-2019)**
Credits & Courtesy for this work	**IBM Developer's Tutorials [1]**

[1] Credits & Courtesy: Use Termjat to easily translate text (By Meshaal Mohammad Alzohrah)

Credits and Courtesy for this work goes to Meshaal Mohammad Alzorah who has published the underlying work as an IBM Cloud Developer's Tutorial. I have acknowledged the same before basing my work on the same.

Also, at every occasion, I have tried to cite the work that I have used from outside sources. These citations have been numbered accordingly and can be accessed by clicking the links. I duly acknowledge the credits and courtesy to all of these resources for making this project possible.

Background:

The age of communication and predictive control of systems has today embarked on a whole new level with the growth of real-time platforms that have come up as technology advances. Quite often a new cloud application shows up with its unique features that complement the existing needs in a special way. WhatsApp, Facebook, Twitter, Telegram, etc. are only to name a few of these platforms that have grown rapidly to service the needs of human communication.

At the back-end of all of these tightly-coupled software systems, Artificial Intelligence and Human Computer Interaction (HCI) plays a quintessential role. With the help of these new frontiers of technology, it is possible to sustain the growing needs of the communication and automation industry in general. At the heart of these platforms lies the use of AI, HCI and user-defined systems that help implement and improve our needs.

This paper at its core, identifies the growing market of AI, HCI and IoT in general and how these technologies are fuelled by a project like the Chat-Bot that basically works as a medium to quickly incorporate language translation using the powerful platform of IBM Cloud. Such projects have the capacity to leverage different sectors; especially the expanding arena of the Industrial Internet-of-Things. The age where sensors and actuators are readily interconnecting with each other in the Industry 4.0 where there is a massive need of decision making tool-chains, this paper tries to address some of these topics.

In the coming sections, the paper encapsulates the gist, knowledge gained, prospects and the implementation of this project respective of the Industry 4.0 and other growing sectors.

Gist of what I did:

The paper focusses on the IBM Cloud platform and how its AI technology helps in translating the user input to the English language while using an application on any device (e.g. Windows / MAC).

The project incorporates the use of various modules as under:

- The Language Translator service
- The Language Identification service
- The Speech to Text service
- The Text to Speech service
- A Node-RED starter app
- The Telegram app installed on your mobile device

While these tools and services are essential for the deployment of this service, it is not the only way to achieve it. Platforms like IBM Cloud make this possible by providing both Platform and Infrastructure as a service to implement such massive projects in the real-scenario. Organizations

are thus equipped with the freedom to deploy and exploit virtualized IT resources – such as compute power, storage and networking – over the internet. [2]

What I did & learnt:

- With the help of the IBM Cloud Tutorial, I developed a Chat-Bot that can interact with me by understanding me through one of its supported languages and translates the information to English language.
- The Chat-Bot also has the capacity to convert the converted text to speech as an extra feature.
- This points towards an implementation with more complex set of algorithms that provide us the ability to interact with the Chat-Bot in many languages including English and the Chat-Bot would be capable of transmitting/receiving the same information to other parts of the world in a consistent language. This supports the growing standards of Industry 4.0 and AI & HCI all the way makes this better.
- This project idea in some sense does not show great complexity but is absolutely integral towards designing smarter and better AI eco-systems that are self-decisive in nature based on predictive algorithms.
- The below topic on the prospects of the focus presented in this paper is along the lines of how it matches with what I learnt in the class.

Prospects (In relation with the class-material):

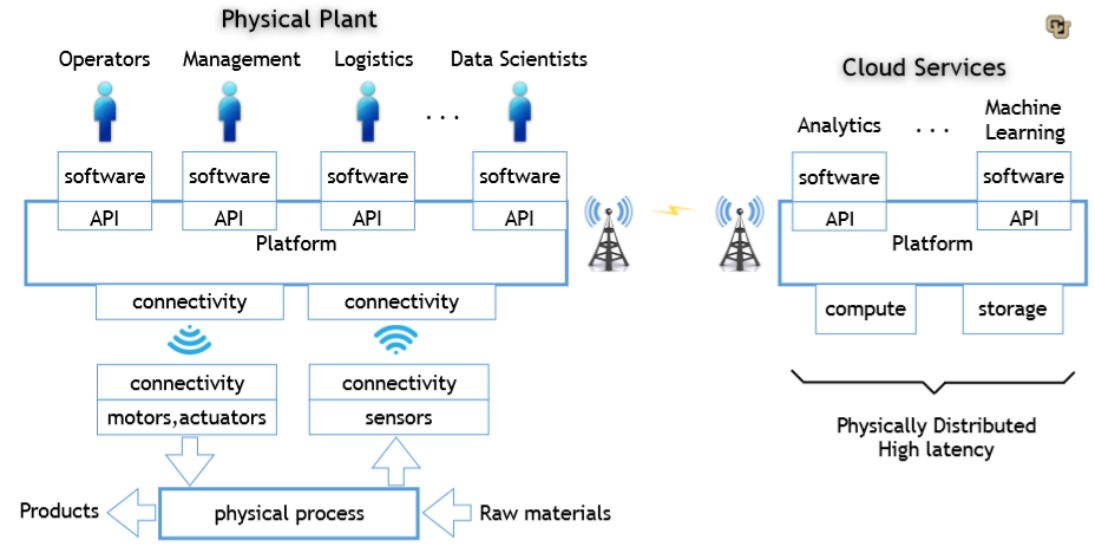
Dev-Ops in the Cloud is the new world that's shaping everything today and Industry 4.0 is a witness to it [3]. Both of them are incontrovertible elements that source today's growing services and platforms. What this means is that the use and deployment of AI powered technologies like the "Chat-Bot for easy in-app translations" serves the purpose of inter-communication over the huge platform of Dev-Ops and Industry 4.0. This can be further traced to the following environments where one or more instances prove that such projects source the essential requirements of the global world.

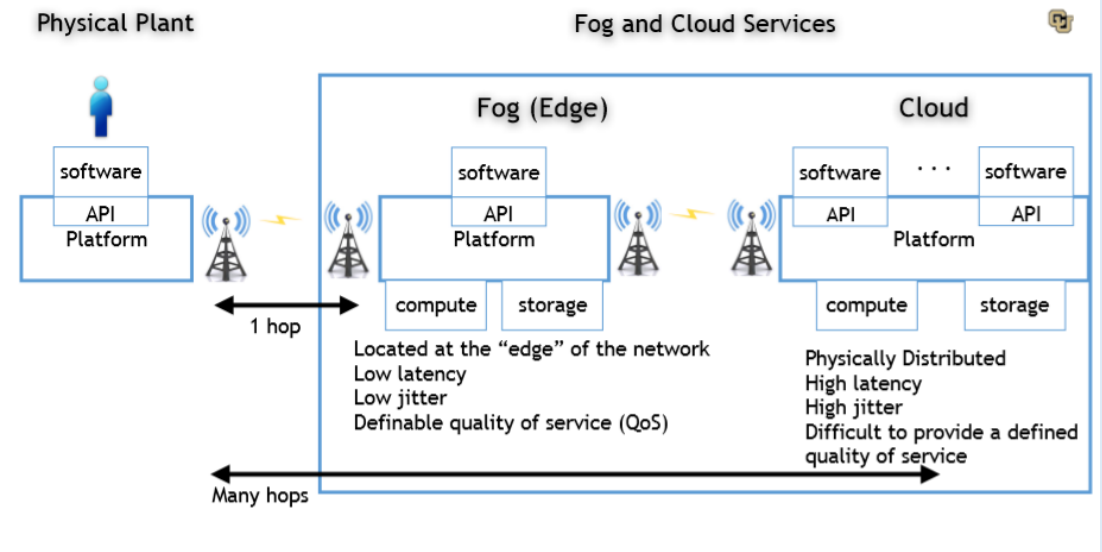
Sr No.	Sector	Description of the impacts
1.	***Industry 4.0 and into Industry 5.0***	Acknowledging the demands of the new world, Industry 4.0 entails the use of faster, reliable, flexible, inter-changeable and affordable communication standards [4]. This is because as previously mentioned, the sensors & actuators, the physical & cloud services and all the distinct elements of the Industry 4.0 will need a steady and reliable connection. In terms of the HCI, these communications will need a language that has to fit in the services irrespective of the location where the user is accessing the platform/service from. This is predominantly of significant importance in global

industries. This is where projects like the one that this paper focuses upon comes into real picture.

According to experts, companies that use machine learning processes increase their economic performance. The biggest gains are expected in the IT and finance sectors, telecommunications, and the manufacturing industry [5].

The next step is how to automate the entire Industry 4.0 cycle. Imagine the transformation that's going to happen for control systems when they can take predictions and act upon them. There's a continuous cycle that needs to be completed. There's still a lot that needs to happen in Industry 4.0 before we can start talking about Industry 5.0. AI and Industry 4.0 go together [6].





Image(s) Courtesy: Class slides provided by Prof. Sluiter

2.	***Social Media***	The secondary user of the technology that this paper focusses upon is entitled with the social media. As deemed quintessential to connect the work, the use of these natural language processing and AI tools help in furnishing better communication across the world sourced through different services like WhatsApp, Facebook, etc.  *Image Courtesy: Gigaom* With over 2.5 billion users expected to have at least one social media channel by the end of 2018, marketers are increasingly combining these platforms with emerging technologies to reach their growing audiences. Many major companies already identify AI as the way forward for progressing business. Facebook, the social networking site, invested in AI since 2013 when they acquired the services of New York University professor Yann LeCun. AI's footprints are all over Facebook, from neural networks learning to tag, to image recognition making it easier to find friends. Most of those signed up to the site would be surprised to learn that AI influences much of what they do.

Image Courtesy: Graphicgoogle.com

With 95% of British people alone purchasing products off the internet, it makes sense for companies to find a way to sell smarter. It's not uncommon now to see AI learning people's searching habits on social media so it can tailor better offers.Twitter is also working on using AI and machine learning to categorize every single tweet. The idea is to provide content people most care about at the top of their timeline. It could mean a significant shift in the way that people currently view tweets within the chronological timeline format.

Companies are better leveraging social media through artificial intelligence. It's helping them to better understand their customers buying personas, which, in theory, should help to market more relevant products.

It's practically impossible to have a brand without a social media presence, yet just being on these platforms isn't enough. They need to be utilized correctly to achieve maximum output, generate more customers and ultimately increase ROI.

However, many businesses don't have the resources to hire human staff that can monitor trends, social patterns and insights. AI is a way of solving such problems and affords marketers the freedom to be creative with their outreach [7].

Needless to say, this does indeed increase the operational efficiency in every other sector be it the Industry 4.0 or the one that we are progressing into Industry 5.0 with the support and unification of AI.

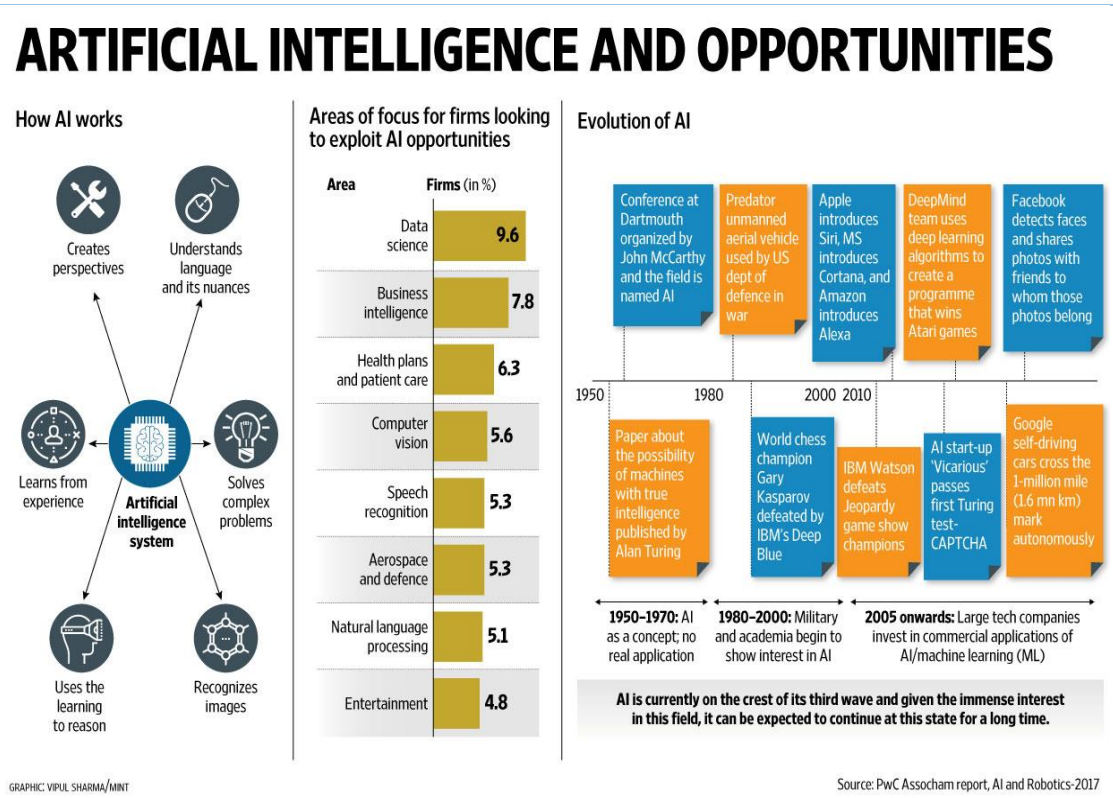


Image Courtesy: grjenkin.com

3. ***Health-Care***

Last but not the least, Health-Care is definitely into the inevitable focus.

Growth opportunities in healthcare are hard to come by without significant investment, but artificial intelligence (AI) is a self-running engine for growth in healthcare. According to Accenture analysis, when combined, key clinical health AI applications can potentially create $150 billion in annual savings for the US healthcare economy by 2026 [8].

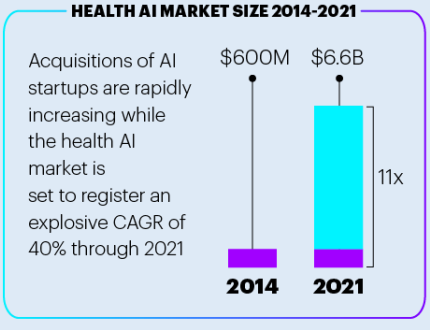


Image Courtesy: Accenture.com

In theory, artificial intelligence and machine learning (AI/ML) can be applied to nearly every process in healthcare. In practice, however, entrepreneurs, enterprise leaders, and investors need to discriminate between incremental improvements and the 10X improvements that will transform the industry.

Media attention has largely centered on the ability of AI/ML to transform how *clinical care* is delivered through better diagnostics and treatments. But AI/ML is even more quickly transforming the business of healthcare through automation and enhancement of non-clinical, operational functions—such as claims adjudication, patient engagement, scheduling optimization, risk analytics, and documentation [9].

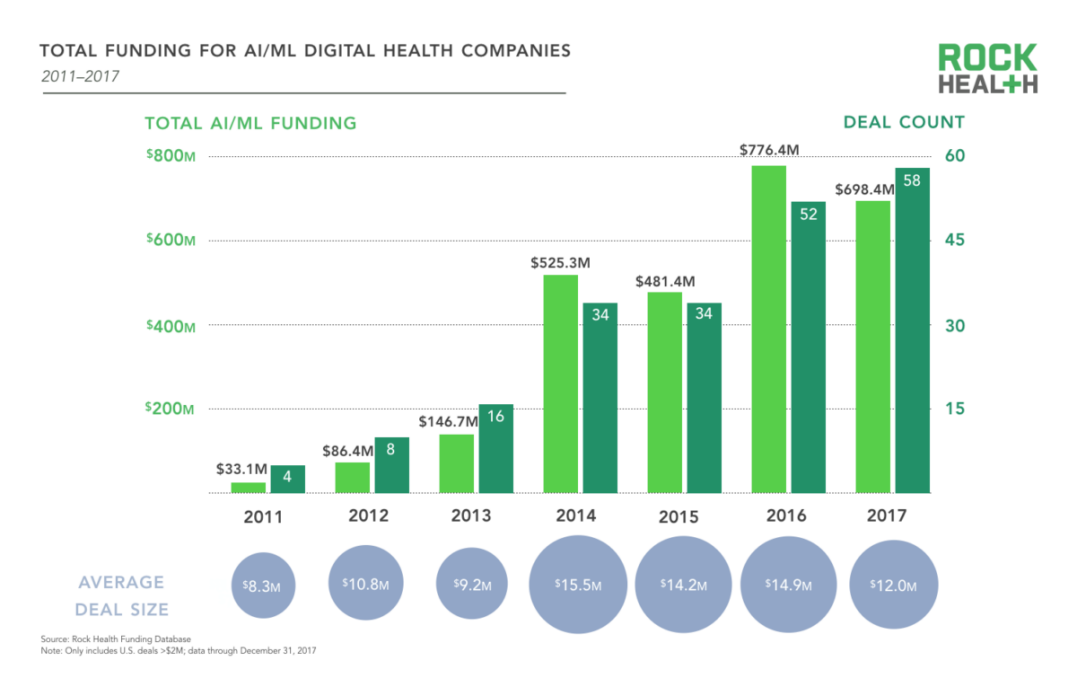
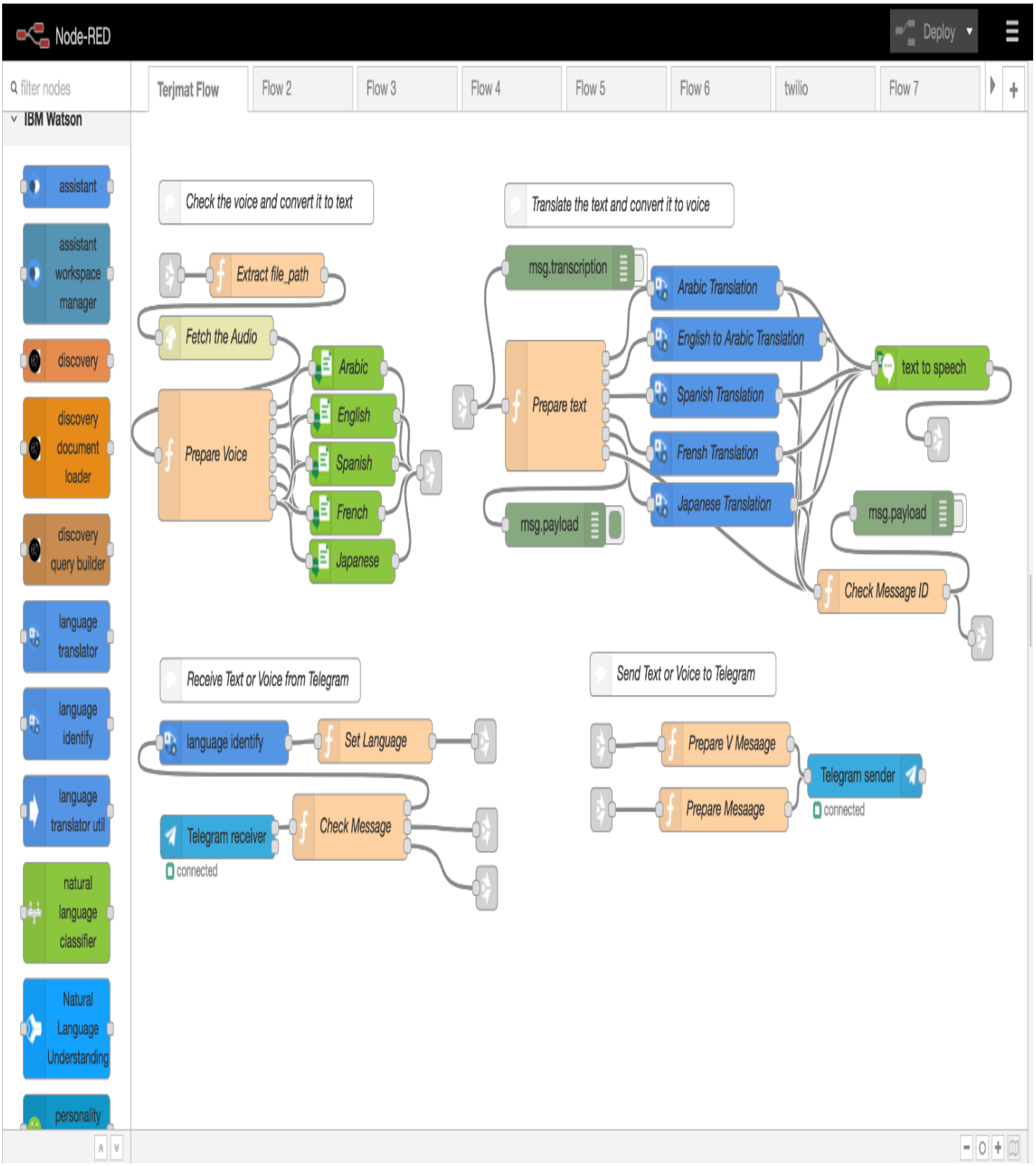


Image Courtesy: rockhealth.com

These were some of the relevant sectors where the growth of such technologies can help boost and leverage new standards. As AI and HCI unite with the Industry 4.0 and other sectors alike, the growth and operational efficiency of things start to grow exponentially.

A glimpse of the cloud application:

The IBM Cloud application that I built for this paper is based upon the below Node-Red clipboard development: *(Image Courtesy: IBM Cloud)*



The project therefore can be broken down into three steps:

1. Creating a bot on Telegram
2. Developing the complete application on Node-RED Editor
3. Integrating the entire project

With the help of the below three services, the Node-Red Editor supports the required tool-chains:

1. Language Translator
2. Speech-to-text
3. Text-to-Speech

To summarise, this project can fulfil the following processes:

1. Can translate your input text/speech from a supported language and provide the text/speech in English
2. With advanced implementation, it can allow you to communicate with bots in languages other than English
3. Bots can thus develop the ability to address human interaction on the global stage

Citations:

[1] - Use Terjmat to easily translate text
[2] - IBM Cloud (formerly IBM Bluemix and IBM SoftLayer)
[3] - DevOps
[4] - Industry 4.0
[5] - Machine learning: artificial intelligence in Industrie 4.0
[6] - Artificial Intelligence and Industry 4.0 - Taking the Plunge
[7] - The Impact of Artificial Intelligence on Social Media
[8] - AI: AN ENGINE FOR GROWTH
[9] - The AI/ML use cases investors are betting on in healthcare