IT2025 Supplementary Note 06

December 2, 2025

1 Roles of an LLM : Interface, Interpreter and Assistant

Due to the advancement of large language models, like ChatGPT and Gemini, and their associated foundation models, various application systems could be easily developed in the form of agents to facilitate business process automation. Figure 1 shows the stack of these modules.

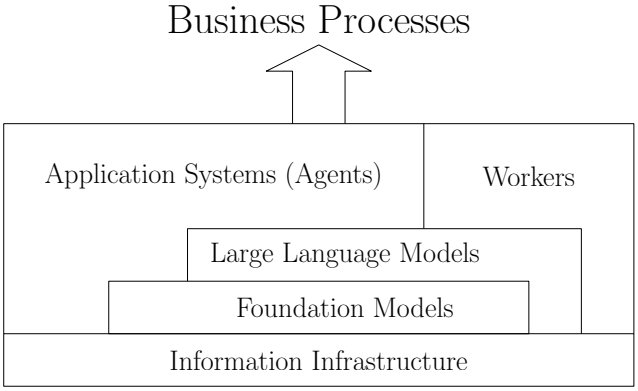

Figure 1: The stack of LLM and agents. LLM plays the vital role in business process automation and re-engineering.

1.1 Information Infrastructure

The layer *information infrastructure* includes the Internet, the telecommunication networks, the database systems, cloud platforms, computers and others. This layer provides services to support the upper layers in terms of data/information storage, data/information processing and numerical computation.

1.2 Foundation Models

The layer *foundation models* covers a number of generative AI models, including LLMs, LRMs, text-to-image generators, text-to-video generators, text-to-audio generators, translators. These foundation models provide services mainly to support the *LLM layer* and the agents.

1.3 Large Language Models

Each LLM in the layer *large language models* acts as an interface[1] in between the application systems (resp. workers) and the foundation models (resp. information infrastructure). Workers

[1] An LLM acts as a programming language interpreter. For a program its commands are coded by an interpreted language, the interpreter converts each command to a machine code sub-routine and then executes the sub-routine right the way. Afterward, the interpreter converts and executes the next command. The process repeats until no more command left.

benefit the most from the LLM as each LLM is able to understand human language. To instruct an LLM to complete a simple task, a worker can simply type the instructions in natural language and then the LLM will do it accordingly. A worker does not have to learn any new programming language.

1.4 Application Systems (Agents)

The *application systems* are responsible for completion of those jobs which are pre-assigned. In simple words, each application system is an agent. It acts on behalf of a worker to complete a job which is used to be completed manually.

1.5 A Talk with Google Gemini

On November 29, 2025, John Sum had talked to Google Gemini on his observation and perception that the current development of an LLM is towards a natural language interpreter and orchestrator. Google Gemini agreed John Sum's observation and perception. Not just Google is moving towards that direction, but also other LLM developers. This trend (resp. goal) has insofar been documented in internal technical reports only.

To the ultimate end, an LLM will be an *operating system orchestrating* the *foundation models* and other *supporting agents* to complete a task specified. A couple of names that I can think of are *executive*, *assistant* and *companion*.

2 Supporting Business Processes

The ultimate purpose of these layers is to support the business processes of a firm, see Figure 2. In it, the *information/physical infrastructure* is an extension of the *information infrastructure* as shown in Figure 1.

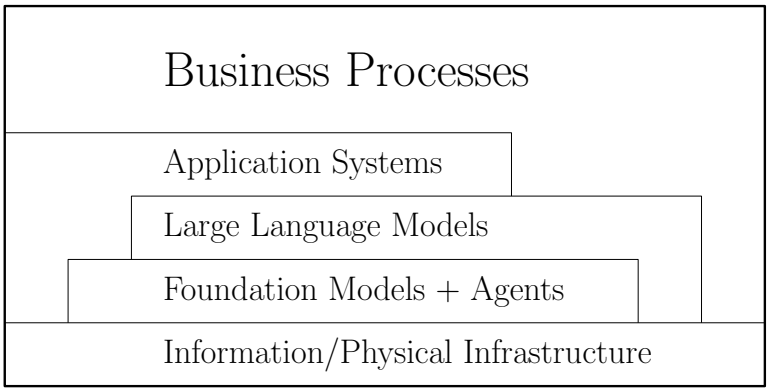

Figure 2: The ultimate purpose of the layers of technologies is to support the business processes of a firm. The physical infrastructure embraces the physical facilities, machines and human resources.

2.1 Information/Physical Infrastructure

The *information/physical infrastructure* covers not just the infrastructure for the information, but also the infrastructure for the physical facilities and human resources. Thus, the *information/physical infrastructure* manages (i) all the resources (including but not limited to information resource, financial resource and human resource) within a firm and (ii) the resources available for public (over or not over the Internet).

2.2 Interactions Among Layers

In Figure 2, a business process is accomplished by a number of human workers together with the underlying application systems. A human worker in a business process might need to directly interact with (i) an LLM, (ii) the foundation models, (iii) the agents or (iv) the *information/physical infrastructure* to complete a task.

A human worker could simply interact with an LLM to complete the task. But, human worker might also interact with the resources in the *information/physical infrastructure* to complete the task. For an application system, it could interact with an LLM to complete its task. Besides, it could interact with the *foundation models + agents* layer and/or the *information/physical infrastructure* layer to complete a task. Clearly, a smart human worker could skip the LLMs layer and directly interact with the *foundation models + agents* layer and/or the *information/physical infrastructure* layer to complete a task. However, this part is not shown in Figure 2 due to the 2D diagram constraint.

2.3 Human in a Business Process/Application System

Here, we consider that human worker is a part of a business process and/or an application system. In convention, an application system is normally developed entirely by accessing the foundation models and the pre-developed systems in the *information infrastructure* layer without needed to access any LLM. With the LLMs, a worker in a business process and/or an application system can develop his/her personalized application systems which entirely rely on top of the LLMs but not the underlying *foundation models* layer or *information/physical infrastructure* layer.

2.4 Business Process Automation/Reengineering

Recent successes can be witnessed from the incorporating of the LLMs in *knowledge management processes* and *adminstration processes* in a firm, in which the processes require a lot of (i) information collection and processing; and (ii) document generation. The LLMs automates these tasks without changing the design of the existing the *knowledge management processes* and *adminstration processes*.

To succeed a radical improvement, business processes might have to be co-designed with the supporting application systems. That is to say, business process re-engineering[2] might be needed.

3 Go Beyond

To go beyond, the success of an LLM as a user interface[3] could lead to a *drastic convenience* in global resource access. A user does not have to learn from a bunch of *instruction manuals* on the commands or the procedures in accessing those resources. As long as those resources are accessible, the LLM will act on behalf of the user to access them, see Figure 3.

3.1 LLM-as-a-Service

Once a user has a task to be accomplished, the user can simply give *verbal instructions* to an LLM. Then, the LLM will (i) interpret the instructions, (ii) orchestrate the appropriate foundation models, agents and other available software systems, (iii) access those available resources on the globe, (iv) complete the task and (v) report the results to the user.

In other words, the future LLMs and the underlying technologies could support a user to (i) access any global information/physical resource and (ii) complete a task on his/her behalf. If we follow the terminology from cloud technology, I will say that LLM-as-a-service. It is in analog to

[2]Hammer, Micheal (1990). Reengineering work: Don't automate, obliterate, *Harvard business review*, 68(4), 104-112. Wikipedia: `https://en.wikipedia.org/wiki/Business_process_re-engineering`.

[3]Clearly, we can consider an LLM as a personal assistant, as described in Section 1.

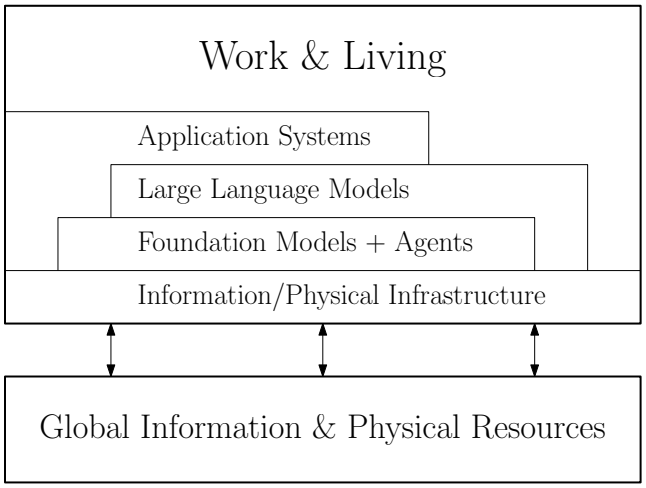

Figure 3: The LLMs and the underlying technologies could support a user to (i) access any global information/physical resource and (ii) complete a task on his/her behalf.

software-as-a-service or *platform-as-a-service*. Besides, we could also say that an LLM is an agent, a personal assistant or a companion.

3.2 LLM as an Interface to the Global Virtual Computer

Once we consider the Internet together with the resources being connected as a virtual computer, the LLMs are now the user interfaces for this global-wise virtual computing machine. The number of users of this global computer will definitely raise drastically in the coming years.

While the number of users to the global computer raises, the number of LLM users will definitely raise. Owing to their user-friendly nature, users will likely be relying a lot more on these LLMs. Almost every person in the world will be binding to at least one LLM for his/her work and living. To this end, privacy preservation will be a critical issue to every user. *How to protect our privacy during our use the LLMs for work and living becomes an important problem every user has to solve.*

4 From a Course Project to a Master Thesis

Now, some of you have almost completed a sound report. These reports cover your experiences in the use of some AI tools for certain simple tasks. So, these reports can be considered as some case studies. To make your work to be excellence. You can try to answer the following questions.

1. Am I the first one interested in this task? If no, who have done similar work as me and what have they found.
2. Would there be any academic research related to my work? If yes, what the points are they claimed?
3. What are the similarities and differences between their works and mine?
4. Could my work be made more completed? How?