

# Portfolio

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Home page: <https://quangbk.github.io>

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Medium Blog: <https://gartist.medium.com>

June 2023

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## 1 Automated chatbot with Tools

- Develop a ReAct agent: chatbot and QA agent with Large Langue Models.
- Interact with humans, looking for knowledge from search tools for answering questions.
- Optimize with small LLMs (Vicuna 13B, WizardML 7B, etc.).
- GitHub repository: [https://github.com/QuangBK/localLLM\\_guidance](https://github.com/QuangBK/localLLM_guidance).
- Blog: “[A Simple Agent With Guidance and Local LLM](#)”.

Figure 1: Demo of our chatbot.

**Demo ReAct agent with Guidance**

The source code can be found at: [https://github.com/QuangBK/localLLM\\_guidance/](https://github.com/QuangBK/localLLM_guidance/)

Input Text

[Clear](#) [Submit](#)

Reasoning

### Input:  
How much is the salary of number 8 of Manchester United?

### Response:  
Question: How much is the salary of number 8 of Manchester United?  
Thought: I need to find out the number 8 of Manchester United.  
Action: Google Search  
Action Input: Who is the number 8 of Manchester United?  
Observation: Bruno Fernandes is the current incumbent of the famous No. 8 shirt at Manchester United – but how does he rank among his predecessors?  
Thought: I should look up Bruno Fernandes's salary.  
Action: Google Search  
Action Input: What is Bruno Fernandes's salary?  
Observation: His leadership and proficiency have powered the Red Devils post-Ronaldo -- Boardroom looks closer at Man United's Bruno Fernandes contract and wage particulars. Bruno Fernandes joined Manchester United in January 2020 from Sporting CP, instantly increasing his salary from \$59,717 to \$289,418 per week. Apr 3, 2023  
Thought: I now know the final answer.  
Action: Google Search  
Action Input: How much is Bruno Fernandes's salary?  
Observation: 2.6 million GBP [2011]  
Thought: I should convert the salary to USD.  
Final Answer: Bruno Fernandes's salary is approximately 3.3 million USD.

Final Answer

Bruno Fernandes's salary is approximately 3.3 million USD.

[Flag](#)

## 2 Generative Agent and Environment

- Develop a complete simulation world with both automated agents and environments.
- Optimize with small LLMs.
- Generative agents: can think, make plans, act, and react to the environment. Can be NPCs in “The Sims”.
- GitHub repository: [https://github.com/QuangBK/generativeAgent\\_LLM](https://github.com/QuangBK/generativeAgent_LLM).
- Blog: “[Implementing Generative Agent With Local LLM, Guidance, and Langchain](#)”.

Figure 2: Generative agent: reaction.

It is Friday June 02, 2023, 18:15 now.

Sam's status: Relax and watch TV

Observation: The dog bowl is empty

Reaction: Sam could put food in the dog's bowl and then call Max over to eat.

Figure 3: Generative agent: planning.

### Response:

Here is Sam's plan from now at Friday June 02, 2023, 18:15:

[From 18:15 to 18:45]: Relax and watch TV  
[From 18:45 to 19:30]: Cook dinner  
[From 19:30 to 20:30]: Finish the CSGO game  
[From 20:30 to 21:30]: Study for the AI course

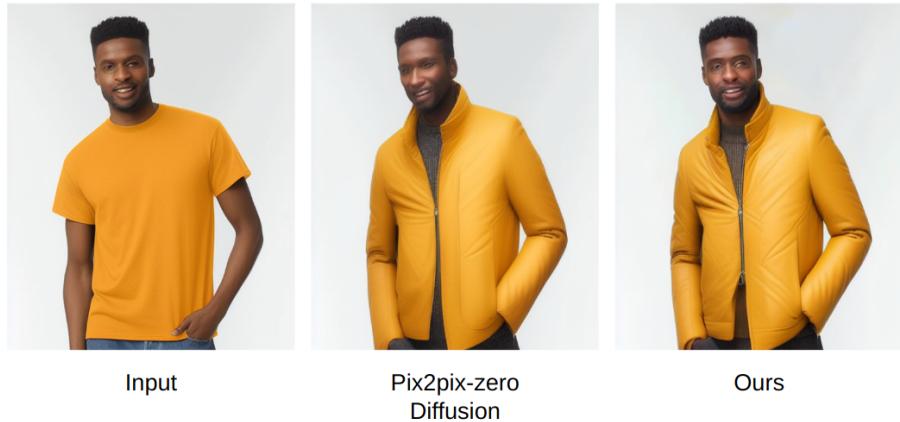
```
:     print(status)
```

Relax and watch TV

### 3 Semantic preservation for Image editing (On-going project)

- Based model: Stable Diffusion model.
- Try to control the semantic information with text conditions.

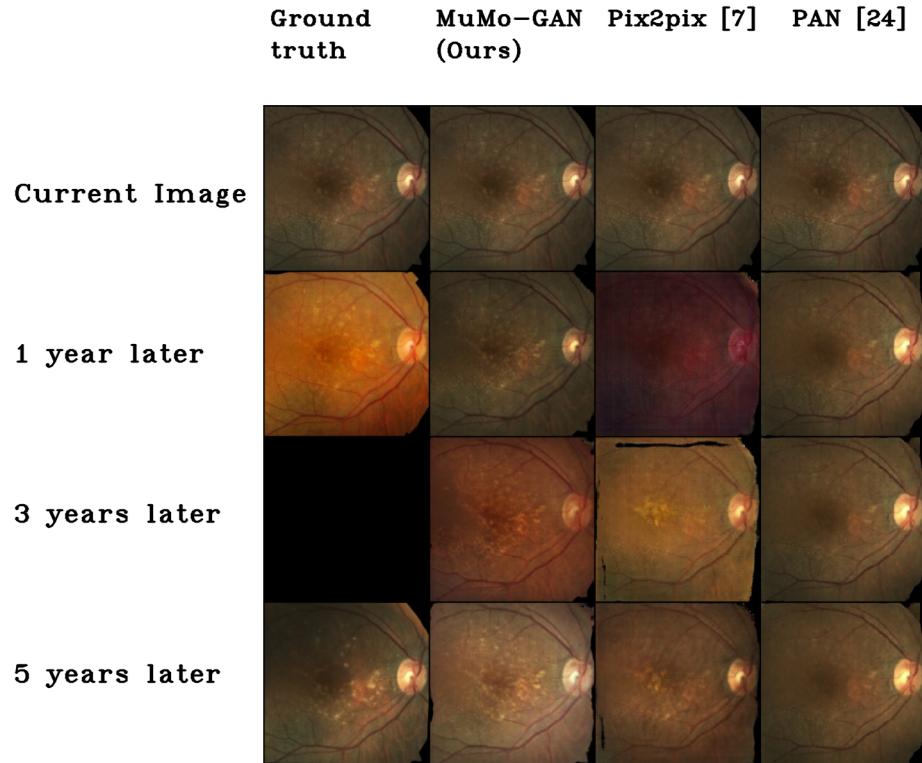
Figure 4: Comparison between our method and others.



## 4 Future fundus image prediction

- Propose a framework to predict future fundus images for AMD patients.
- Combine the GAN model for image generation and the segmentation model for Drusen detection.
- Paper: “[Generating future fundus images for early age-related macular degeneration based on generative adversarial networks](#)”.

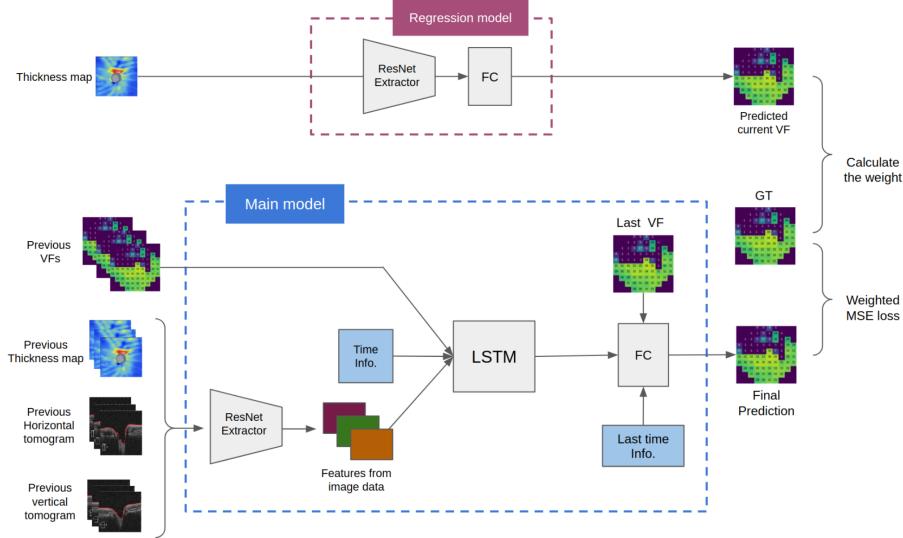
Figure 5: Future fundus images generated by our method and compared methods.



## 5 Future visual field prediction

- Propose a framework to predict the visual field for glaucoma patients.
- Combine CNN and LSTM models to deal with multimodal.
- Deal with limited and missing data: propose a new loss function and a new learning scheme.
- Paper: “Multimodal Deep Learning Model of Predicting Future Visual Field for Glaucoma Patients” and “Visual Field Prediction with Missing and Noisy Data Based on Distance-Based Loss”.

Figure 6: Overview of our framework: a combination of CNN and LSTM.



## 6 Face aging with StyleGAN

- Propose a framework for the face aging task: predict the future/past of the human face.
- Introduce a semi-supervised method.
- Using Conditional StyleGAN and a proposed GAN to deal with unpaired datasets.
- Paper: “[Semi-Supervised FaceGAN for Face-Age Progression and Regression with Synthesized Paired Images](#)”.

Figure 7: Comparison between our method and others.

